

TOWN OF AGAWAM AGAWAM, MA

WHITE BROOK OVER NORTH STREET CULVERT REPLACEMENT BRIDGE NO.: A-05-034, BIN NO: CH5

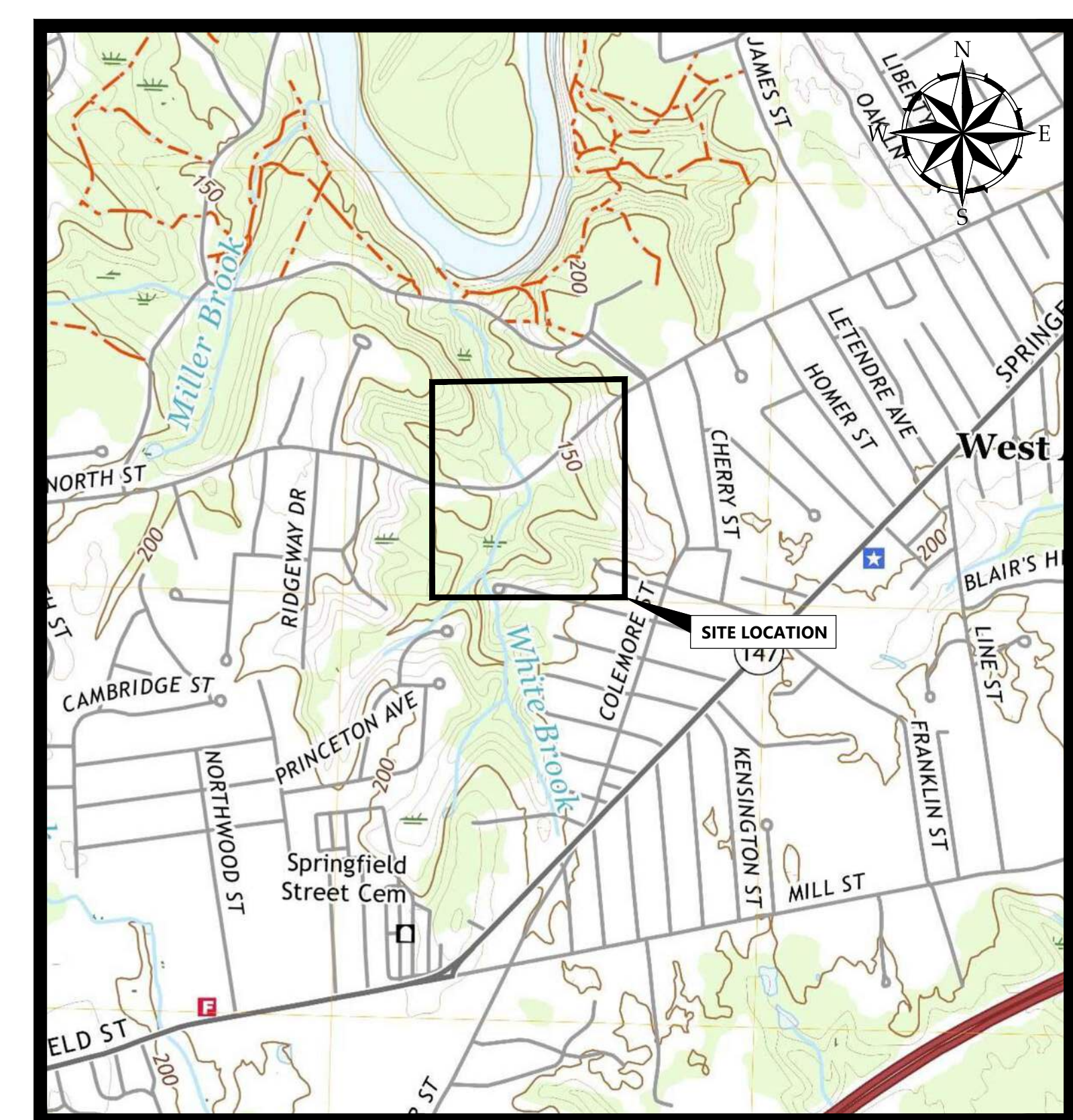
JUNE 2023

ISSUED FOR BID



PROJECT LOCATION MAP

DRAWING INDEX		
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2	G-001	GENERAL NOTES & LEGEND
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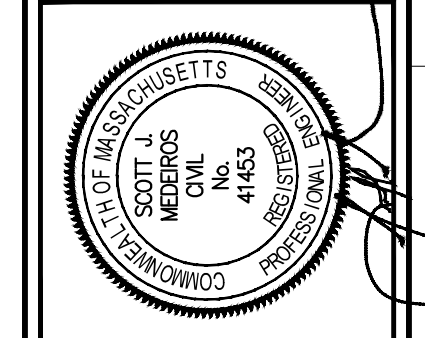


SITE LOCATION MAP
SOURCE: USGS TOPO QUADRANGLE

40 Shattuck Road, Suite 110
Andover, Massachusetts 01810
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Woodard & Curran
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REV	DESCRIPTION	DATE	DESIGNED BY	CHECKED BY	DATE
1	METAL INVERT REVISION	2/16/2023	RT	RT	
2	RESPONSE TO DFP COMMENTS	2/19/2023	BCM	BCM	

COVER SHEET

TOWN OF AGAWAM
AGAWAM, MA

WHITE BROOK OVER
NORTH STREET CULVERT
REPLACEMENT

JOB NO:	0234052.00
DATE:	JUNE 2023
SCALE:	AS NOTED
SHEET:	1 OF 12

G-000

ISSUED FOR BID

WoodardCurran.net\blairm\Projects\0234052.00_Agawam MA - North Street Culvert\FS\wp\Drawings\General\0234052.00-G-000.dwg, Jun 21, 2023, 8:57am, BMCDEVIT

GENERAL NOTES:

- 1. EXISTING CONDITIONS ARE BASED ON A SURVEY PREPARED BY WSP USA INC., TITLED, "EXISTING CONDITIONS AND TOPOGRAPHIC SURVEY NORTH STREET AGAWAM, MASSACHUSETTS," DATED JANUARY 10, 2020, BASED ON AN ACTUAL ON THE GROUND FIELD SURVEY PERFORMED IN NOVEMBER 2020 AND OCTOBER 2021.
2. CONTRACTOR SHALL INVESTIGATE EXISTING CONDITIONS AND FIELD VERIFY LOCATIONS, DEPTH, AND SIZE OF UTILITIES AND SUB-SURFACE STRUCTURES PRIOR TO CONSTRUCTION.
3. THE HORIZONTAL DATUM SHOWN HEREON IS THE MASSACHUSETTS STATE COORDINATE GRID, MAINLAND ZONE, NORTH AMERICAN DATUM OF 1983.
4. THE SUBJECT PROPERTY IS NOT LOCATED WITHIN A MAPPED FLOOD ZONE AREA ACCORDING TO FLOOD INSURANCE RATE MAP NO. 2501300383E, EFFECTIVE ON 07/16/2013.
5. ANY PROPERTY AND RIGHT OF WAY LOCATIONS THAT MAY BE SHOWN HEREON ARE APPROXIMATE AND DO NOT REPRESENT A PROPERTY BOUNDARY SURVEY.
6. WOODARD & CURRAN ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN.
7. COORDINATE CONSTRUCTION ACTIVITY WITH UTILITY COMPANIES, EMERGENCY SERVICES AND TOWN. CONTRACTOR SHALL NOTIFY ALL UTILITIES PRIOR TO COMMENCING WORK, ALLOWING SUFFICIENT TIME TO LOCATE AND MARK THE LOCATION OF BURIED UTILITIES.
8. RESTORE ALL AREAS DISTURBED BY CONTRACTOR'S OPERATIONS TO ORIGINAL FINISH (GRAVEL, PAVEMENT, GRASS, ETC.) UNLESS NOTED OTHERWISE ON THE PLANS.
9. PROPERLY PROTECT AND DO NOT DISTURB PROPERTY IRONS AND MONUMENTS. IF DISTURBED, THE PROPERTY MONUMENT SHALL BE RESET AT THE CONTRACTOR'S EXPENSE BY A LICENSED LAND SURVEYOR ACCEPTABLE TO THE TOWN.
10. EXISTING FACILITIES (I.E. TREES, POLES, LIGHT POSTS, CATCH BASINS, ETC.) SHALL BE REMOVED AND/OR PROTECTED DURING CONSTRUCTION.
11. ALL TREES NOT NOTED TO BE REMOVED OR RELOCATED SHALL BE PROTECTED BY CONTRACTOR DURING CONSTRUCTION.
12. RESTRICT ACCESS TO SITE THROUGH THE USE OF APPROPRIATE SIGNAGE, BARRIERS, FENCES, ETC.
13. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSTRUCTION PERMITS.
14. ALL WORK ASSOCIATED WITH THE PROJECT SHALL BE COMPLETED IN ACCORDANCE WITH THE TOWN OF AGAWAM BYLAW AND LOCAL REGULATIONS AND MASSACHUSETTS DOT STANDARD SPECIFICATIONS.
15. UPON COMPLETION OF CONSTRUCTION, A COMPLETE SET OF "RECORD" DRAWINGS SHALL BE SUBMITTED TO THE TOWN ENGINEER.
16. PROTECTION OF EXISTING UTILITIES DURING CONSTRUCTION SHALL BE PROVIDED AT NO ADDITIONAL COST.
17. CONTRACTOR SHALL BE RESPONSIBLE FOR SWEEPING NORTH STREET EVERY FRIDAY AND AS NECESSARY DURING THE DURATION OF THE WORK.
18. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL ATTEND A PRE-CONSTRUCTION MEETING HELD AT THE PROJECT SITE WITH THE CONTRACTOR, ENGINEER, OWNER, AND CONSERVATION OFFICE TO REVIEW THE CONSTRUCTION SCHEDULE AND SEQUENCING, ORDER OF CONDITIONS, STOCKPILE LOCATIONS AND CRITICAL ASPECTS OF THE PROJECT.
19. ALL DISTURBED UPLAND AREAS SHALL BE BROUGHT TO FINAL GRADE AND SHALL BE PERMANENTLY STABILIZED WITHIN 30 DAYS AFTER DISTURBANCE.
20. CONTRACTOR SHALL DEMARCAT CONSTRUCTION EQUIPMENT AND MATERIAL STORAGE AREAS PRIOR TO CONSTRUCTION.
21. THE CONSTRUCTION SITE SHALL BE MAINTAINED IN CLEAN CONDITIONS AT ALL TIMES AND CONSTRUCTION REFUSE AND DEBRIS SHALL BE DISPOSED OF PROMPTLY AND IN A LEGAL MANNER.
22. STORING, SERVICING, OR CLEANING OF TRUCKS OR EQUIPMENT SHALL BE PERFORMED IN AN UPLAND AREA AT A HORIZONTAL DISTANCE GREATER THAN 100 FEET FROM THE WETLAND RESOURCE AREAS.
23. WETLAND DELINEATION WAS PREPARED BY LEC ENVIRONMENTAL CONSULTANTS, INC.
24. ALL FUELING SHALL TAKE PLACE ON HARD/PAVED SURFACES AND OUTSIDE THE 100-FOOT BORDERING VEGETATED WETLAND BUFFER.

DEWATERING NOTES:

- 1. AT LEAST 1 WEEK PRIOR TO THE PRECONSTRUCTION CONFERENCE THE CONTRACTOR SHALL PROVIDE THE CONSERVATION OFFICE WITH A DEWATERING PLAN SPECIFIC TO EACH SITE FOR APPROVAL.
2. INSTALL A DEWATERING SYSTEM AS NEEDED TO KEEP SUBGRADES DRY AND CONVEY GROUNDWATER AWAY FROM EXCAVATIONS.
3. ALL DEWATERING ACTIVITIES SHALL MEET LOCAL, STATE, AND FEDERAL REGULATIONS.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL LABOR AND EQUIPMENT REQUIRED TO PERFORM THE WORK INCLUDING BUT NOT LIMITED TO PROPER SHORING, DEWATERING EQUIPMENT, AND WATER TREATMENT EQUIPMENT.
5. IN ACCORDANCE WITH THE TIME OF YEAR RESTRICTIONS SET FORTH IN THE U.S. ARMY CORPS OF ENGINEERS GENERAL PERMIT FOR MASSACHUSETTS GENERAL CONDITION 16, ALL SILT-GENERATING, IN-WATER WORK SHALL BE CONSTRUCTED BETWEEN JULY 1ST AND FEBRUARY 28TH.
6. ALL DREDGING OPERATIONS SHALL BE CONDUCTED FROM UPLAND AREAS.
7. ALL DREDGE SPOILS SHALL BE DEWATERED AND DISPOSED OF AT AN UPLAND LOCATION (OR OTHER APPROVED LOCATION).
8. THE REMOVAL OF MATERIAL FROM THE STREAM BOTTOM SHALL BE DONE IN SUCH A MANNER AS TO ENSURE THE RECONFIGURED BOTTOM AREA WILL NOT IMPEDE OR OBSTRUCT FISH MIGRATION, OR INTERFERE WITH THE NATURAL FLOW OF THE BROOK.
9. DEWATERING ACTIVITIES SHALL BE MONITORED DAILY TO ENSURE THAT SEDIMENT LADEN WATER IS APPROPRIATELY SETTLED PRIOR TO DISCHARGE TOWARD THE RESOURCE AREAS.
10. BYPASS WATER AND RESIDUAL WATER SHALL BE COMPLETELY SEGREGATED.
11. HEATED OR SEDIMENT LADEN WATER SHALL NOT BE ALLOWED TO DIRECTLY ENTER THE STREAM.

EROSION CONTROL NOTES:

- 1. EROSION CONTROL DEVICES SHALL REMAIN IN PLACE, UNTIL ALL DISTURBED SURFACES HAVE BEEN STABILIZED WITH FINAL VEGETATION COVER OR THE COMMISSION HAS AUTHORIZED THEIR REMOVAL.
2. EROSION CONTROL MEASURES AND BARRIERS SHALL BE MONITORED DAILY AND MAINTAINED, OR REINFORCED AS NECESSARY TO ENSURE AND PREVENT EROSION AND SILTATION OF SOILS TO WETLAND RESOURCE AREAS.
3. DURING ALL PHASES OF CONSTRUCTION, ALL DISTURBED OR EXPOSED AREAS OUTSIDE THE ROADWAY SHALL BE BROUGHT TO FINISHED GRADE AND EITHER A) LOAMED AND SEEDED FOR PERMANENT STABILIZATION, IN ACCORDANCE WITH U.S. SOIL CONSERVATION SERVICE PROCEDURES, OR B) STABILIZED IN ANOTHER WAY APPROVED BY THE COMMISSION.
4. AN ADEQUATE STOCKPILE OF EROSION AND SEDIMENTATION CONTROL MATERIALS SHALL BE ON SITE AT ALL TIMES FOR EMERGENCY OR ROUTINE REPLACEMENT.
5. ANY DAMAGE CAUSED AS A DIRECT RESULT OF CONSTRUCTION TO THE WETLAND RESOURCE AREAS SHALL BE REPAIRED, RESTORED AND/OR REPLACED.
6. THE FOLLOWING REPRESENTS THE GENERAL OBSERVATION AND REPORTING PRACTICES THAT SHALL BE FOLLOWED AT ALL TIMES.
7. ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CONSTRUCTED IN ACCORDANCE WITH THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES AND VOLUME TWO OF THE MASSACHUSETTS STORMWATER MANAGEMENT HANDBOOK.
8. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL INSTALL ALL EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN ON THE PLAN OR AS DICTATED BY THE TOWN OF AGAWAM.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE TIMELY INSTALLATION, INSPECTION, MAINTENANCE, AND/OR REPLACEMENT OF ALL TEMPORARY AND PERMANENT EROSION CONTROL DEVICES TO ENSURE PROPER OPERATION THROUGHOUT THE LIFE OF THE PROJECT.
10. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CLEAN ROADS, CONTROL DUST, AND TAKE ALL NECESSARY MEASURES TO ENSURE THAT THE SITE AND ALL ROADS BE MAINTAINED IN A MUD AND DUST FREE CONDITION AT ALL TIMES THROUGHOUT THE DURATION OF CONSTRUCTION.
11. ANY PROPOSED CATCH BASINS THAT MAY BE SUBJECT TO SEDIMENTATION PROCESSES SHALL HAVE SILT SACKS INSTALLED TO PREVENT SEDIMENT FROM ENTERING THE PROPOSED STORM DRAINAGE SYSTEM PRIOR TO PERMANENT STABILIZATION OF THE SITE.
12. IMMEDIATELY PRIOR TO THE END OF CONSTRUCTION OR ACCEPTANCE BY THE OWNER, THE CONTRACTOR SHALL INSPECT ALL ON-SITE STORMWATER MANAGEMENT FACILITIES AND CLEAN AND FLUSH AS NECESSARY.

CONSTRUCTION SEQUENCING:

- 1. INSTALL TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES, INCLUDING COFFER DAM, TURBIDITY CURTAIN, AND SEDIMENT BARRIERS.
2. SUPPORT EXISTING UTILITIES TO REMAIN WITHIN THE PROJECT AREA;
3. REMOVE AND DISPOSE OF EXISTING CULVERT STRUCTURE, AND OTHER ITEMS MARKED FOR REMOVAL AS SHOWN ON THE PROJECT PLANS;
4. INSTALL REPLACEMENT CULVERT, HEADWALLS, AND OTHER ITEMS AS SHOWN ON THE PROJECT PLANS;
5. REPAIR ANY TEMPORARY DISTURBANCE TO ADJACENT STREAM BED AS NECESSARY;
6. BACKFILL CULVERT;
7. STABILIZE SIDE SLOPES WITH EROSION CONTROL MATTING AND LOAM AND SEED ALL DISTURBED AREAS;
8. REMOVE TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES UPON VEGETATIVE STABILIZATION AND AUTHORIZATION FROM THE AGAWAM CONSERVATION COMMISSION.

CHAPTER 85 SECTION 35 REVIEW AND APPROVAL

- 1. IN ACCORDANCE AND COMPLIANCE WITH THE REQUIREMENTS OF CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS, THE CONTRACTOR SHALL SUBMIT TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION ALL CONSTRUCTION DRAWINGS AND DESIGN CALCULATIONS THAT SHALL BE USED TO FABRICATE AND CONSTRUCT THE STRUCTURE DENOTED ON THESE PLANS FOR REVIEW AND APPROVAL.

Table with 2 columns: PROJECT NOTES, PROJECT FILE NO.: 0234052.00, PROJECT DESCRIPTION: NORTH STREET CULVERT REPLACEMENT PROJECT, BRIDGE DESIGN LOADING: HL-93, SURVEY: OBTAINED FROM PLAN ENTITLED: "EXISTING CONDITIONS AND TOPOGRAPHIC SURVEY NORTH STREET, AGAWAM, MASSACHUSETTS," DATED JANUARY 10, 2020, BASED ON ACTUAL ON THE GROUND FIELD SURVEY PERFORMED IN NOVEMBER 2020 AND OCTOBER 2021, ELEVATION REFERENCE: NAVD OF 1988

MASSDOT CONSTRUCTION NOTES

DESIGN: IN ACCORDANCE WITH THE 2017 AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS, AND MASSDOT LRFD BRIDGE MANUAL - 2013 EDITION WITH REVISIONS.

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

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

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

SEISMIC GROUND SHAKING HAZARD: DESIGN RETURN PERIOD: 1,000 YEAR RETURN PERIOD IN ACCORDANCE WITH 2020 MASSDOT LRFD / 2011 AASHTO LRFD DESIGN SPECTRA: SDS = 0.326, S01 = 0.132, SITE CLASS = E, SEISMIC DESIGN CATEGORY (SDC) = A

ANCHOR BOLTS: ALL ANCHOR BOLTS SHALL BE SET BY TEMPLATE BEFORE THE CONCRETE IS PLACED.

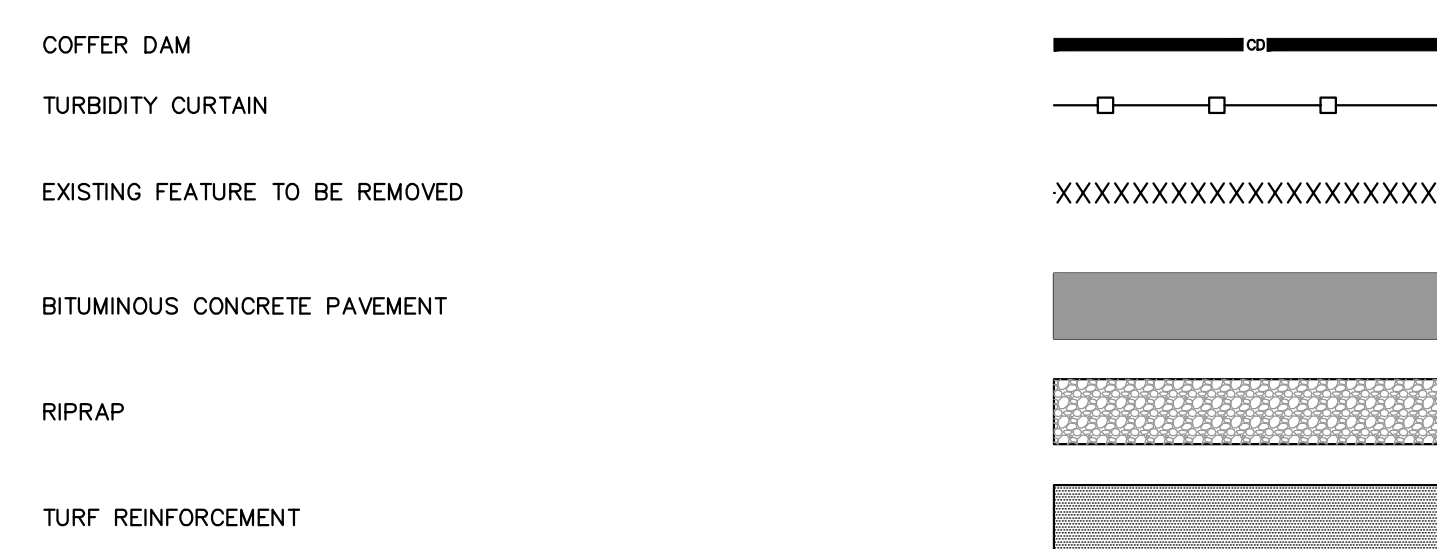
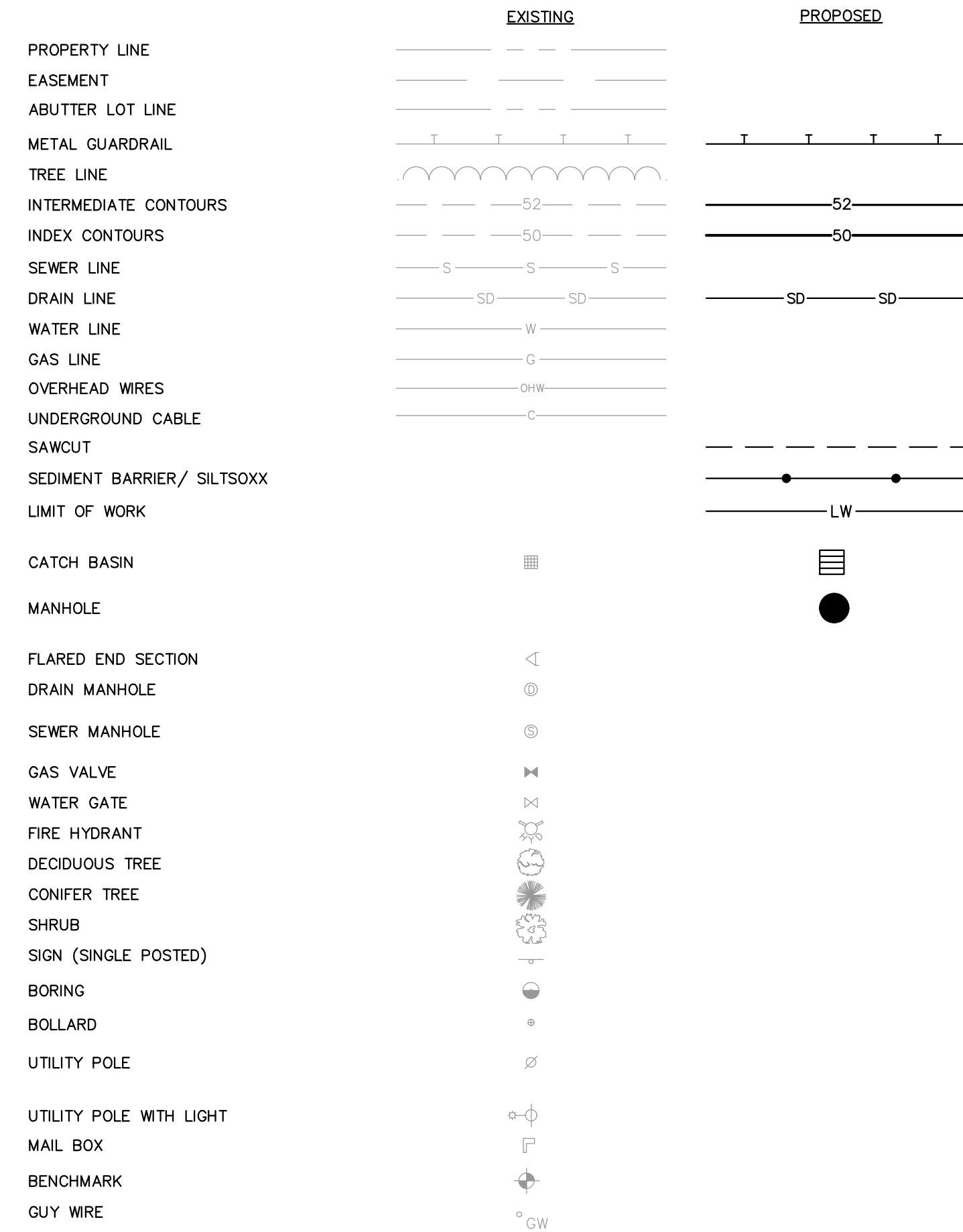
REINFORCEMENT: REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60. UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

Table with 3 columns: MODIFICATION, CONDITION, #4 BARS, #5 BARS. Rows include NONE, 12' OF CONCRETE BELOW BAR, COATED BARS, COVER < 3db, OR CLEAR SPACING < 6db, COATED BARS, ALL OTHER CASES, CONDITION 2, AND 3, CONDITION 2, AND 4.

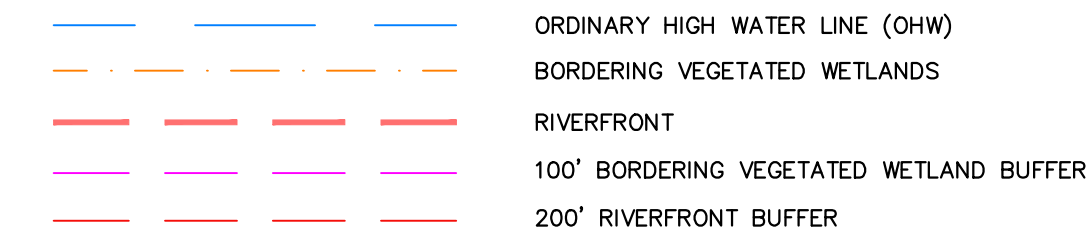
IF THE ABOVE BARS ARE SPACED 6' OR MORE ON CENTER, THE LAP LENGTH SHALL BE 80% OF THE LAP LENGTH GIVEN ABOVE. ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

REINFORCEMENT SHALL BE EPOXY COATED.

LINETYPES & HATCHES



RESOURCE AREA LEGEND

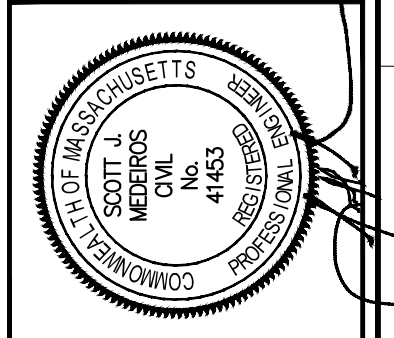


ABBREVIATIONS

EG EXISTING GRADE

COMMONWEALTH OF MASSACHUSETTS MASSDOT, HIGHWAY DIVISION CONCEPTUAL DESIGN IS ACCEPTABLE TO MASSDOT FOR CONTRACTING DISTRICT TWO BRIDGE ENGINEER DATE

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Revision table with columns: NO., DESCRIPTION, DATE, CHECKED BY, DRAWN BY. Includes entries for METAL INVERT REVISION and RESPONSE TO DFP COMMENTS.

GENERAL NOTES & LEGEND section header and title block information.

TOWN OF AGAWAM AGAWAM, MA and WHITE BROOK OVER NORTH STREET CULVERT REPLACEMENT

Job information table: JOB NO: 0234052.00, DATE: JUNE 2023, SCALE: AS NOTED, SHEET: 1 OF 12

G-001

ISSUED FOR BID



LOG OF BORING WB-1

Table with columns: PROJECT, JOB NUMBER, LOCATION, START DATE, FINISH DATE, ENGINEER/SCIENTIST, BORING LOCATION, DEPTH (ft), SAMPLES, FIELD TEST DATA, SAMPLE DESCRIPTION, PROFILE, REMARKS/ WELL CONSTRUCTION.



LOG OF BORING WB-2

Table with columns: PROJECT, JOB NUMBER, LOCATION, START DATE, FINISH DATE, ENGINEER/SCIENTIST, BORING LOCATION, DEPTH (ft), SAMPLES, FIELD TEST DATA, SAMPLE DESCRIPTION, PROFILE, REMARKS/ WELL CONSTRUCTION.



TEST BORING LOG

Table with columns: Drilling Co., Foreman, Logged By, Auger/Casing Type, L.D.O.D. (ft), Hammer Weight (lb.), Hammer Fall (ft.), Other, Type of Rig, Rig Model, Drilling Method, Sample Type, L.D.O.D. (ft), Sampler Head Weight (lb.), Sampler Head Fall (ft.), Other, Boring Location, Ground Surface Elev. (ft.), Final Boring Depth (ft.), Date Start - Finish, H. Datum, V. Datum, Sample Description and Identification, Field Test Data, Remarks.



TEST BORING LOG

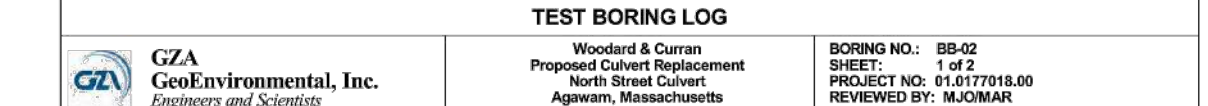
Table with columns: Drilling Co., Foreman, Logged By, Auger/Casing Type, L.D.O.D. (ft), Hammer Weight (lb.), Hammer Fall (ft.), Other, Type of Rig, Rig Model, Drilling Method, Sample Type, L.D.O.D. (ft), Sampler Head Weight (lb.), Sampler Head Fall (ft.), Other, Boring Location, Ground Surface Elev. (ft.), Final Boring Depth (ft.), Date Start - Finish, H. Datum, V. Datum, Sample Description and Identification, Field Test Data, Remarks.

Remarks: 1. Auger easily advanced beginning at 17 feet below ground surface.

Remarks: 1. Auger grouting at 2 and 4 feet below ground surface, suspended grout.

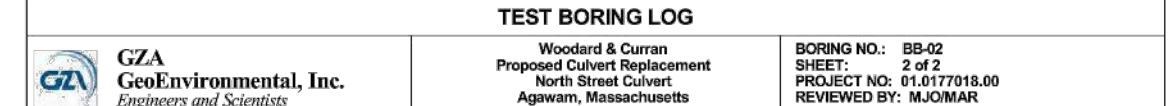
Remarks: 1. Ground surface elevation estimated from the topography shown on preliminary design plan NO. C-100 entitled "Existing Conditions Plan" prepared by Woodard & Curran and dated October 2022.

Remarks: 1. Driller noted greatly increased resistance after hitting at 42.5 feet logs and indicated the presence of bedrock. Bedrock was then core drilled starting at 42.5 feet logs.



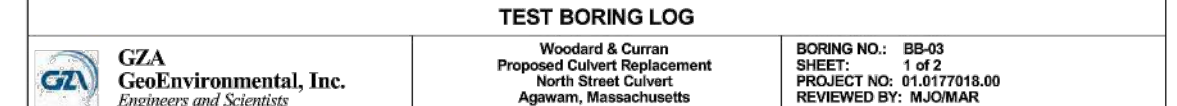
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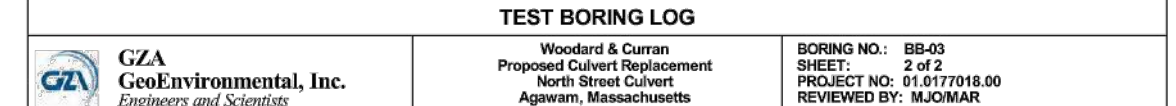
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Remarks: 1. Ground surface elevation estimated from the topography shown on preliminary design plan NO. C-100 entitled "Existing Conditions Plan" prepared by Woodard & Curran and dated October 2022.

Remarks: 7. Driller indicated tip of bedrock at approximately 53.8 feet logs. Roller bitted from approximately 53.8 to 56.8 feet logs using approximately 450 psi down pressure & over approximately 30 minutes. Drill cuttings appeared to consist of 15-20 inch pieces of red granite.

Remarks: 1. Ground surface elevation estimated from the topography shown on preliminary design plan NO. C-100 entitled "Existing Conditions Plan" prepared by Woodard & Curran and dated October 2022.

Remarks: 1. Drill indicated bedrock at 62.5 feet logs. Roller bitted with a 4-inch roller bit from 62.5 to 66.5 feet logs using approximately 700 psi down pressure in approximately 45 minutes.

Table with columns: Boring No., Core Run, Core Depths (ft), Core Recovery, Rock Quality Designation (RQD, %).



COMMONWEALTH OF MASSACHUSETTS MASSDOT, HIGHWAY DIVISION CONCEPTUAL DESIGN IS ACCEPTABLE TO MASSDOT FOR CONTRACTING DISTRICT TWO BRIDGE ENGINEER DATE

Vertical sidebar containing project information: 40 Shattuck Road, Suite 110, Woodard & Curran logo, professional seal, revision table, and drawing title: BORING LOGS.

A

B

C

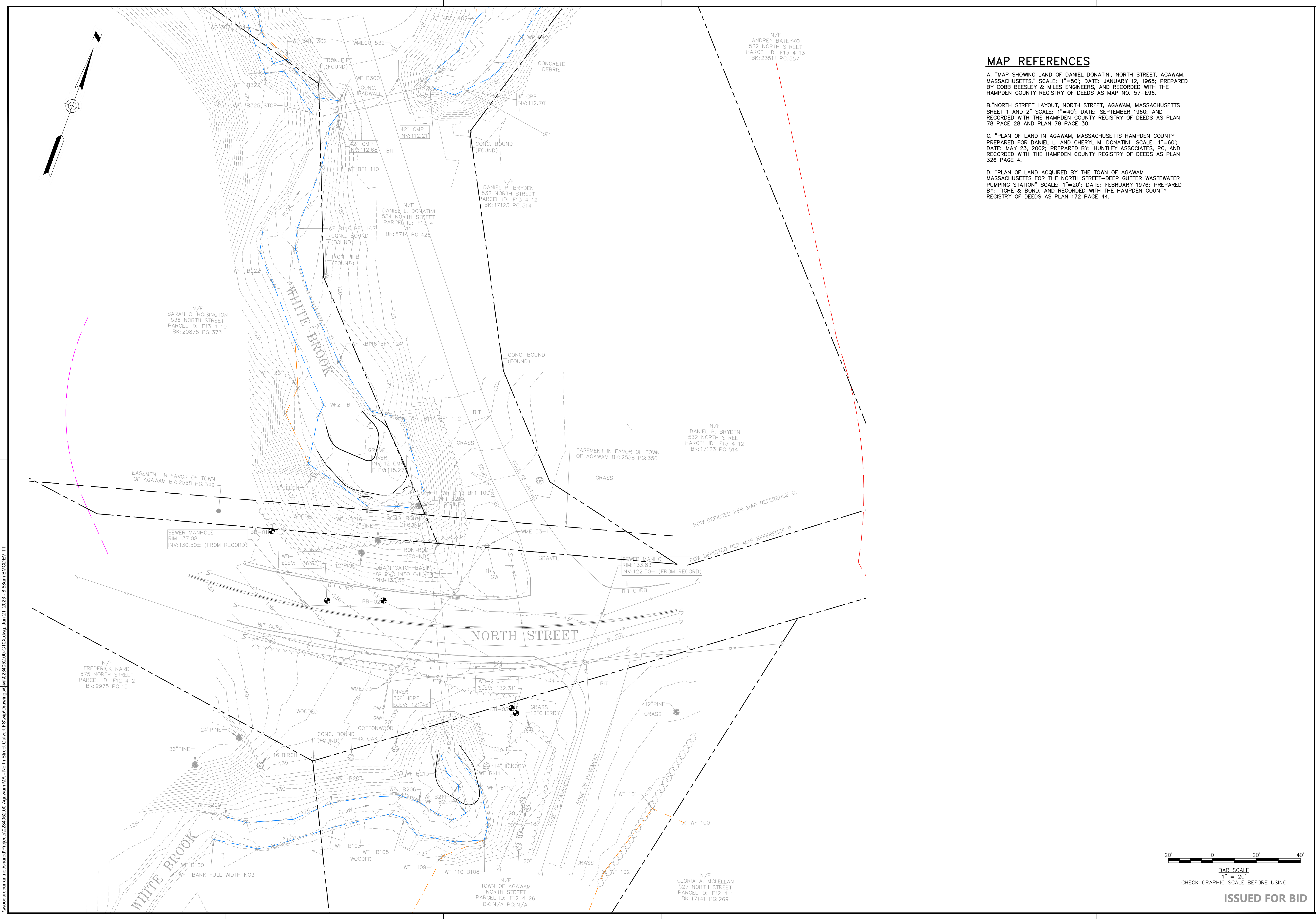
D

A

B

C

D



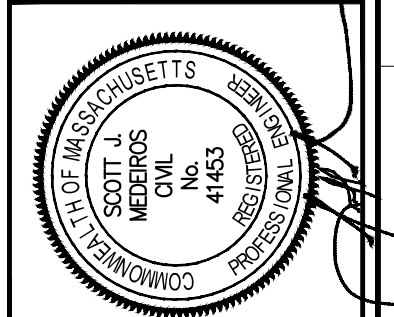
MAP REFERENCES

- A. "MAP SHOWING LAND OF DANIEL DONATINI, NORTH STREET, AGAWAM, MASSACHUSETTS." SCALE: 1"=50'; DATE: JANUARY 12, 1965; PREPARED BY COBB BEESLEY & MILES ENGINEERS, AND RECORDED WITH THE HAMPDEN COUNTY REGISTRY OF DEEDS AS MAP NO. 57-E96.
- B. "NORTH STREET LAYOUT, NORTH STREET, AGAWAM, MASSACHUSETTS SHEET 1 AND 2" SCALE: 1"=40'; DATE: SEPTEMBER 1960; AND RECORDED WITH THE HAMPDEN COUNTY REGISTRY OF DEEDS AS PLAN 78 PAGE 28 AND PLAN 78 PAGE 30.
- C. "PLAN OF LAND IN AGAWAM, MASSACHUSETTS HAMPDEN COUNTY PREPARED FOR DANIEL L. AND CHERYL M. DONATINI" SCALE: 1"=60'; DATE: MAY 23, 2002; PREPARED BY: HUNTLEY ASSOCIATES, PC, AND RECORDED WITH THE HAMPDEN COUNTY REGISTRY OF DEEDS AS PLAN 326 PAGE 4.
- D. "PLAN OF LAND ACQUIRED BY THE TOWN OF AGAWAM MASSACHUSETTS FOR THE NORTH STREET-DEEP GUTTER WASTEWATER PUMPING STATION" SCALE: 1"=20'; DATE: FEBRUARY 1976; PREPARED BY: TIGHE & BOND, AND RECORDED WITH THE HAMPDEN COUNTY REGISTRY OF DEEDS AS PLAN 172 PAGE 44.

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REV	DESCRIPTION	DATE	CHECKED BY	DATE
1	RESPONSE TO DFP COMMENTS	2/9/2023	BCM	
2	METAL INVERT REVISION	2/16/2023	BCM	

DESIGNED BY: KLD
DRAWN BY: BCM
CHECKED BY: RN
DATE: 02/24/2023

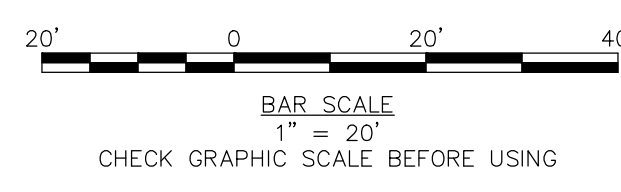
EXISTING CONDITIONS PLAN

TOWN OF AGAWAM
AGAWAM, MA

WHITE BROOK OVER
NORTH STREET CULVERT
REPLACEMENT

JOB NO: 0234052.00
DATE: JUNE 2023
SCALE: 1"=20'
SHEET: 4 OF 12

C-100




ISSUED FOR BID

W:\woodardcurran\mfr\shattuck\Projects\0234052.00 Agawam MA - North Street Culvert\FS\wp\Drawings\0234052.00-C-100.dwg, Jun 21, 2023, 8:58am BMCDEVIT

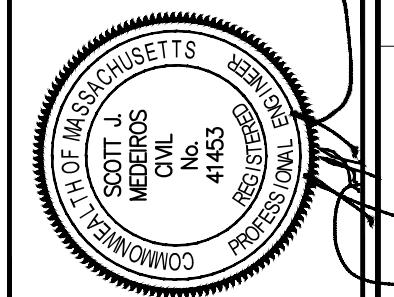
NOTES:
1. CONTRACTOR SHALL FIELD VERIFY ELEVATION OF ALL UTILITIES PRIOR TO ORDERING CULVERT.

40 Shattuck Road, Suite 110
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REV	DESCRIPTION	DATE	CHECKED BY	DATE
2	METAL INVERT REVISION	2/16/2023	RM	
1	RESPONSE TO DFP COMMENTS	2/9/2023	KLD	

DESIGNED BY: **KLD**
DRAWN BY: **BCM**
CHECKED BY: **RM**
DATE: 02/24/2023

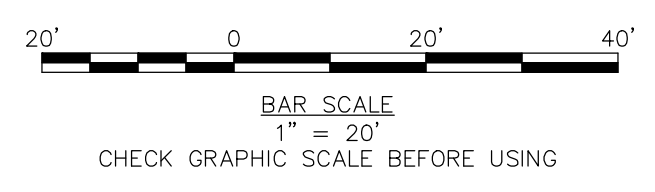
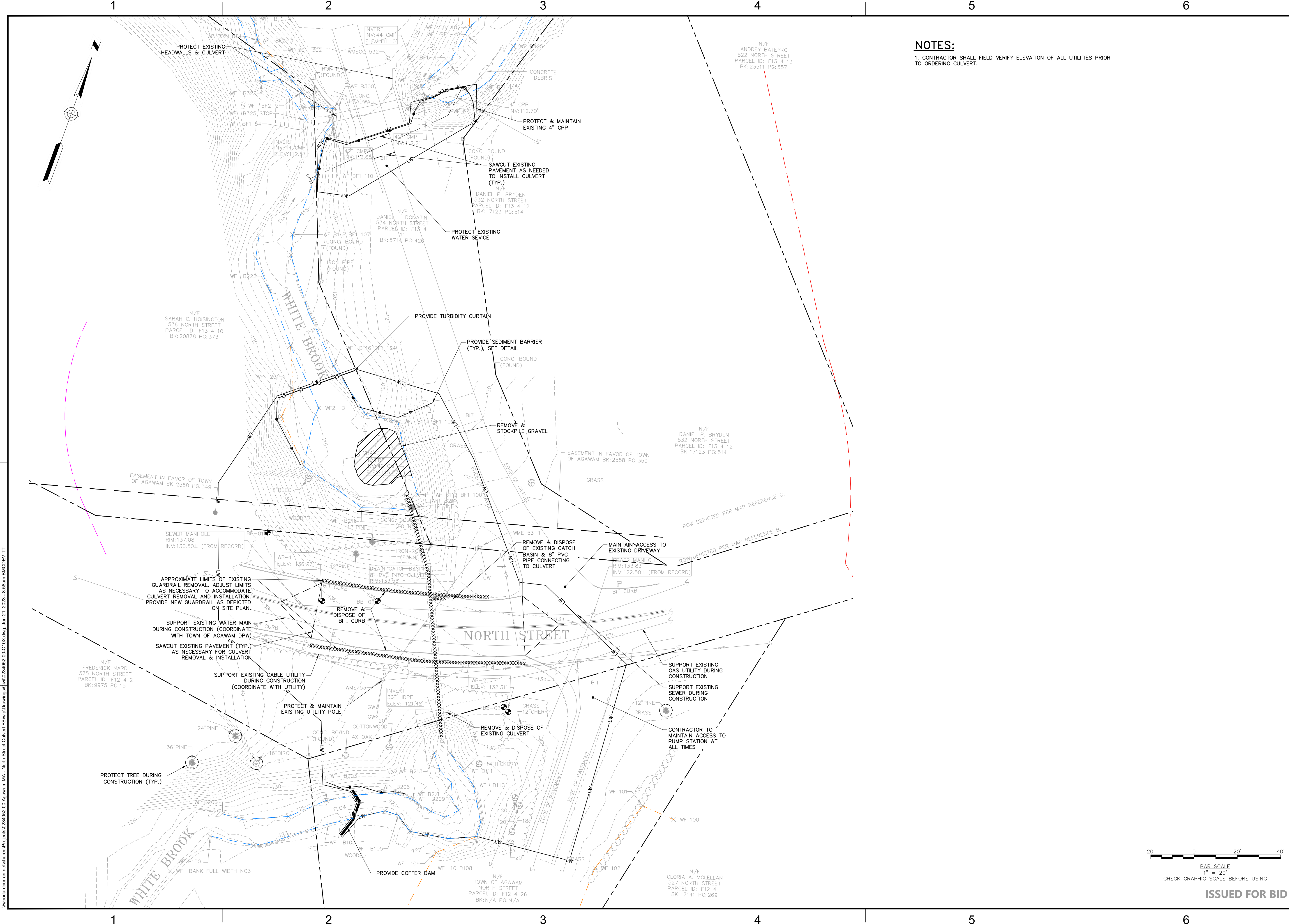
DEMOLITION & EROSION CONTROL PLAN

TOWN OF AGAWAM
AGAWAM, MA

**WHITE BROOK OVER
NORTH STREET CULVERT
REPLACEMENT**

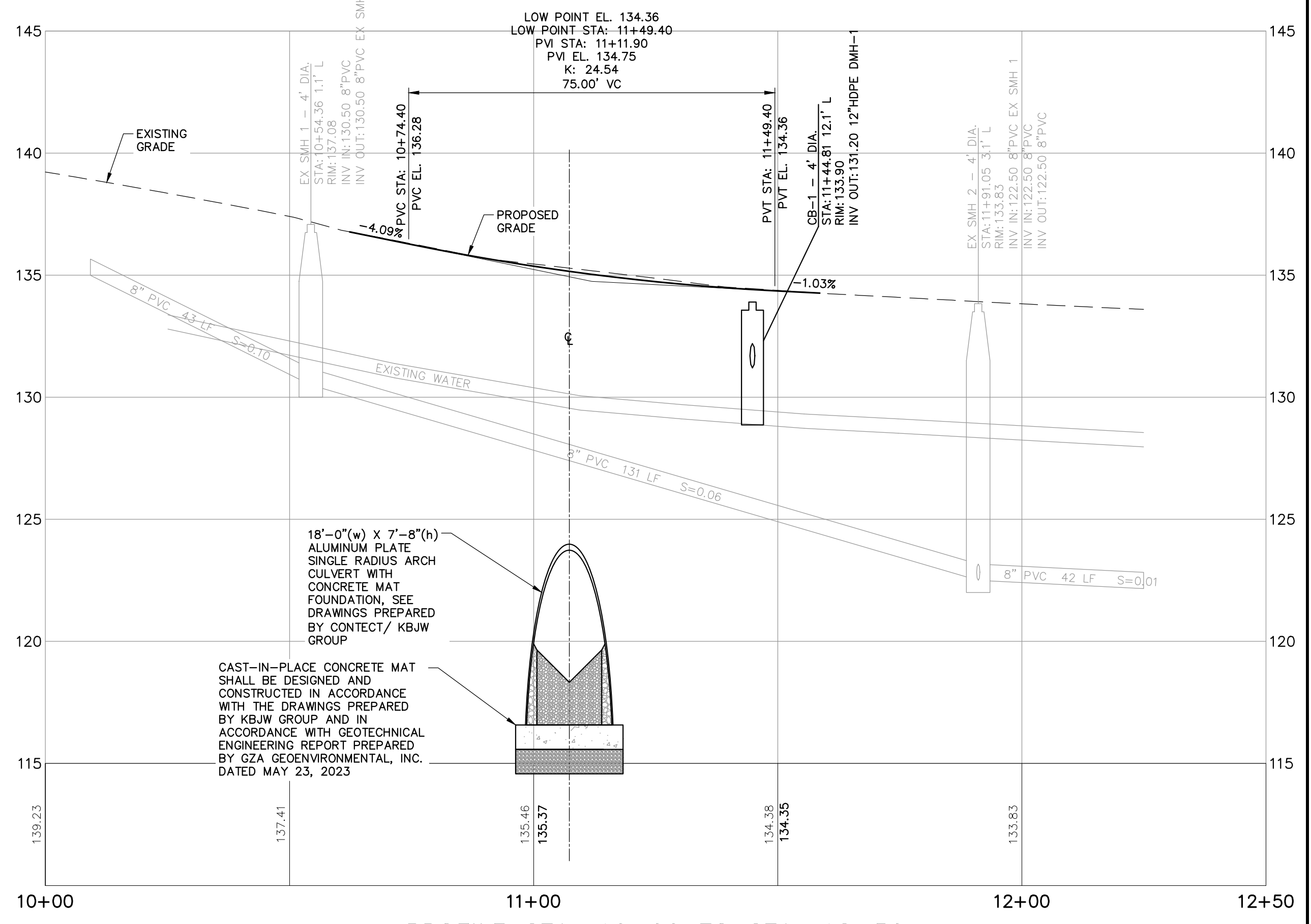
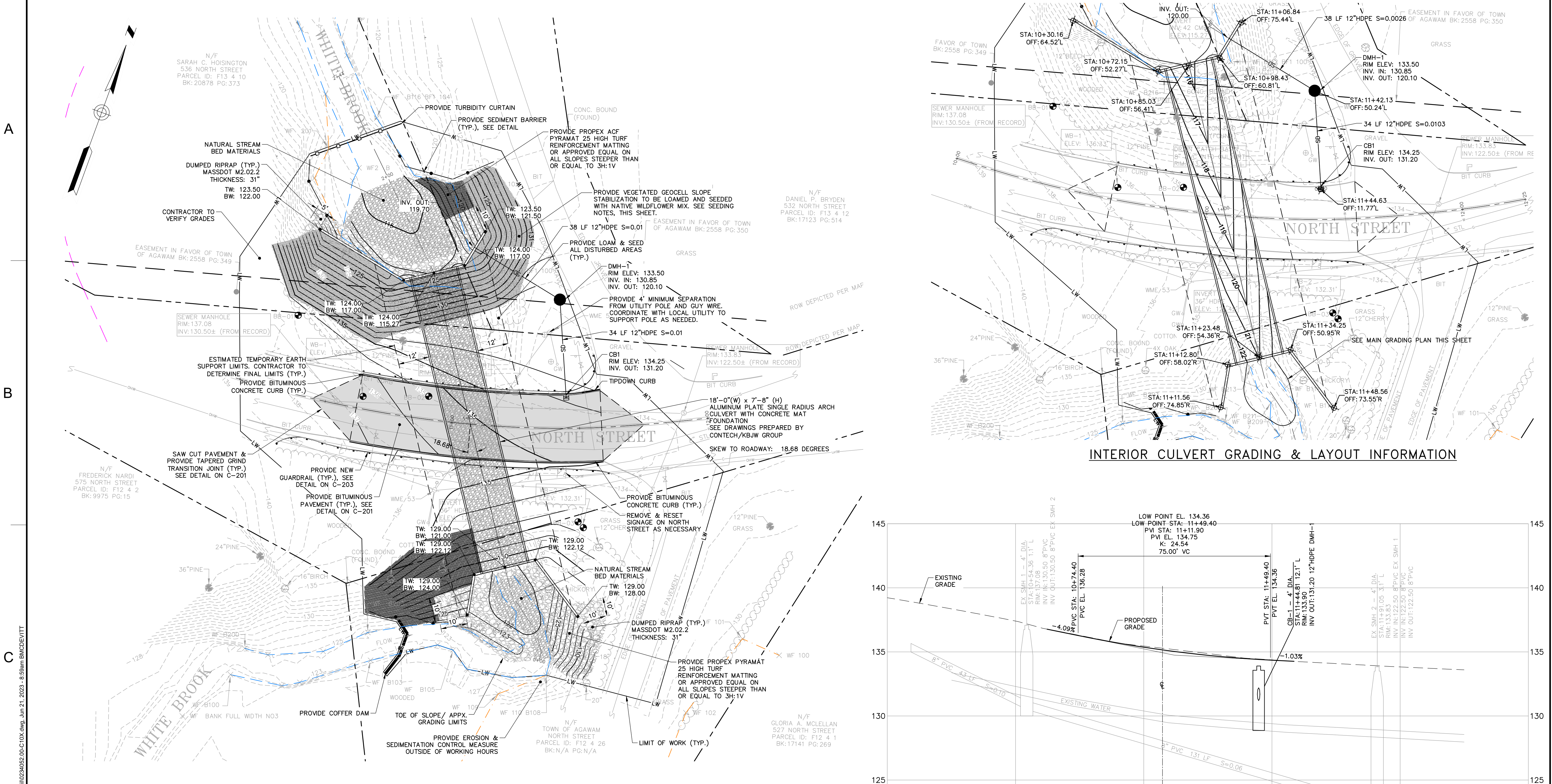
JOB NO: 0234052.00
DATE: JUNE 2023
SCALE: 1" = 20'
SHEET: 5 OF 12

C-101



ISSUED FOR BID

W:\woodardcurran\m\shattuck\Projects\0234052.00 Agawam MA - North Street Culvert\FS\wp\Drawings\c\0234052.00-C-101.dwg, Jun 21, 2023, 8:58am BMCDEVIT



- NOTES:**
- ALL SLOPES STEEPER THAN 3:1 SHALL RECEIVE EROSION CONTROL MATTING UNLESS NOTED OTHERWISE.
 - ALL DISTURBED BORDERING VEGETATED WETLANDS AREAS SHALL BE RESTORED BY THE CONTRACTOR IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL LAWS PER THE PROJECT SPECIFICATIONS.
 - DUMPED RIPRAP SHALL BE KEYPED INTO ADJACENT STREAMBED MATERIAL AND NATIVE FILL PER SHEET C-201, RIVER STONE DETAIL.
 - DUMPED RIPRAP SHALL BE TOED BELOW THE STREAM BOTTOM AT THE TOE OF SLOPES PER SHEET C-201, DUMPED RIPRAP DETAIL.

SEEDING NOTES:

- NATIVE WILDFLOWER SEED MIX SHALL BE NEW ENGLAND CONSERVATION/WILDLIFE MIX, OR SIMILAR (SEE SPECIFICATION).

**COMMONWEALTH OF MASSACHUSETTS
MASSDOT, HIGHWAY DIVISION
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING**

DISTRICT TWO BRIDGE ENGINEER _____ DATE _____

- GEOTECHNICAL NOTES:**
- DISTURBED FOOTING SUBGRADES AND/OR LOOSE OR SOFT ZONES SHALL BE OVER EXCAVATED TO REMOVE LOOSE/DISTURBED MATERIAL AND REPLACED WITH COMPACTED 3/4" CRUSHED STONE, WRAPPED IN NON-WOVEN GEOTEXTILE (MIRAFI 180N OR APPROVED EQUAL).
 - IF EXISTING FILL SOIL IS ENCOUNTERED AT THE BOTTOM OF THE FOUNDATION, THE CONTRACTOR SHALL OVER EXCAVATE AND BACKFILL TO CULVERT SUBGRADE WITH 3/4" CRUSHED STONE WRAPPED IN NON-WOVEN GEOTEXTILE (MIRAFI 180N OR APPROVED EQUAL).
 - EXCAVATIONS SHOULD BE SEQUENCED AND CONSTRUCTED IN SUCH A WAY TO MINIMIZE DISTURBANCE OF SUBGRADES AND FINAL EXCAVATION TO THE UNDISTURBED NATURAL CONNECTICUT VALLEY VARVED CLAY (CVVC) SUBGRADE WITH A SMOOTH-EDGED EXCAVATOR BUCKET. EQUIPMENT SHALL NOT OPERATE DIRECTLY ON THE NATURAL SUBGRADE.
 - WITHIN A LATERAL DISTANCE OF 5 FEET OF THE BACK OF A CULVERT WALL OR WINGWALL, THE CONTRACTOR SHALL ONLY USE HAND-OPERATED ROLLERS OR PLATE COMPACTORS WEIGHING NOT MORE THAN 250 POUNDS.
 - EXISTING FILL AND EXCAVATED CVVC SHALL NOT BE USED AS BACKFILL BEHIND PROPOSED WINGWALLS AND HEADWALLS OR OVER THE PROPOSED CULVERT. EXCAVATED SOIL THAT CANNOT BE REUSED IN THESE AREAS SHALL BE REGRADED ELSEWHERE ON SITE AS SPECIFIED BY THE ENGINEER OR REMOVED FROM THE SITE AND DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.
 - INTERFACE BETWEEN GRANULAR FILL AND LIGHTWEIGHT AGGREGATE FILL CAN BE STEPPED WITH ACCEPTANCE OF GEOTECHNICAL ENGINEER. EACH SUCCESSIVE LIFT NEEDS TO BE KEYPED INTO SLOPE.
 - THE FACTORED ALLOWABLE BEARING CAPACITY IS 2 KSF PER THE GEOTECHNICAL REPORT.

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WOODARD & CURRAN ENGINEERS
SCOTT A. WOODARD
REGISTERED PROFESSIONAL ENGINEER
LICENSE NO. 41453
EXPIRES 12/31/2024

NO.	REVISION	DATE	BY	CHECKED BY	RM
1	DESIGN	2/16/2023	SCW	MLD	RM
2	METAL INVERT REVISION	2/16/2023	SCW	MLD	RM
3	RESPONSE TO DDP COMMENTS	2/9/2023	SCW	MLD	RM

DESIGNED BY: MLD
CHECKED BY: MLD
DRAWN BY: BCM

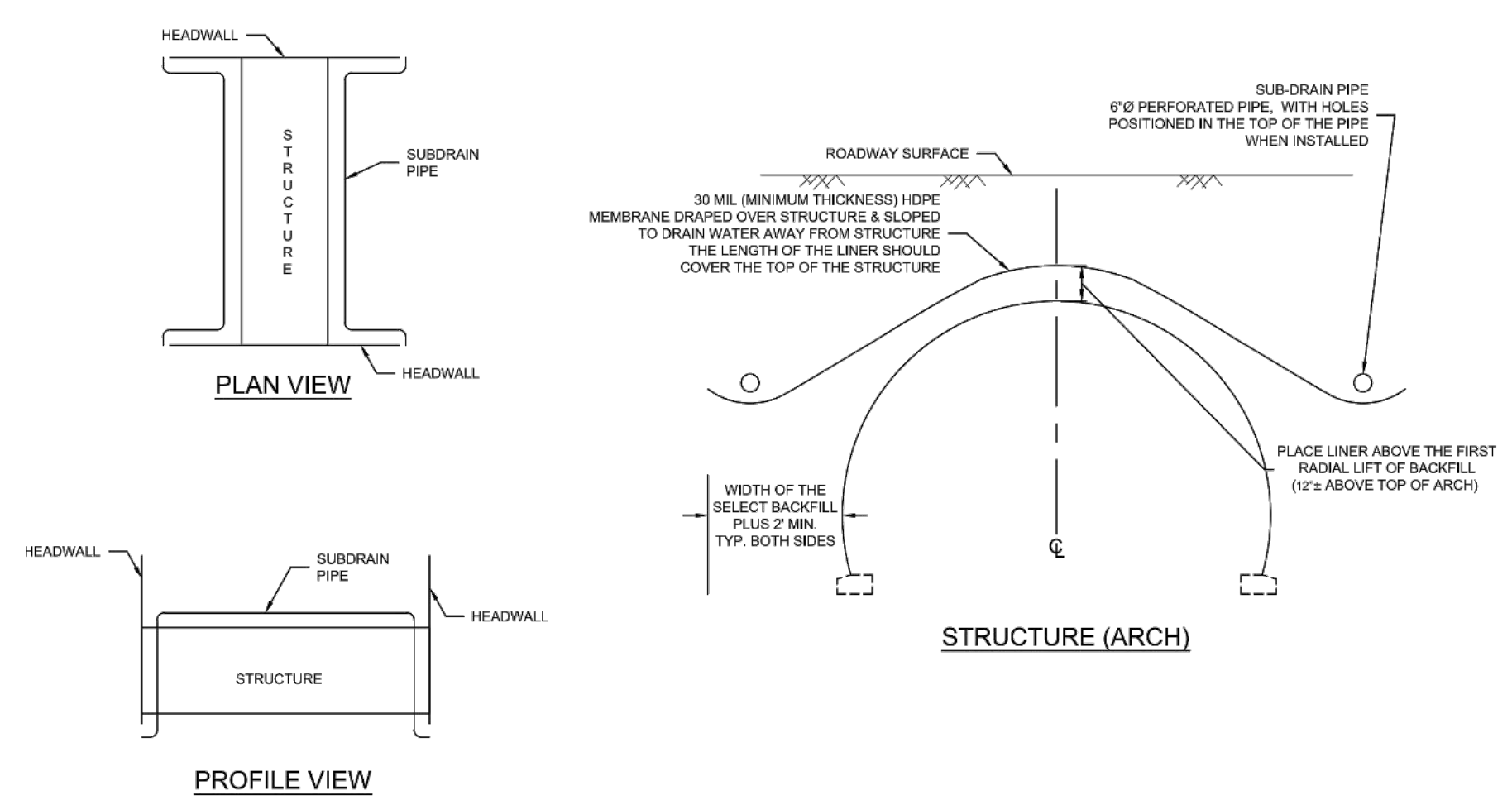
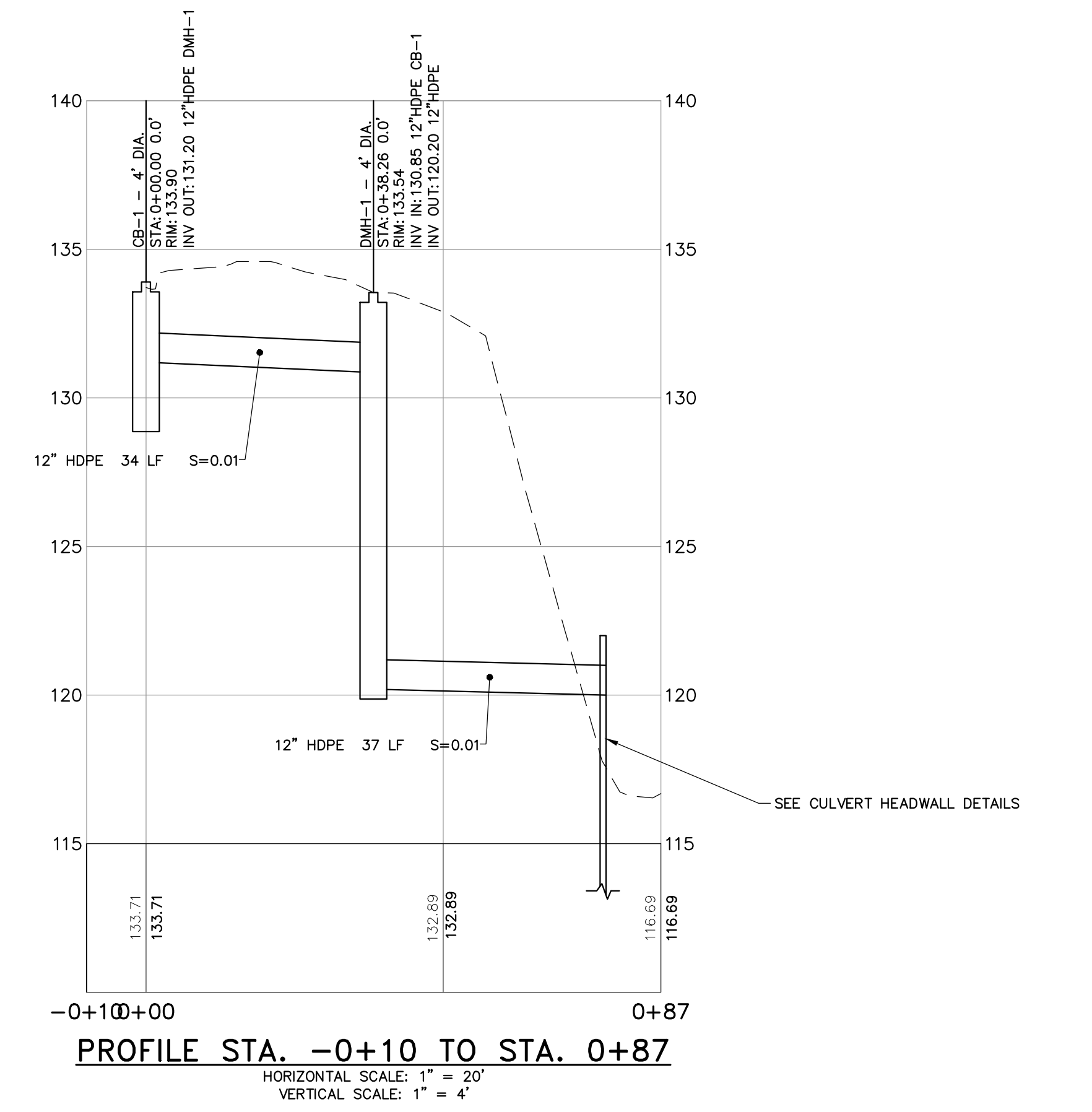
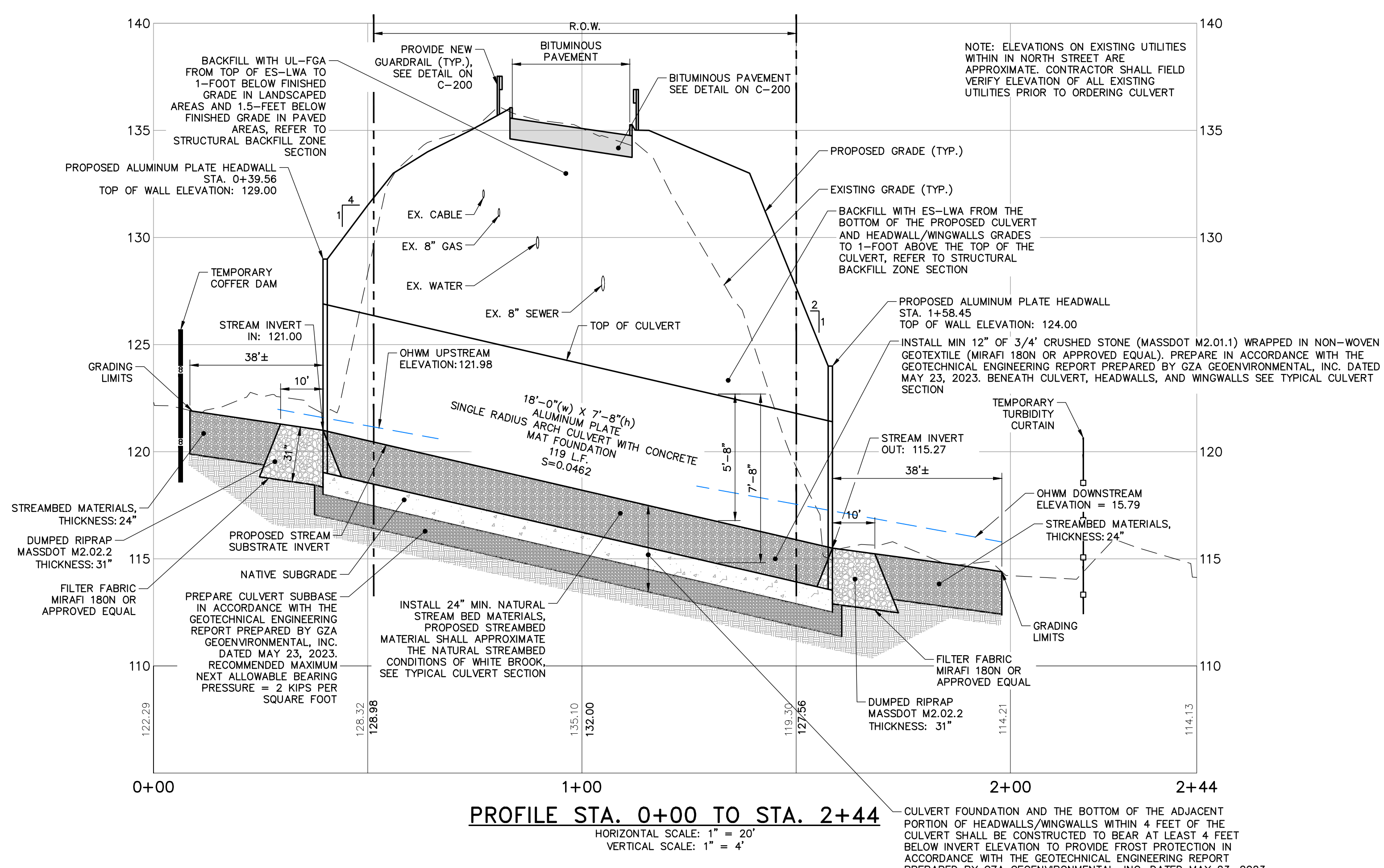
**TOWN OF AGAWAM
AGAWAM, MA**

**WHITE BROOK OVER
NORTH STREET
REPLACEMENT**

JOB NO: 0234052.00
DATE: JUNE 2023
SCALE: 1" = 20'
SHEET: 6 OF 12

C-102

ISSUED FOR BID

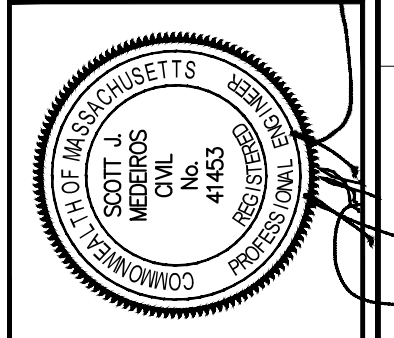


HDPE MEMBRANE PROTECTION DETAIL FOR STANDARD PLATE N.T.S.

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NO.	REVISION	DATE	BY	CHECKED BY
1	DESIGN	2/9/2023	RT	RT
2	MATERIAL REVISION	2/9/2023	RT	RT
3	RESPONSE TO BFP COMMENTS	2/9/2023	RT	RT

DESIGNED BY: **KLD**
 DRAWN BY: **BCM**
 CHECKED BY: **KLD**
 DATE: 02/24/2023

CULVERT GRADING & STORMDRAIN PROFILE

TOWN OF AGAWAM
 AGAWAM, MA

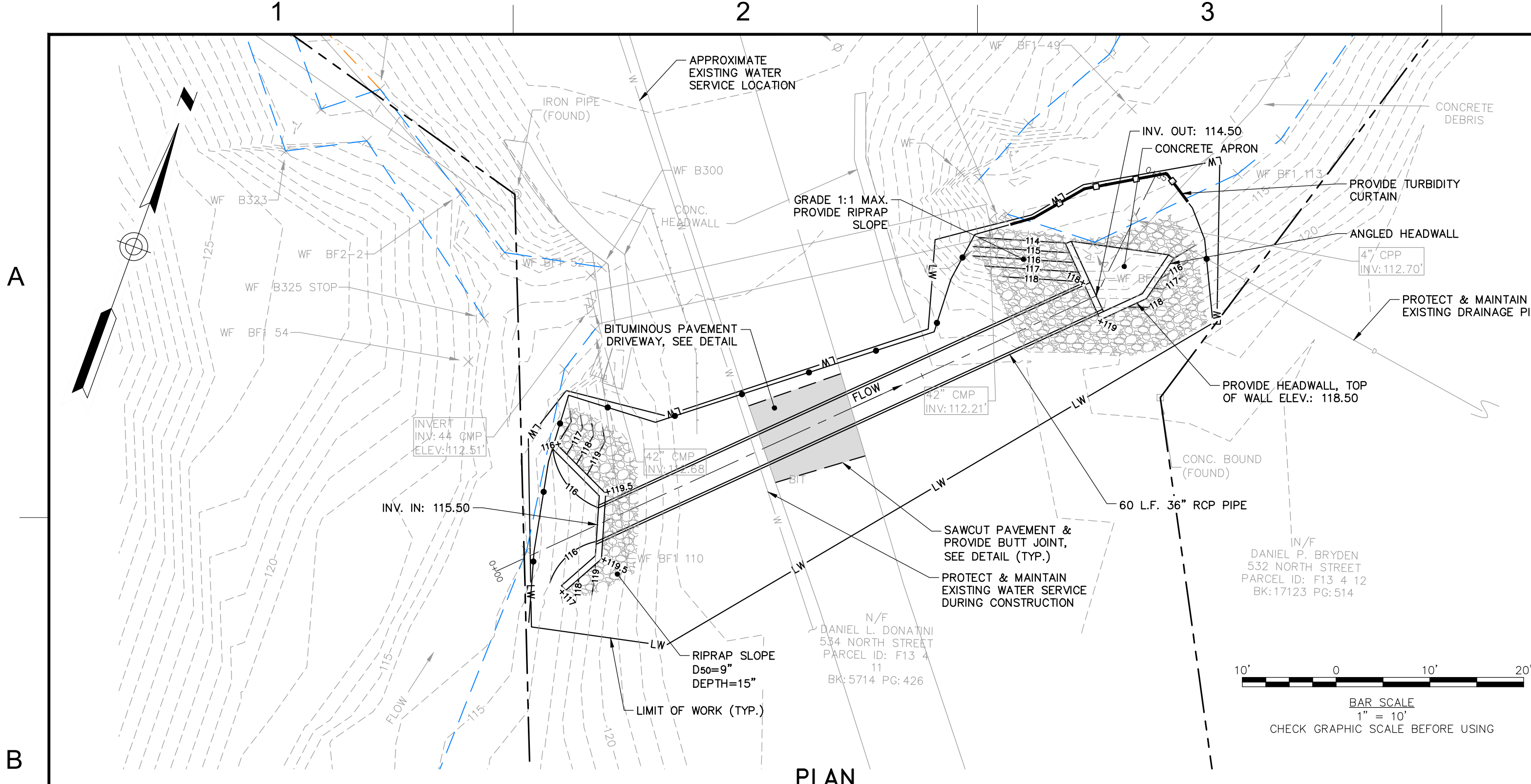
WHITE BROOK OVER
 NORTH STREET CULVERT
 REPLACEMENT

JOB NO: 0234052.00
DATE: JUNE 2023
SCALE: 1" = 20'
SHEET: 7 OF 12

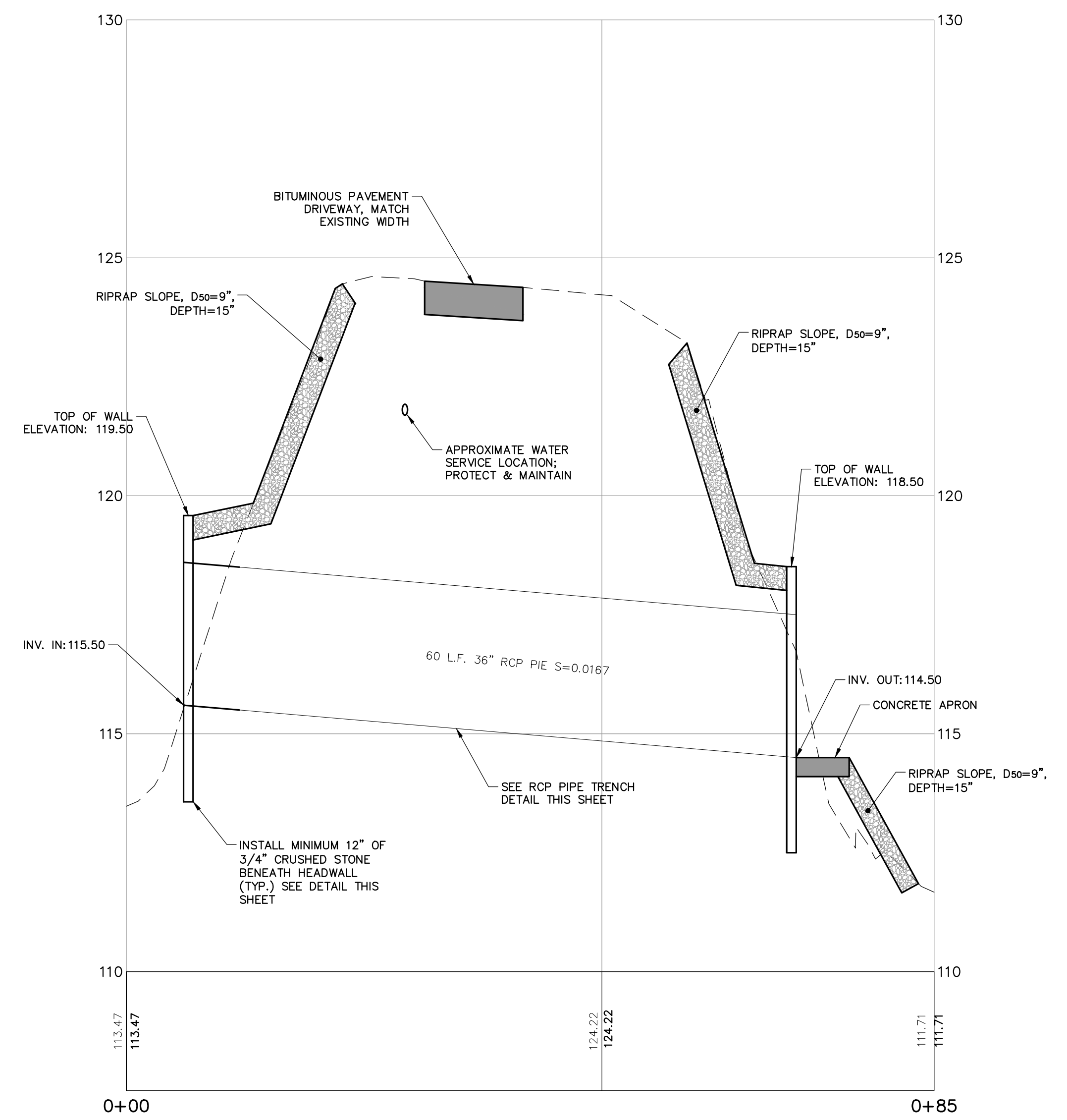
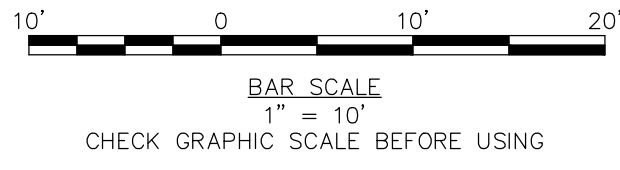
C-103

ISSUED FOR BID

WoodardCurran.net\shared\Projects\0234052.00 Agawam MA - North Street Culvert\FS\wp\Drawings\c\0234052.00-C-103.dwg, Jun 21, 2023, 9:08am BMCDEV\IT

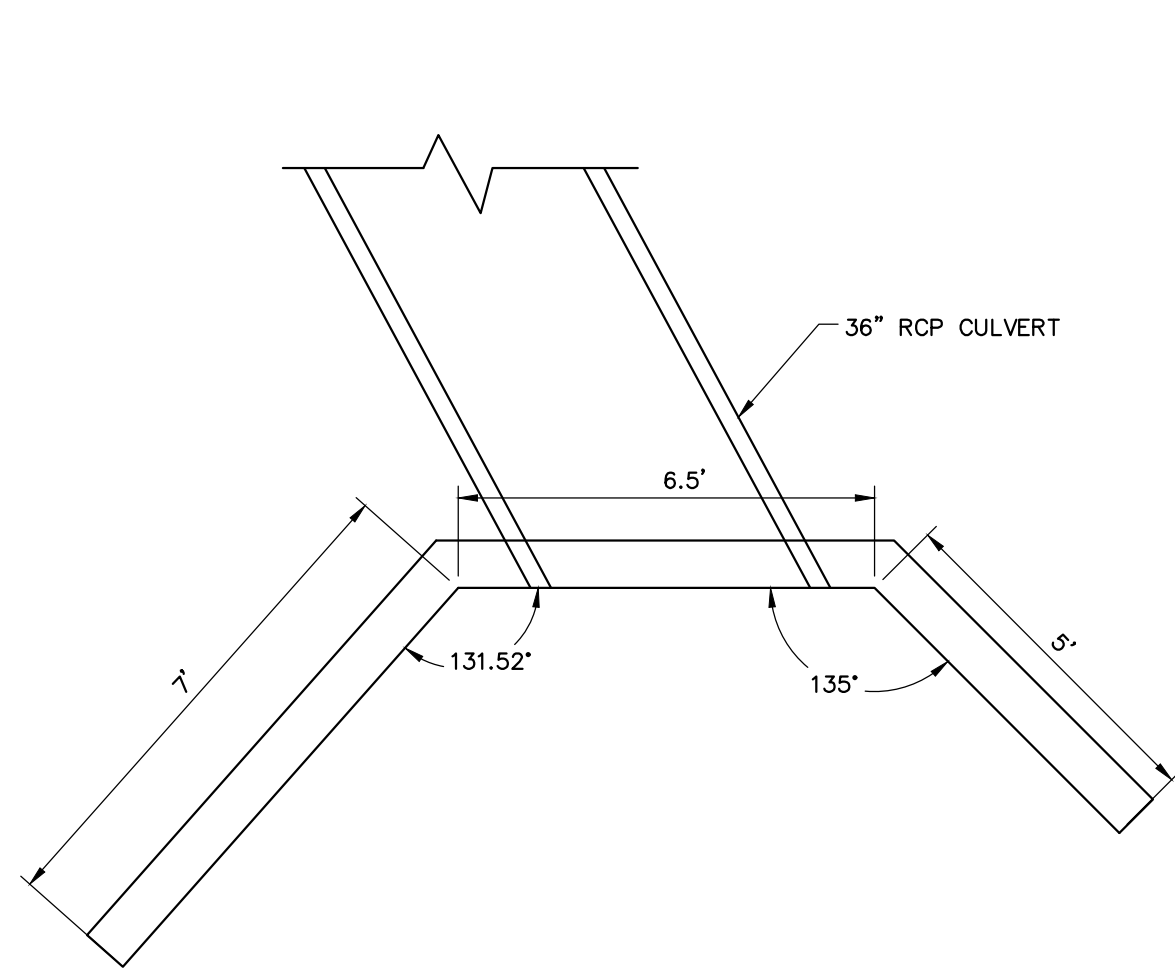


PLAN
1"=10'

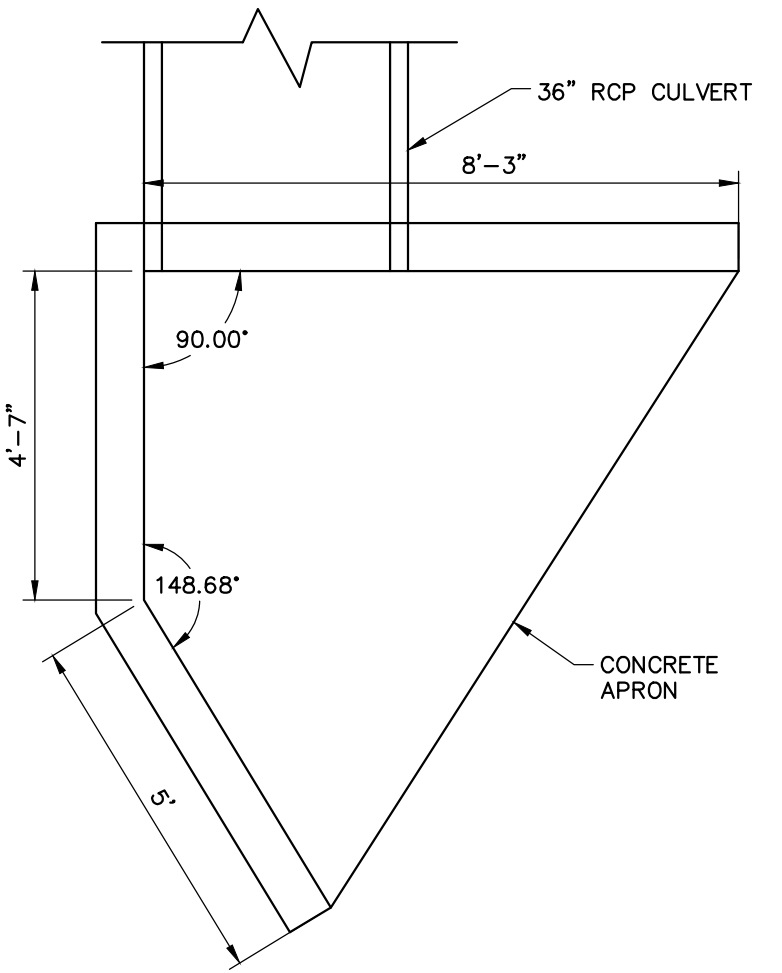


PROFILE STA. 0+00 TO STA. 0+85

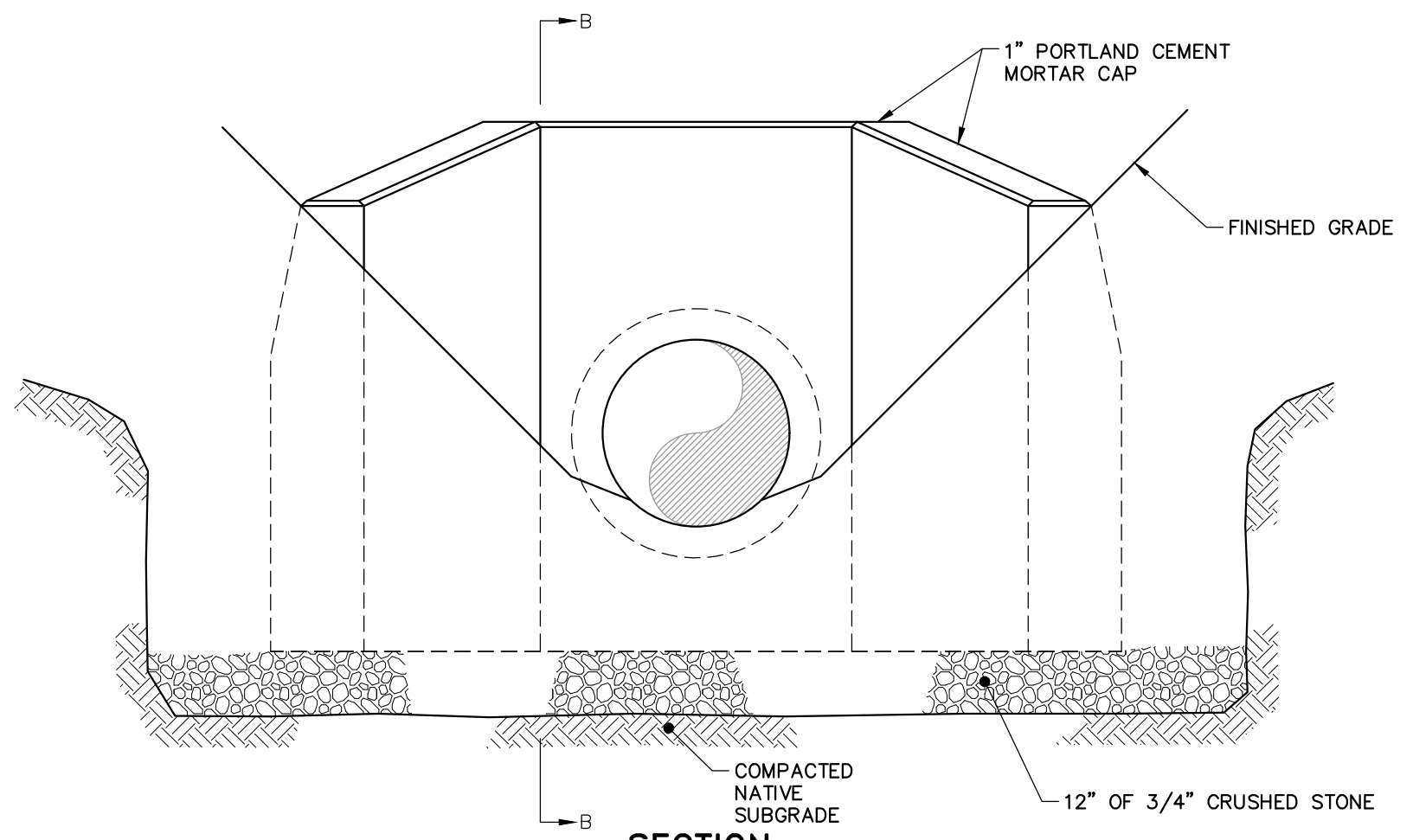
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VERTICAL SCALE: 1" = 4'



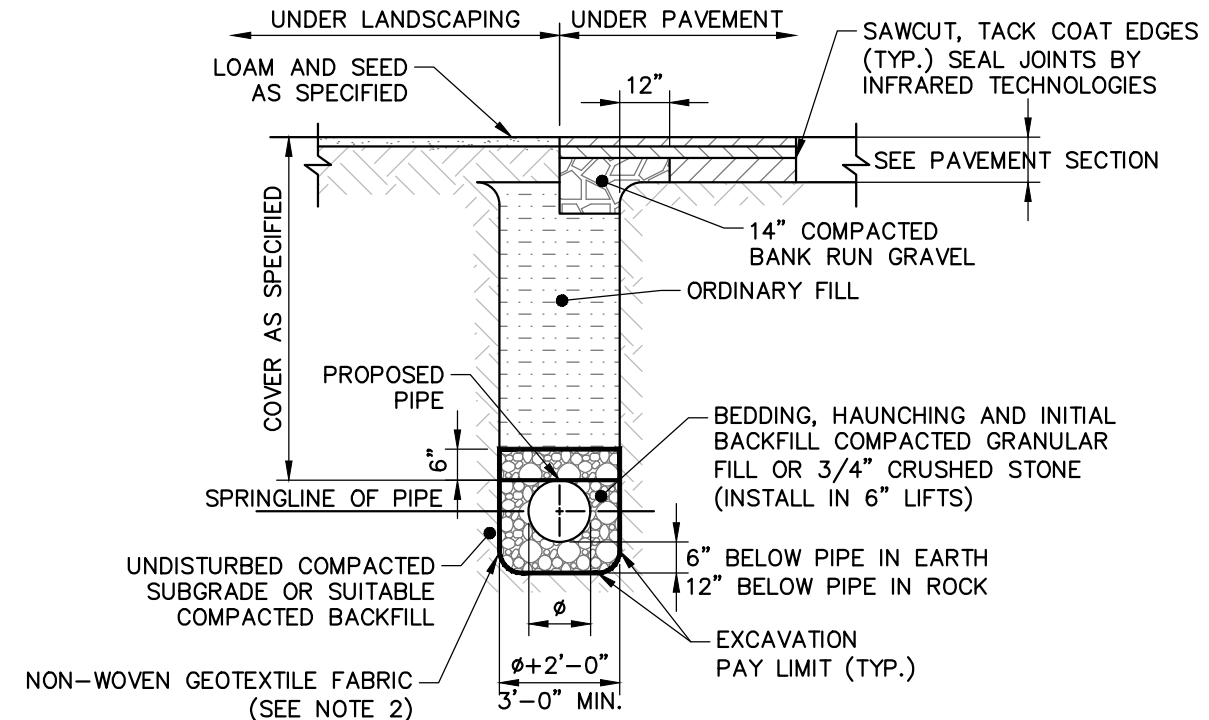
INLET PLAN



OUTLET PLAN

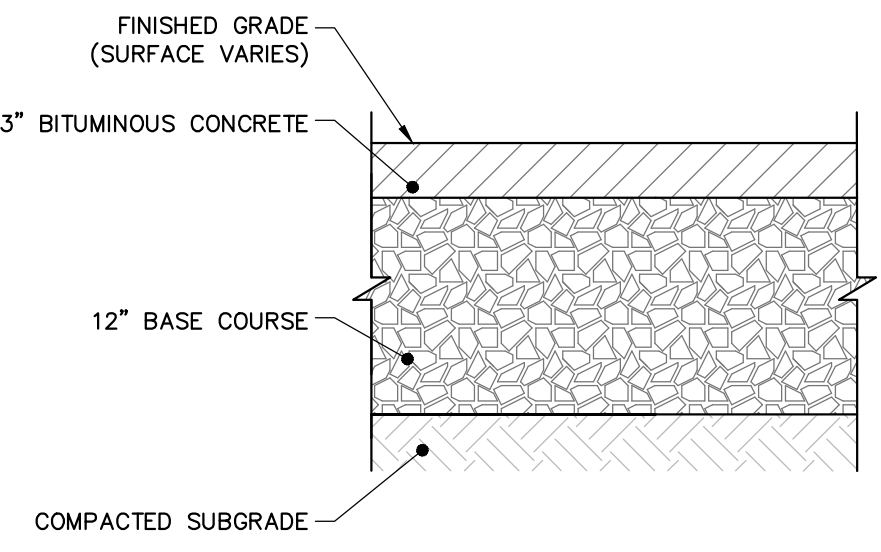


SECTION
PRECAST CONCRETE HEADWALL
NOT TO SCALE



- NOTES:
1. BEDDING, HAUNCHING AND BACKFILL SHALL BE COMPACTED IN ACCORDANCE WITH THE SPECIFICATIONS.
 2. NON-WOVEN GEOTEXTILE SHALL BE INSTALLED AS SHOWN WHEN FINE SANDS, SILT, CLAY OR ORGANIC MATERIALS ARE ENCOUNTERED AT THE TRENCH BOTTOM.

REINFORCED CONCRETE PIPE TRENCH
NOT TO SCALE

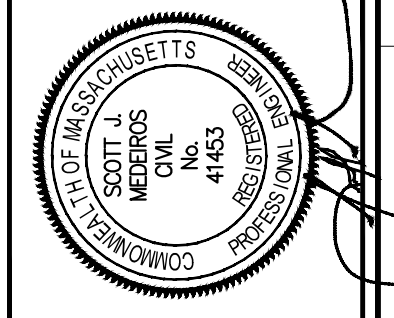


BITUMINOUS CONCRETE DRIVEWAY PAVEMENT
NOT TO SCALE

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NO.	REVISION	DATE	BY	CHECKED BY
1	METAL INVERT REVISION	2/16/2023	RT	MD
2	RESPONSE TO DFP COMMENTS	2/16/2023	MD	MD

DESIGNED BY: MD
DRAWN BY: BCM

AUX. CULVERT PLAN & PROFILE

TOWN OF AGAWAM
AGAWAM, MA

WHITE BROOK OVER
NORTH STREET CULVERT
REPLACEMENT

JOB NO: 0234052.00
DATE: JUNE 2023
SCALE: 1"=10'
SHEET: 8 OF 12

C-104

ISSUED FOR BID

I:\woodardcurran\metros\shawn\Projects\0234052.00 Agawam MA - North Street Culvert\FS\wp\Drawings\0234052.00-C-104.dwg, Jun 21, 2023, 9:08am BMCDEV/IT

EROSION AND SEDIMENT CONTROL NOTES

Temporary Erosion Control

Measure	Dates For Use	Timing, Activity, and Location
Sedimentation Barrier	ALL	Before soil disturbance, install downhill of areas to be disturbed and around material stockpiles.
Up-slope Diversion	ALL	Before soil disturbance, install uphill of areas to be disturbed and around material stockpiles.
Catch Basin Protection	ALL	Before soil or pavement disturbance, install ACF Environmental, Inc. High Flow Siltsock, Siltsover Inlet Filter, or equal, installed per manufacturer's requirements.
Dust Control	ALL	During dry weather, apply water and calcium chloride to control dust.
Temporary Seeding	April 15 to Oct. 15	Soil stockpiles that are not covered and disturbed areas that will not be disturbed again within 14 days. If grass growth provides less than 95% soil coverage by Nov. 1, apply mulch and anchor with erosion control blanket.
Mulch	April 15 to Sept. 15	On all areas of exposed soil prior to rain events apply 100-150 lbs (2.5 bales) per 1,000 sq. ft. by mechanical blower.
Winter Mulch	Sept. 16 to Oct. 31	On all areas of exposed soil prior to precipitation apply 150 to 170 lbs. mulch (4 bales) per 1,000 sq. ft. by mechanical blower. Erosion control blanket may be used as a substitute for winter mulch.
	Nov. 1 to April 14	On all areas of exposed soil, apply 150 to 170 lbs. mulch (4 bales) per 1,000 sq. ft. and anchor with netting at the end of each working day. Erosion control blanket may be used as a substitute for winter mulch.
Inspections	Until site is permanently stabilized	Inspect the erosion and sedimentation control measures daily, and after rainfall of half inch or greater in a 24-hour period, and maintain and repair as necessary.

Permanent Erosion Control:

Measure	Dates For Use	Timing, Activity, and Location
Pavement - Base Course - Final Course	When no frost is in ground	Install only in areas shown on the plan, shortly after pavement base is brought to final grade. Install near completion of project.
Permanent Seeding	April 15 to Sept. 15	On final grade areas, within 7 days of grade preparation, prepare topsoil, followed by seed and mulch application.
Dormant Seeding	Sept. 16 to April 15	On final grade areas, with prepared topsoil. Apply seed at double the specified rate on bare soil, and follow with an application of winter mulch.
Ground Cover, Trees, Shrubs	April 15 to Nov. 1	Install with final landscaping.
Permanent Mulch	ALL	Install with final landscaping.

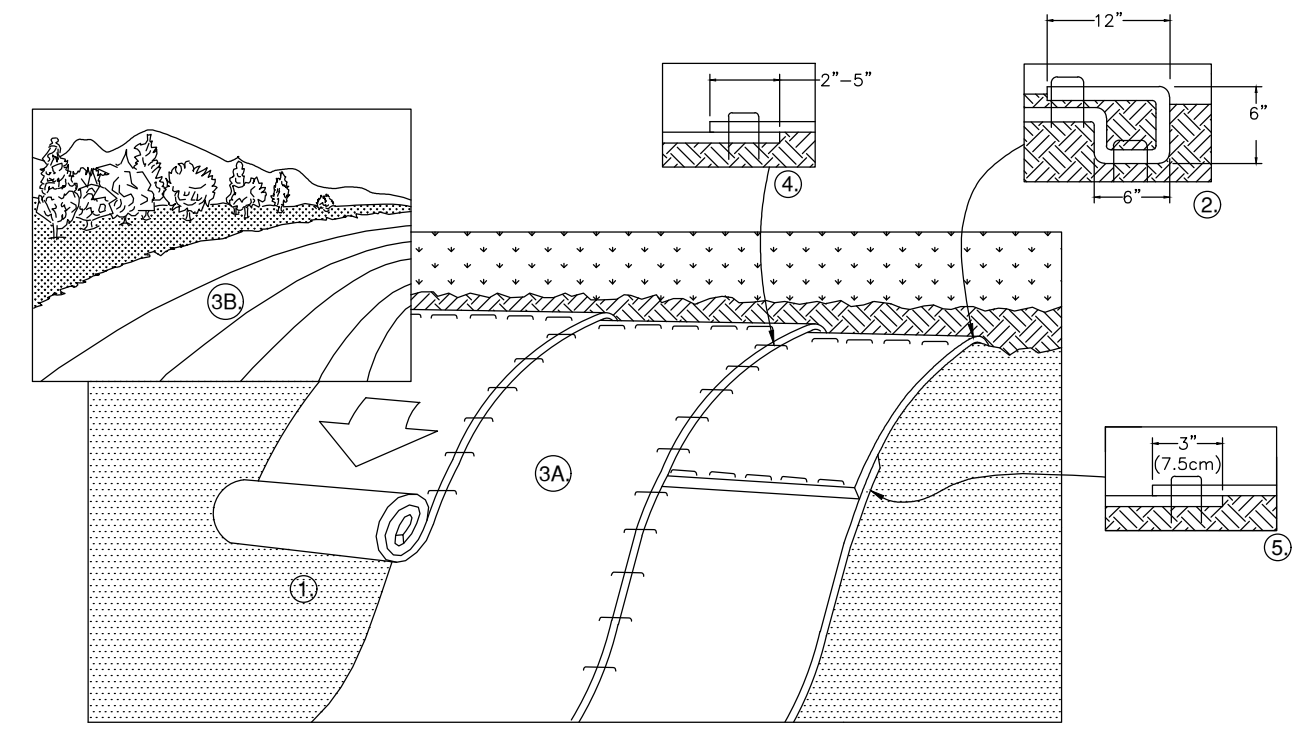
Inspections:

Regular inspections of all erosion and sedimentation controls shall be made at least weekly and prior to and following storm events. Minimum inspections shall be made as listed in the table below.

Inspected Item	Look For
Mulched Surfaces	Thin mulch or inadequate application. Wind movement.
Seeded Surfaces	Poor seed germination. Loss of mulch. Development of rivulets.
Sediment Barrier	Sediment build-up to one half the height of the barrier. Undermining of the barrier. Supporting stakes loose, toppled, or unmarked. Breaks in barrier.
Perimeter Diversion	Discharge is to stabilized area. Erosion or breaks in barrier. Supporting stakes loose, toppled or unmarked.
Catch Basin Protection	Sediment build-up and structure blockages. Slow flow/Ponding water. Breaks in fabric or voids in barrier.
Dewatering Filter	Breaks in fabric or supporting structure. Slow flow, indicating high sediment build-up.
Construction Entrance	Sedimentation of roadways. Off-site dust complaints.

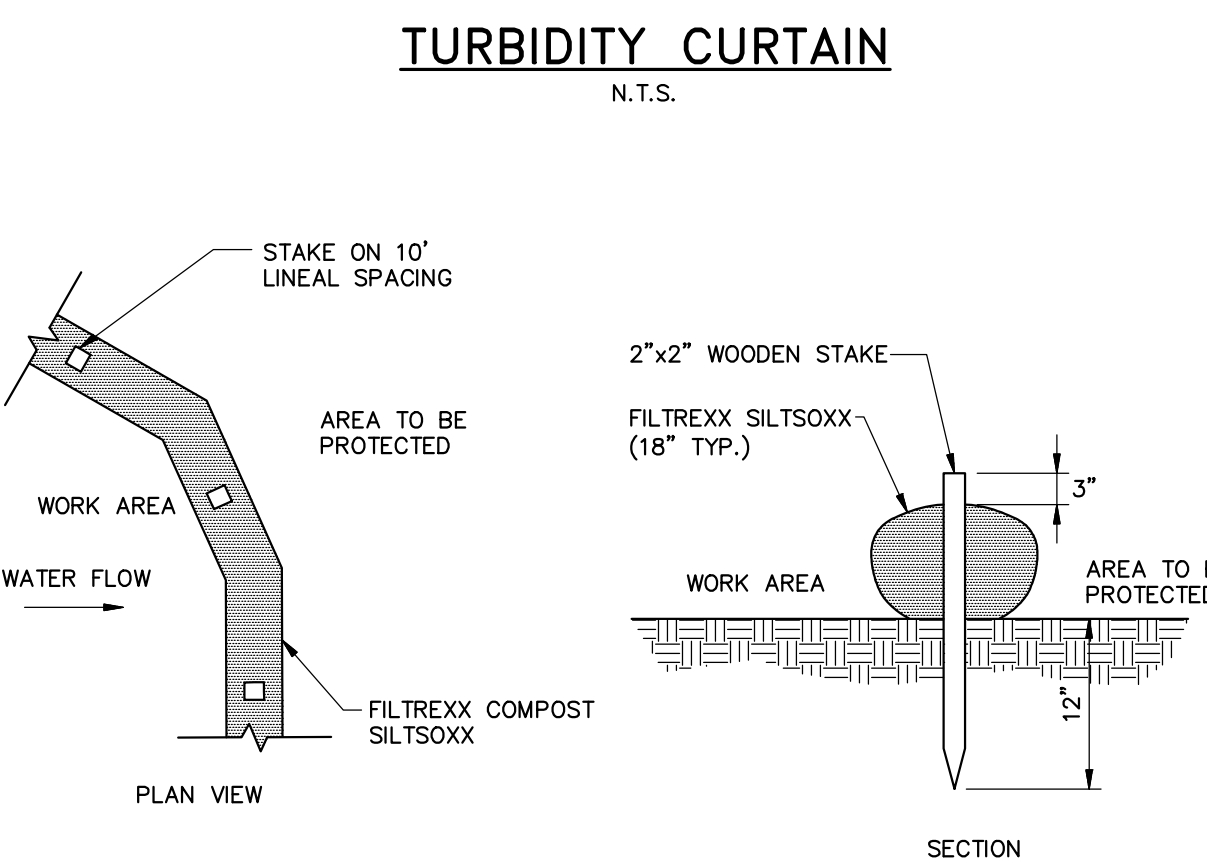
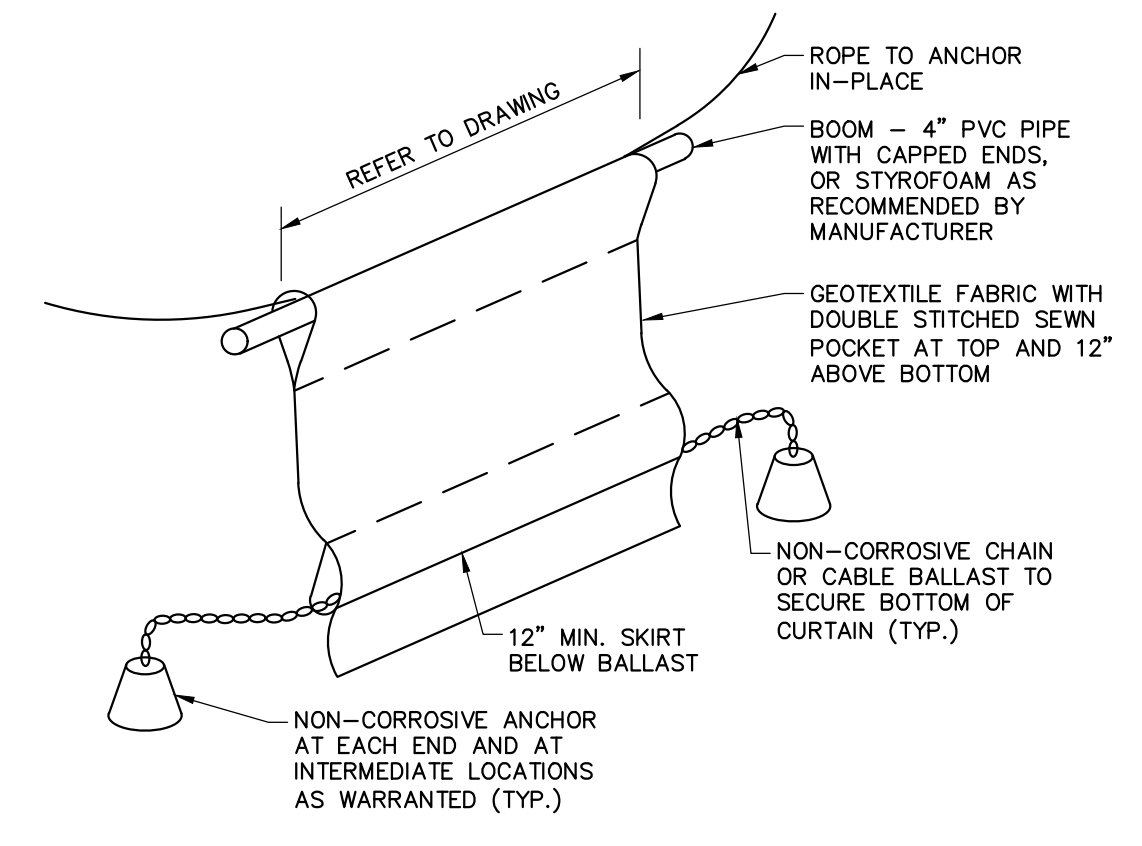
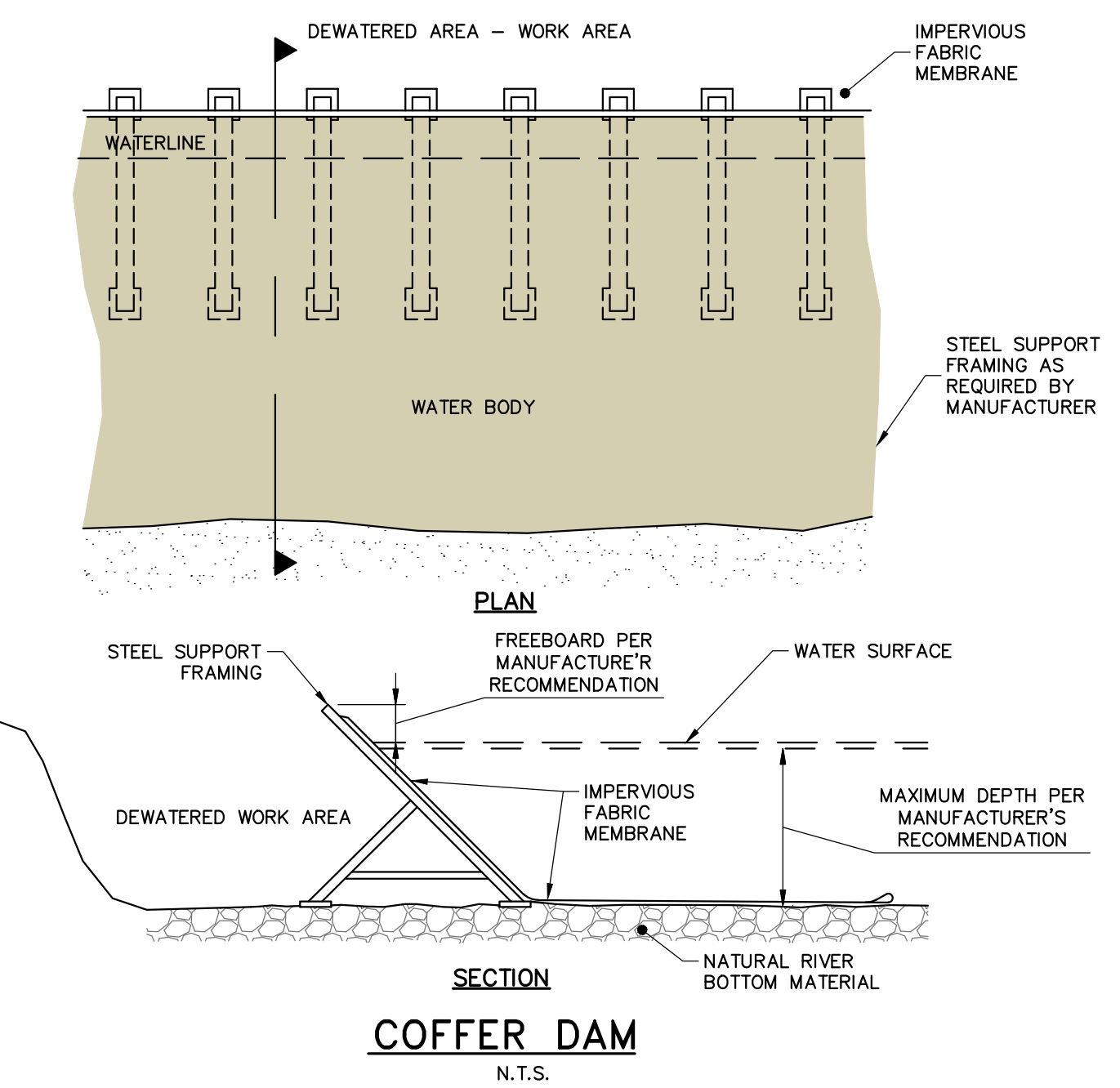
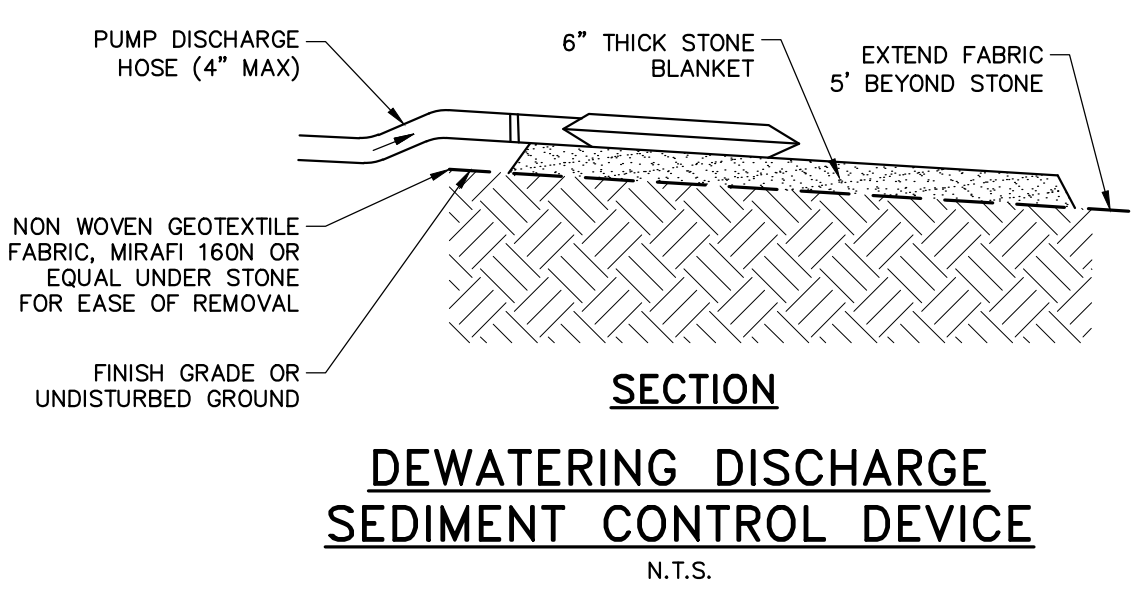
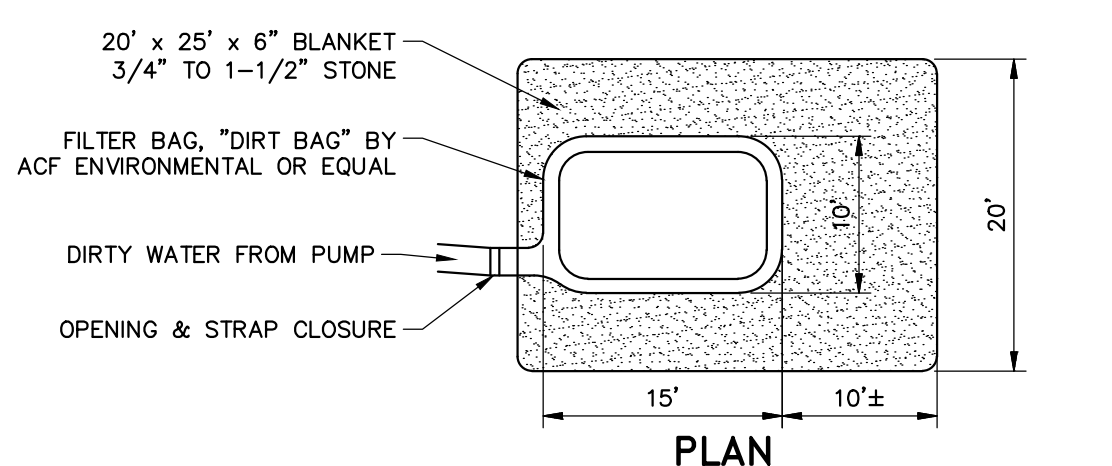
DEWATERING NOTES

- LOCATE DISCHARGE SITE ON FLAT UPLAND AREAS AS FAR AWAY AS POSSIBLE FROM STREAMS, WETLANDS, OTHER RESOURCES AND POINTS OF CONCENTRATED FLOW.
- NEVER DISCHARGE TO AREAS THAT ARE BARE OR NEWLY VEGETATED.
- DIRT BAG MATERIAL BASED ON PARTICLE SIZE IN DIRTY WATER, I.E., FOR COARSE PARTICLES A WOVEN MATERIAL; FOR SILTS/CLAYS A NON-WOVEN MATERIAL.
- DO NOT OVER PRESSURIZE DIRT BAG OR USE BEYOND CAPACITY.
- CHANNELS DUG FOR DISCHARGING WATER FROM THE EXCAVATED AREA NEED TO BE STABLE. IF FLOW VELOCITIES CAUSE EROSION WITHIN THE CHANNEL THEN A DITCH LINING SHOULD BE USED.
- BUCKETED WATER SHOULD BE DISCHARGED IN A STABLE MANNER TO THE SEDIMENT REMOVAL AREA. A SPLASH PAD OF RIPRAP UNDERLAIN WITH GEOTEXTILE MAY BE NECESSARY TO PREVENT SCOURING OF SOIL.
- DEWATERING IN PERIODS OF INTENSE, HEAVY RAIN, WHEN THE INFILTRATIVE CAPACITY OF THE SOIL IS EXCEEDED, SHOULD BE AVOIDED.
- INSTALL DIVERSION DITCHES OR BERMS TO MINIMIZE THE AMOUNT OF CLEAN STORMWATER RUNOFF ALLOWED INTO THE EXCAVATED AREA.
- DURING THE ACTIVE DEWATERING PROCESS, INSPECTION OF THE DEWATERING FACILITY SHOULD BE REVIEWED FREQUENTLY. SPECIAL ATTENTION SHOULD BE PAID TO THE BUFFER AREA FOR ANY SIGN OF EROSION AND CONCENTRATION OF FLOW THAT MAY COMPROMISE THE BUFFER AREA, OBSERVE WHERE POSSIBLE THE VISUAL QUALITY OF THE EFFLUENT AND DETERMINE IF ADDITIONAL TREATMENT CAN BE PROVIDED.
- EROSION CONTROL REQUIRED AROUND DEWATERING DISCHARGE SEDIMENT CONTROL DEVICE.



- PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED AS WELL AS REMOVING ANY PROTRUDING ROCKS, STUMPS OR ROOTS. DURING THE GROWING SEASON (APRIL 15 - SEPTEMBER 15) USE RECP'S ON SLOPES HAVING A GRADE GREATER THAN 15% OR ANYWHERE WHERE HAY MULCH HAS PROVEN TO BE INEFFECTIVE AT CONTROLLING SHEET EROSION. RECP'S ARE A MANUFACTURED COMBINATION OF MULCH AND NETTING DESIGNED TO PREVENT EROSION AND RETAIN SOIL MOISTURE. FOR OVER WINTER PROTECTION, APPLY RECP'S ON SLOPES STEEPER THAN AN 8% GRADE.
- BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP'S IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP'S EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP'S WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH (USE OF METAL STAPLES IS PROHIBITED). BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP'S BACK OVER SEED AND COMPACTED SOIL. SECURE RECP'S OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE RECP'S.
- ROLL THE RECP'S (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP'S WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP'S MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
- THE EDGES OF PARALLEL RECP'S MUST BE STAPLED WITH APPROXIMATELY 2" - 5" OVERLAP DEPENDING ON RECP'S TYPE.
- CONSECUTIVE RECP'S SPICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE RECP'S WIDTH. NOTE: *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE RECP'S.
- UNTIL GRASS HAS GOOD COVERAGE, INSPECT PERIODICALLY AND AFTER EACH RAINSTORM TO CHECK FOR EROSION. IMMEDIATELY REPAIR AND ADD MORE MULCH UNTIL GRASSES ARE FIRMLY ESTABLISHED. DO NOT MOW THE FIRST YEAR.
- EROSION CONTROL MATTING AND GROUND FASTENERS SHALL BE 100% BIODEGRADABLE.

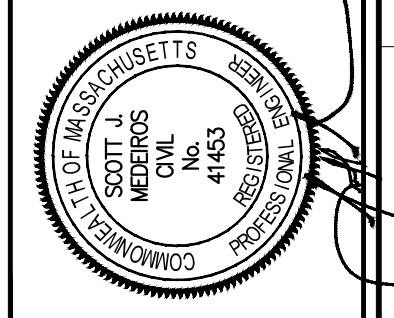
EROSION CONTROL MATTING
N.T.S.



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NO.	REV.	DESCRIPTION	DATE
1	1	METAL INERT REVISION	2/16/2023
2	1	RESPONSE TO DEP COMMENTS	2/9/2023

DESIGNED BY: KLD
CHECKED BY: RN
DRAWN BY: BCM

CIVIL DETAILS - 1

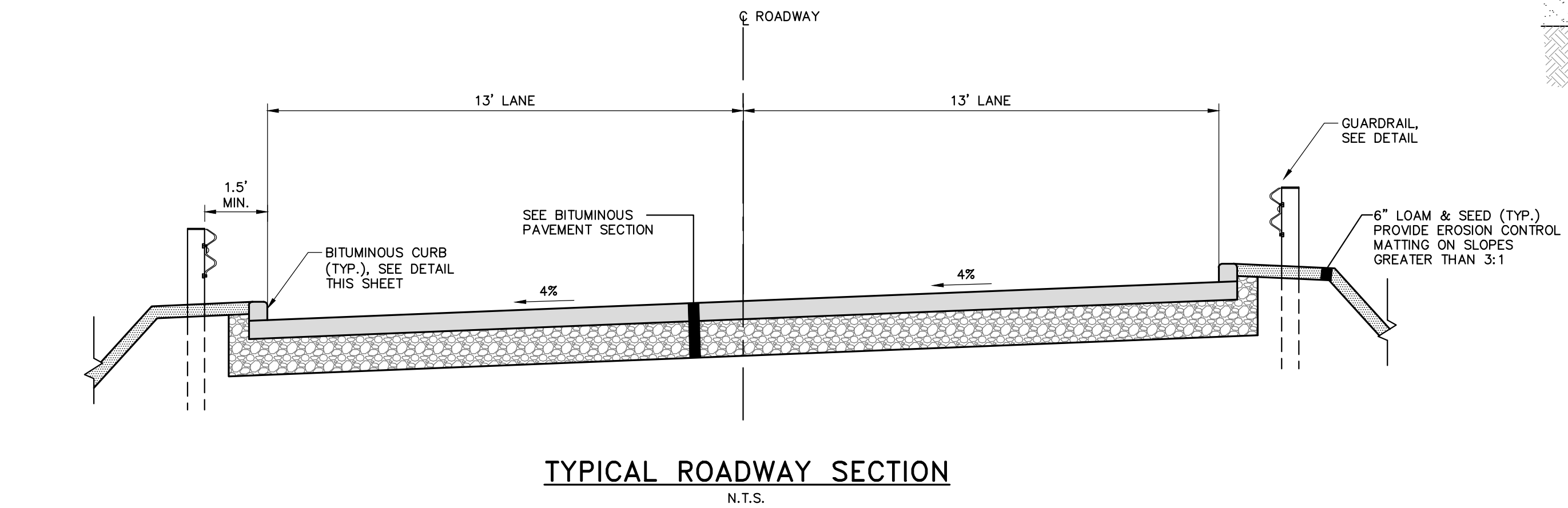
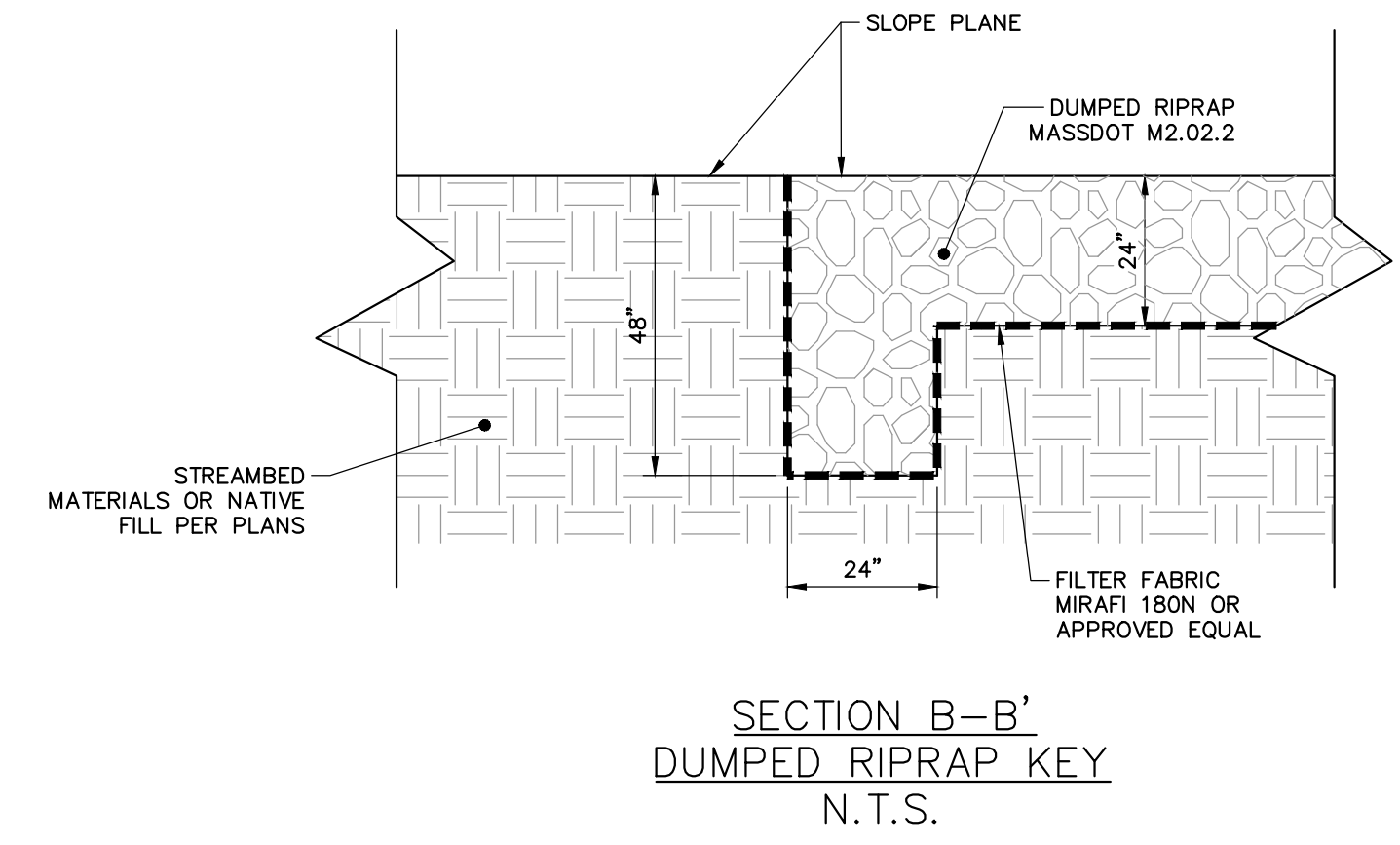
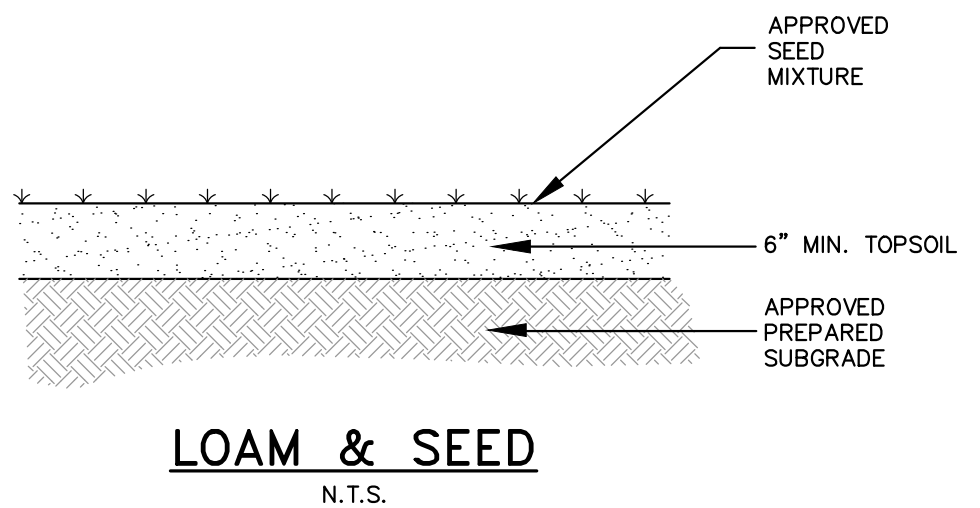
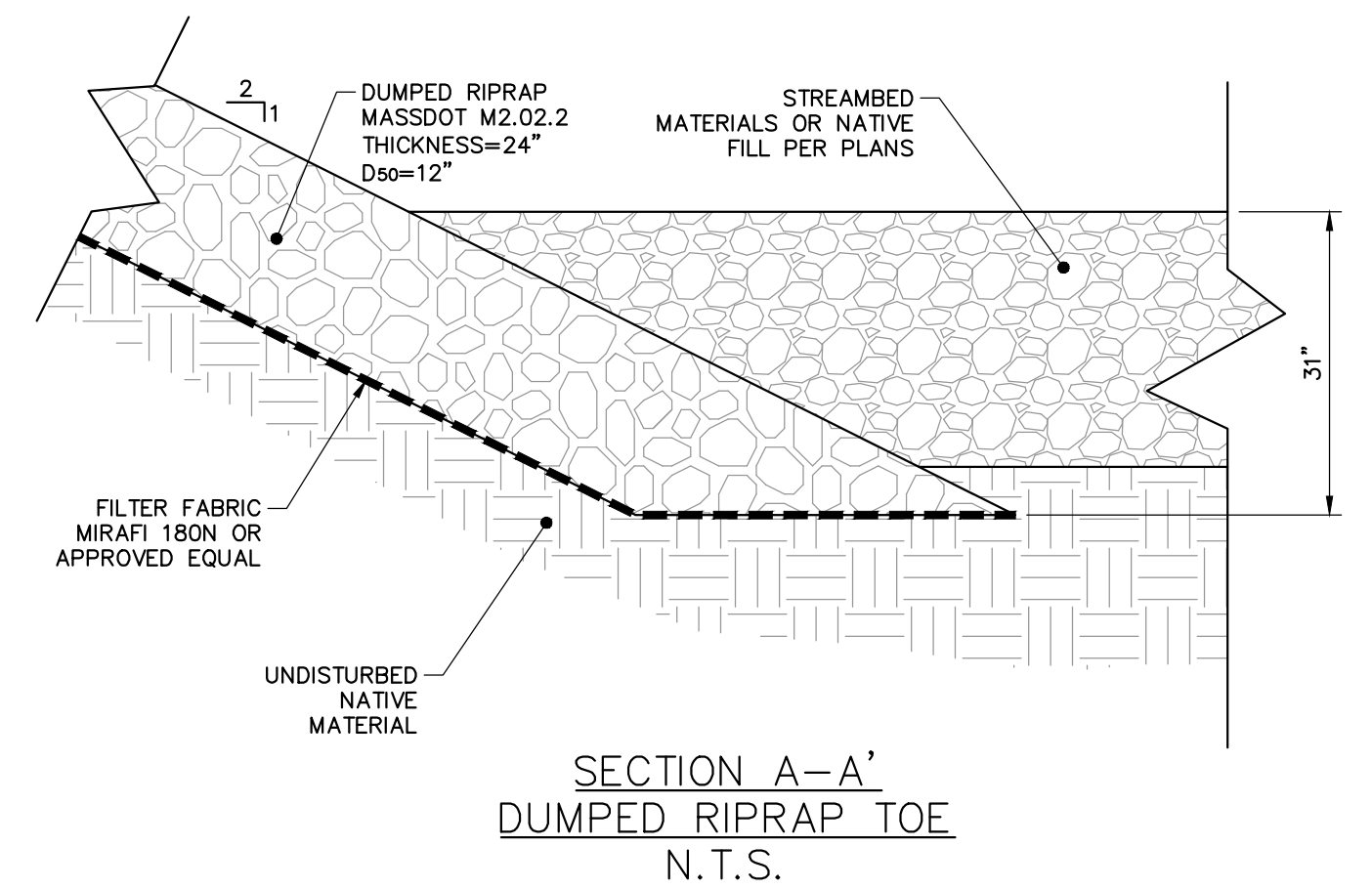
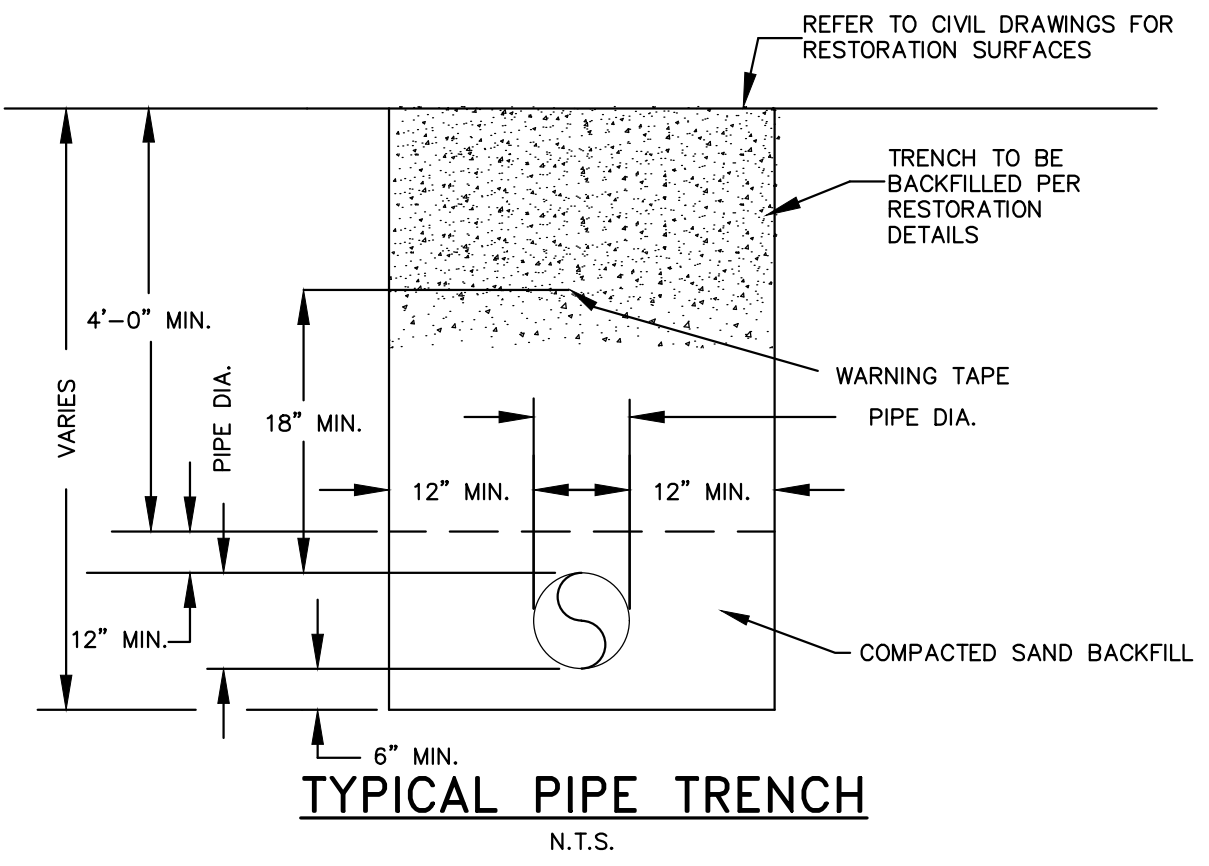
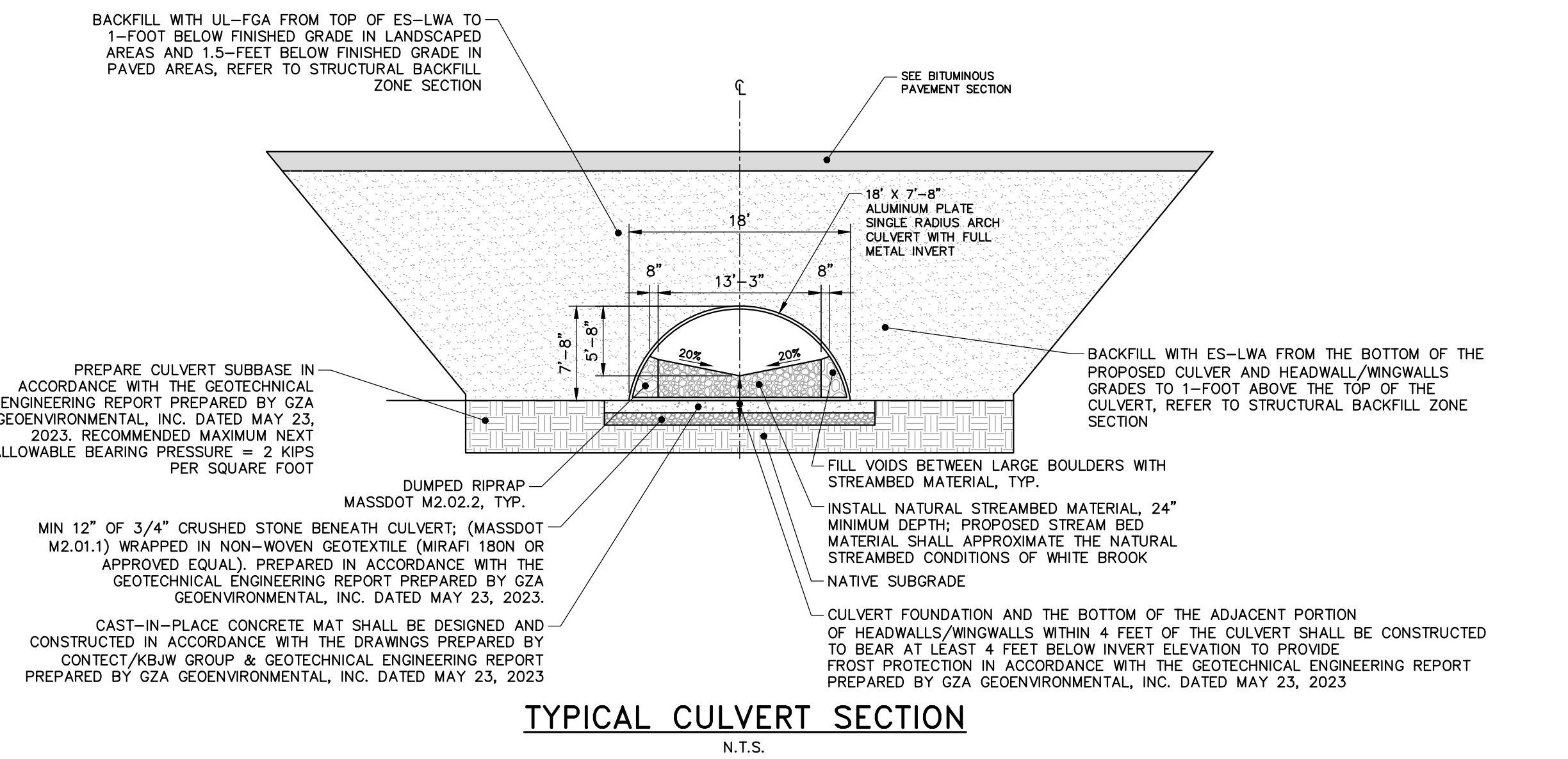
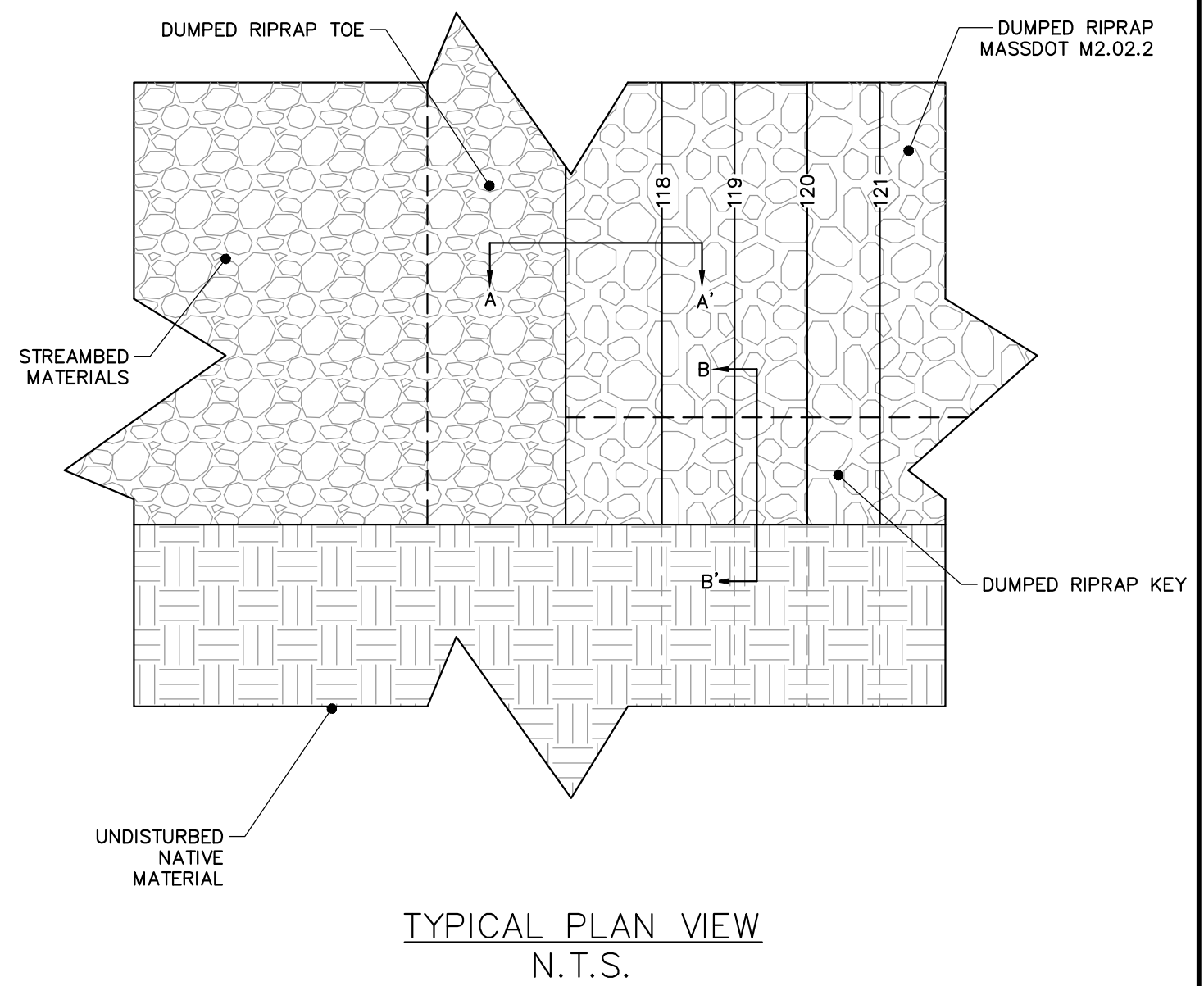
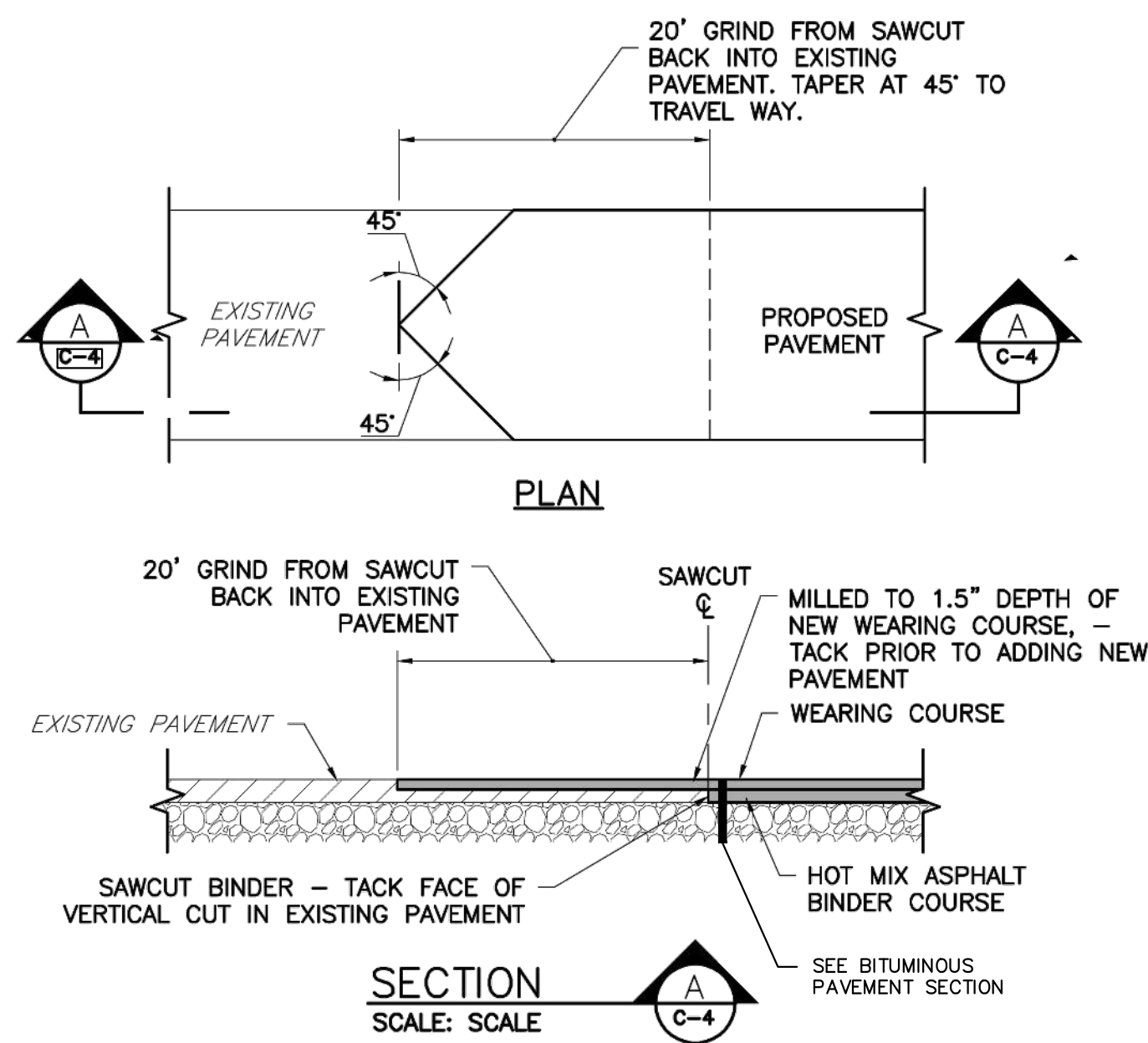
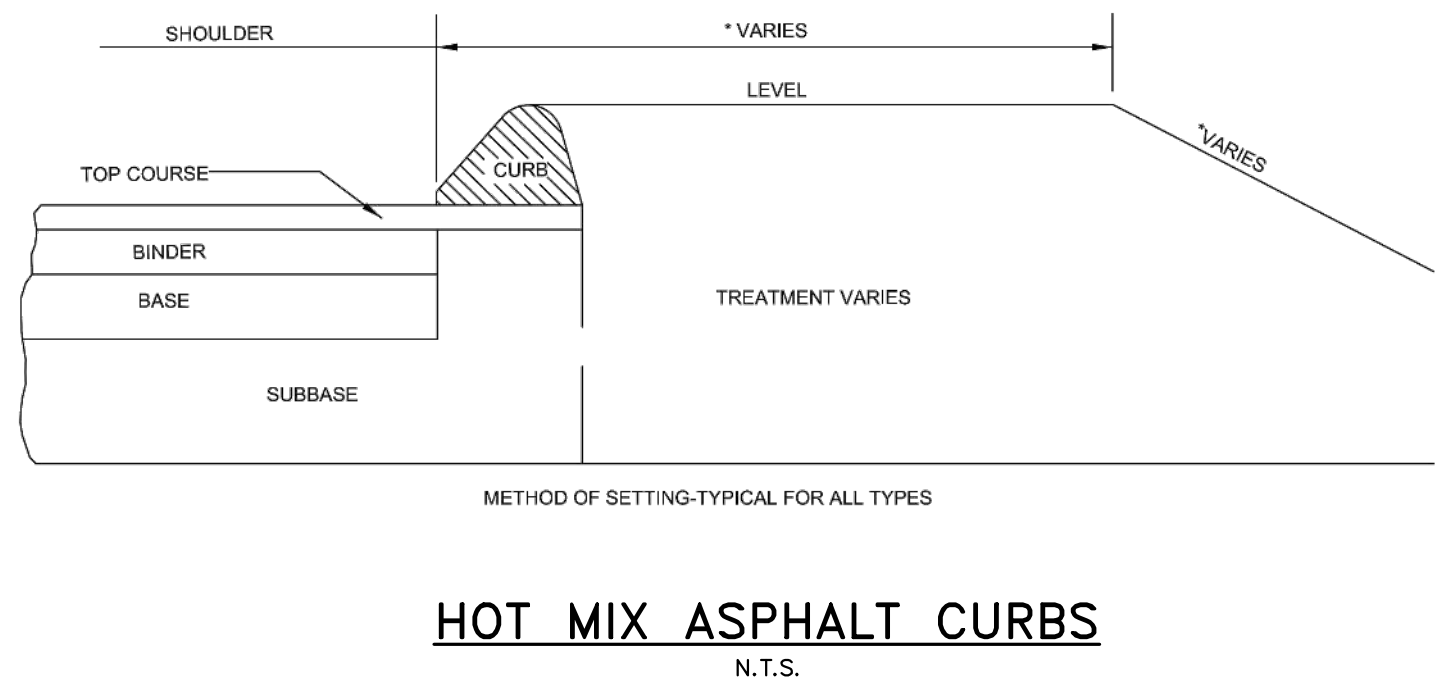
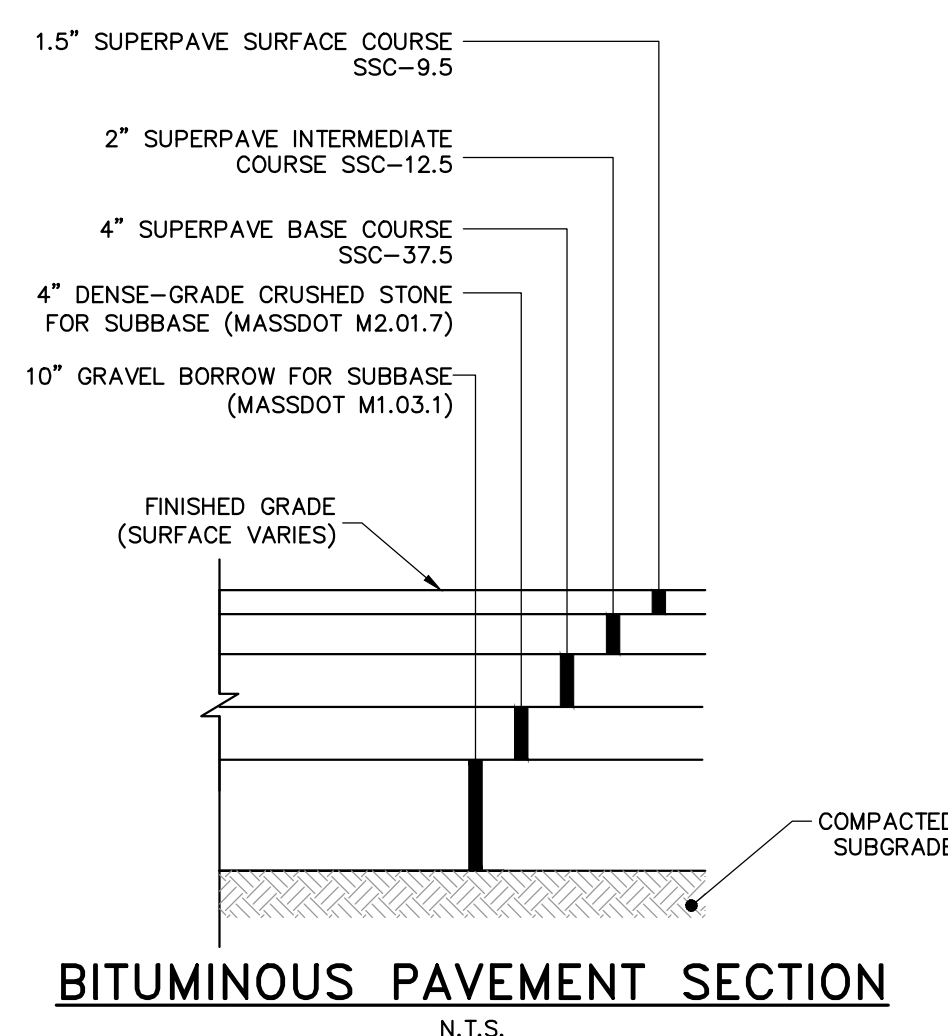
TOWN OF AGAWAM
AGAWAM, MA

WHITE BROOK OVER
NORTH STREET CULVERT
REPLACEMENT

JOB NO:	0234052.00
DATE:	JUNE 2023
SCALE:	1" = 20'
SHEET:	9 OF 12

C-200

ISSUED FOR BID



COMMONWEALTH OF MASSACHUSETTS
MASSDOT, HIGHWAY DIVISION
**CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING**

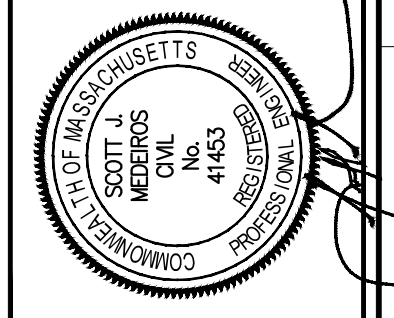
DISTRICT TWO BRIDGE ENGINEER _____ DATE _____

DUMPED RIPRAP DETAILS
N.T.S.

40 Shattuck Road, Suite 110
Andover, Massachusetts 01810
866.702.6371 | www.woodardcurran.com

Woodard & Curran
COMMITMENT & INTEGRITY DRIVE RESULTS

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REV	DESCRIPTION	DATE	CHECKED BY	DATE
1	METAL INVERT REVISION	2/16/2023	KLD	2/9/2023
2	RESPONSE TO DEP COMMENTS	4/15/23	BCM	

DESIGNED BY: BCM
DRAWN BY: BCM

CIVIL DETAILS - 2

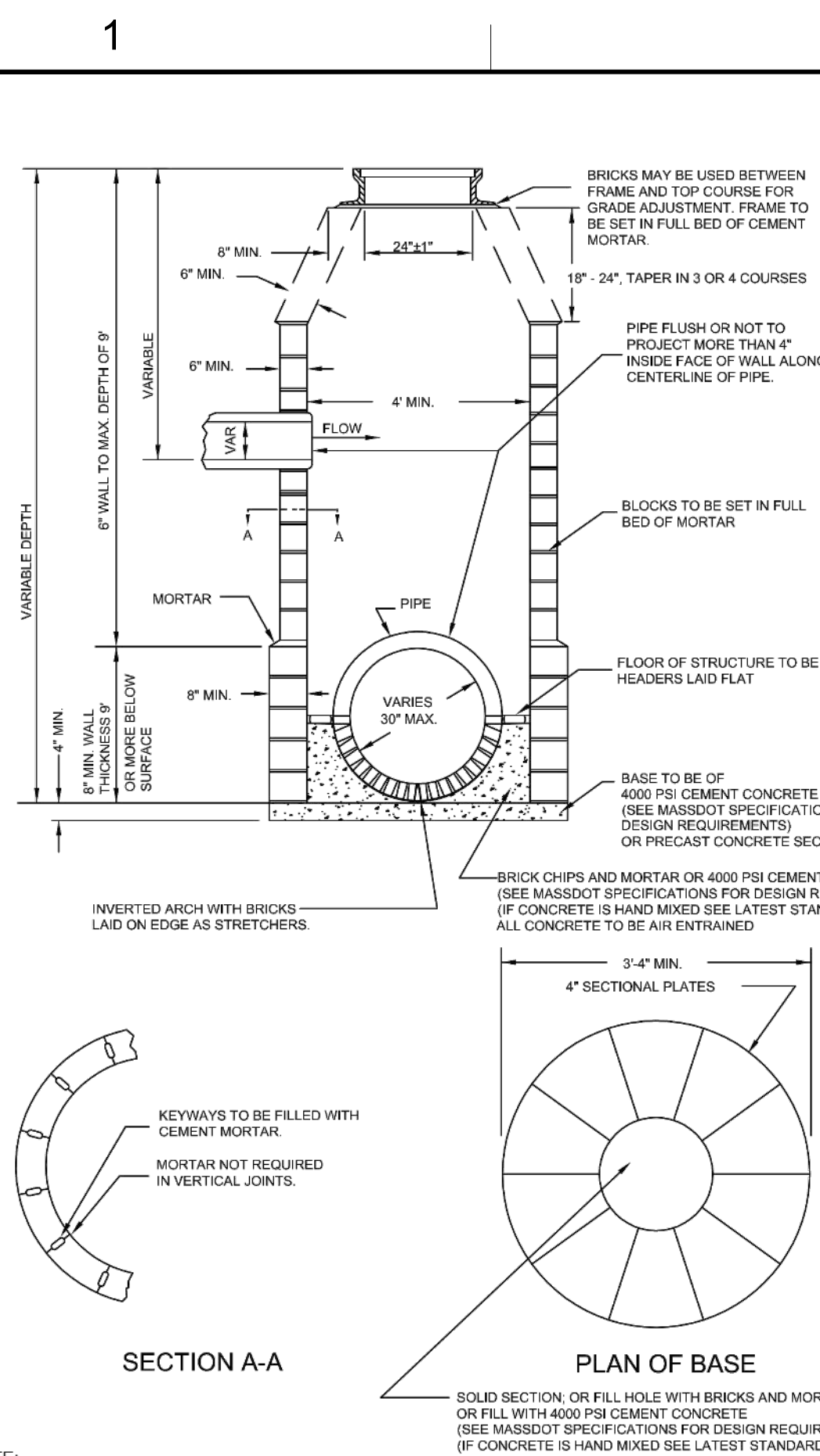
TOWN OF AGAWAM
AGAWAM, MA

WHITE BROOK OVER
NORTH STREET CULVERT
REPLACEMENT

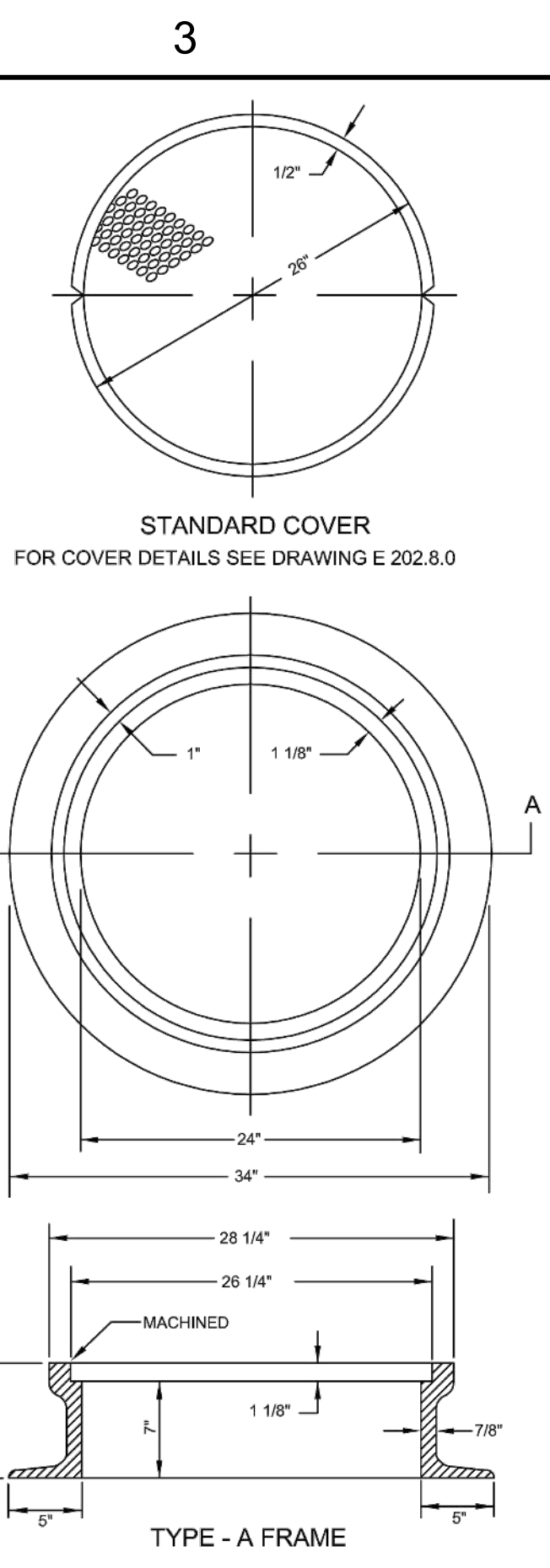
JOB NO: 0234052.00
DATE: JUNE 2023
SCALE: 1"=20'
SHEET: 10 OF 12

C-201

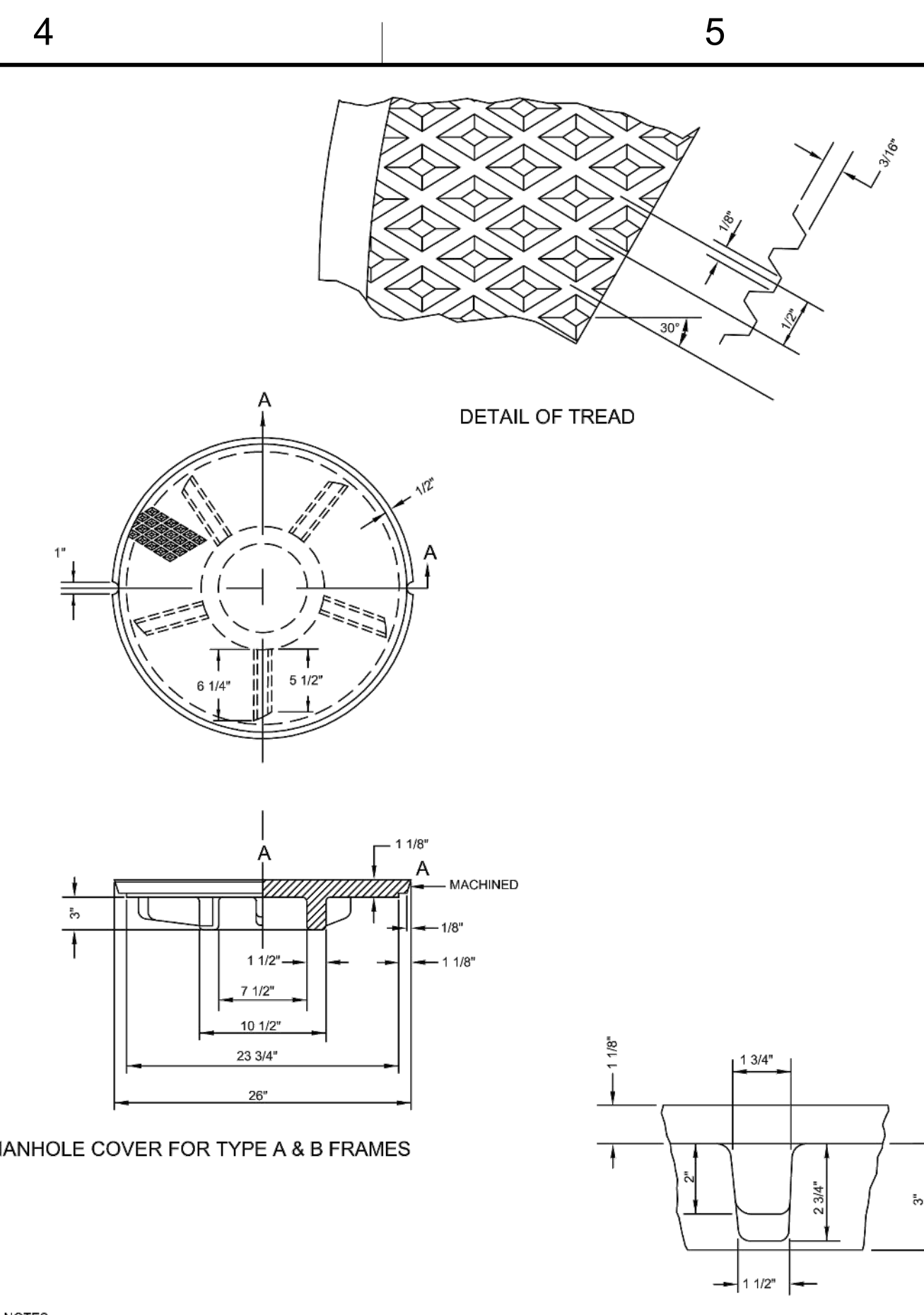
ISSUED FOR BID



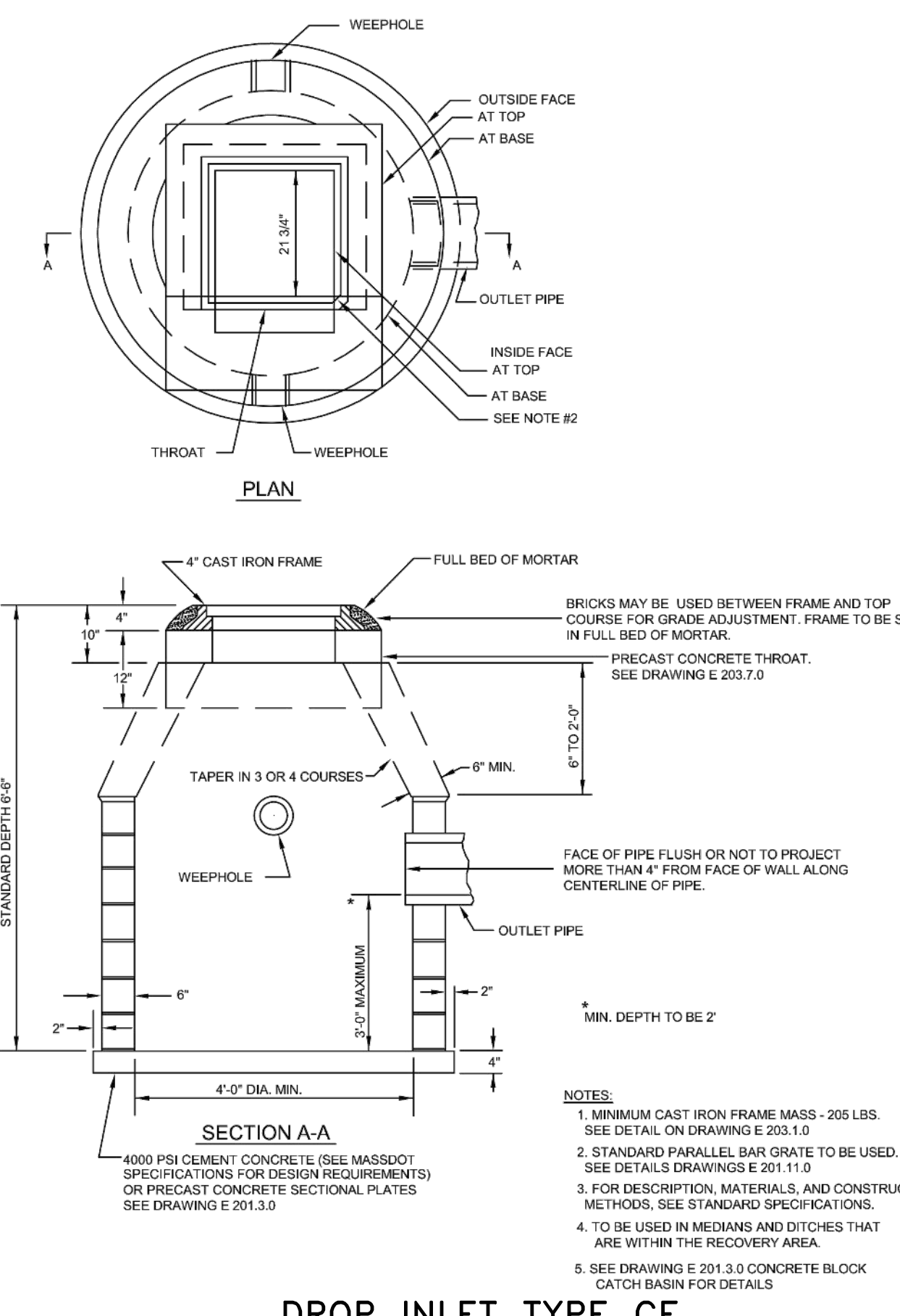
CONCRETE BLOCK MANHOLE MANHOLES OVER 9' IN DEPTH
 N.T.S.



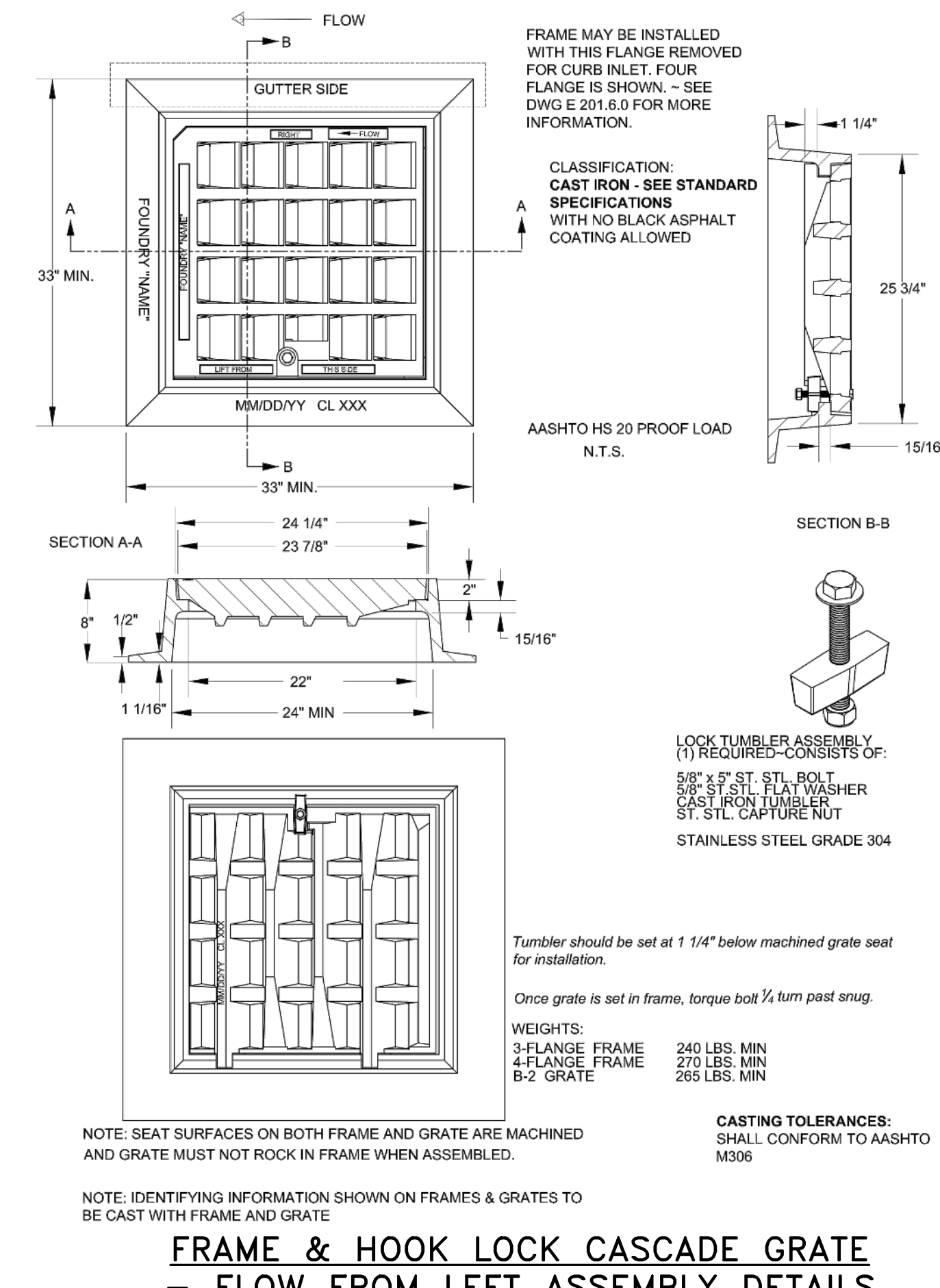
MANHOLE FRAME & COVER - A FRAME
 N.T.S.



MANHOLE COVER DETAILS
 N.T.S.



DROP INLET TYPE CF
 N.T.S.



FRAME & HOOK LOCK CASCADE GRATE - FLOW FROM LEFT ASSEMBLY DETAILS
 N.T.S.

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 Andover, Massachusetts 01810
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PROFESSIONAL SEAL: SCOTT A. MEDBROS, CIVIL ENGINEER, LICENSE NO. 41453, STATE OF MASSACHUSETTS

DESIGNED BY: KLD	CHECKED BY: RT
DRAWN BY: BCM	DATE: 2/9/2023
REVISION: 2/9/2023	DATE: 2/9/2023
RESPONSE TO DEF. COMMENTS	DATE: 2/9/2023
METAL INVERT REVISION	DATE: 2/9/2023

CIVIL DETAILS - 3

TOWN OF AGAWAM
 AGAWAM, MA

WHITE BROOK OVER
 NORTH STREET CULVERT
 REPLACEMENT

JOB NO: 0234052.00
 DATE: JUNE 2023
 SCALE: 1"=20'
 SHEET: 11 OF 12

C-202

ISSUED FOR BID

A

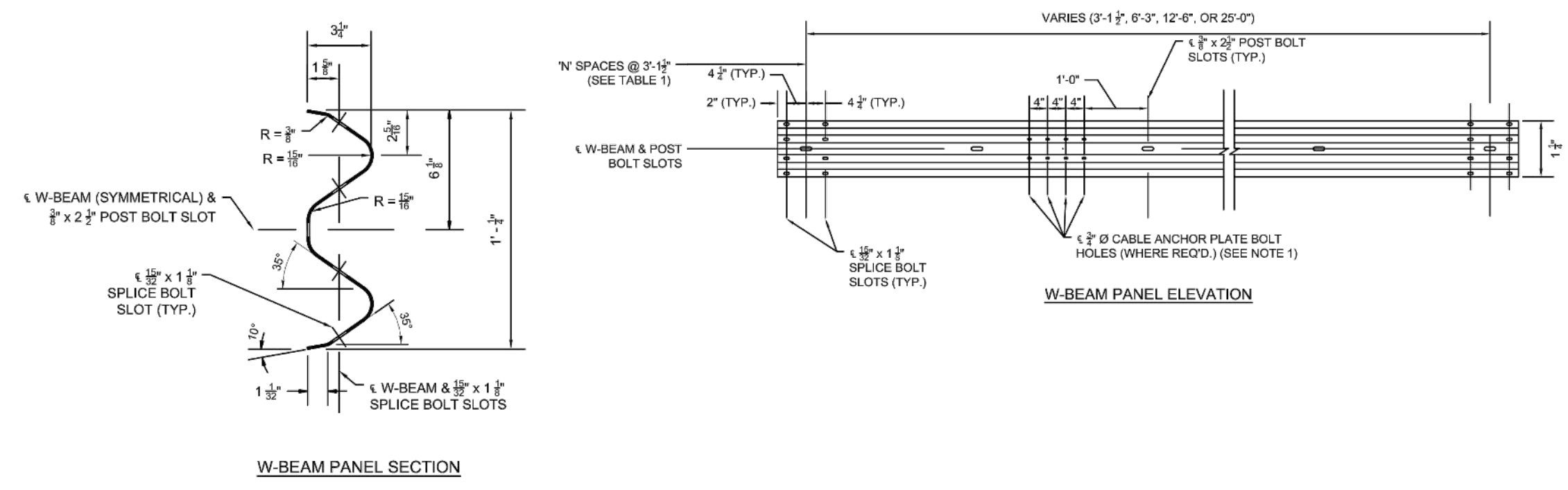


TABLE 1 : PANEL SUMMARY

PANEL TYPE	NUMBER OF SPACES, N	GAUGE
6'-0" W-BEAM	2	12
9'-0" W-BEAM	3	12
12'-0" W-BEAM	4	12
25'-0" W-BEAM	8	12
12'-0" THRIE-BEAM	4	12
25'-0" THRIE-BEAM	8	12
THRIE-BEAM TRANS.	2	10

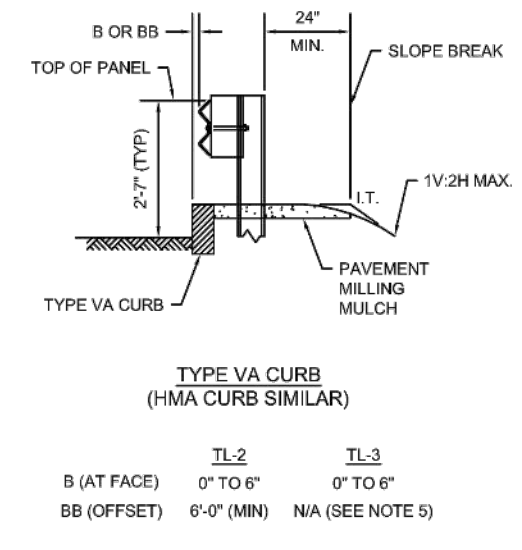


TABLE 2 : 3/8" BUTTON-HEAD BOLT LENGTHS

APPLICATION(S)	LENGTH L ¹	MIN. THREAD LENGTH
PANEL SPlice	1'-2"	FULL LENGTH
STEEL POST MOUNT - SINGLE FACED	1'-0"	4"
TIMBER POST MOUNT - SINGLE FACED	1'-0"	4"
STEEL POST MOUNT - DOUBLE FACED	1'-0"	4"
TERMINAL CONNECTOR SPlice	2"	FULL LENGTH

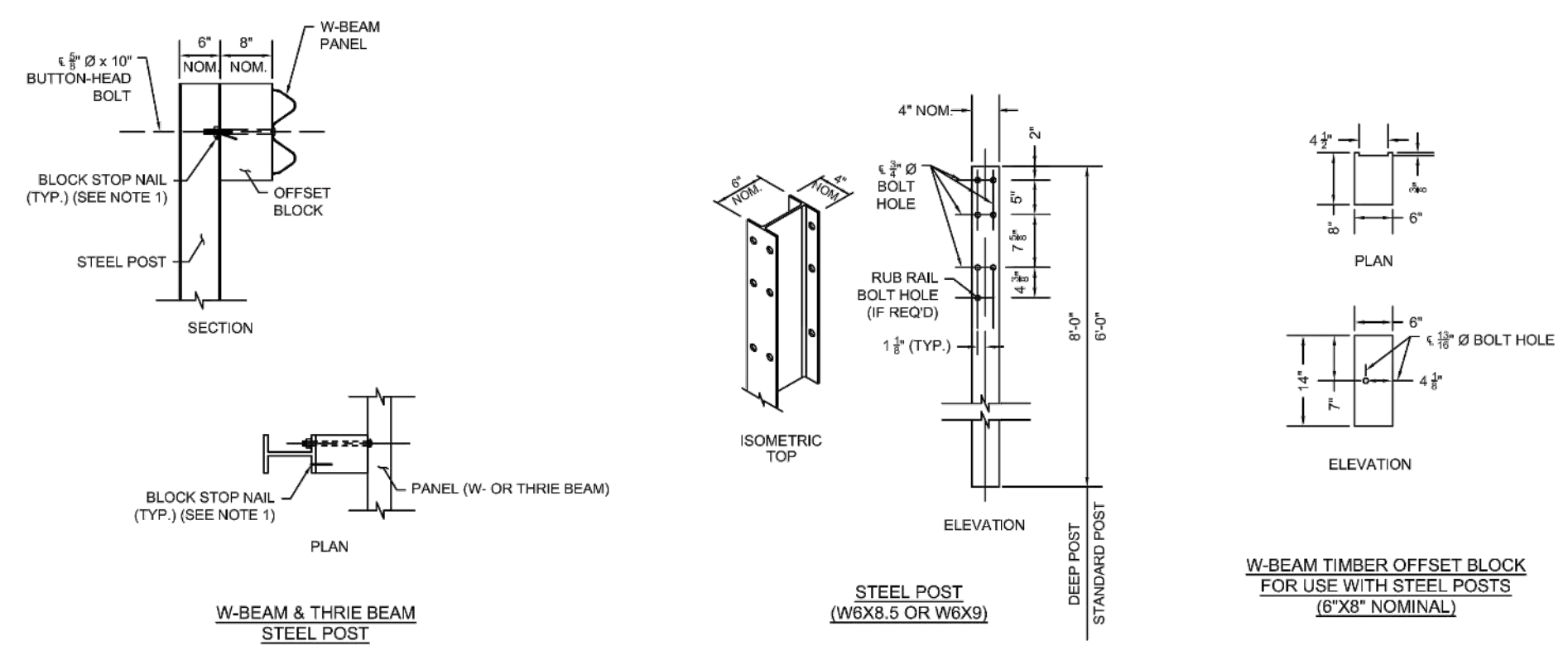
TL-3 GUARDRAIL SHALL NOT BE OFFSET FROM VERTICAL CURB AND SINGLE FACED TL-3 GUARDRAIL SHALL NOT BE OFFSET FROM SLOPED EDGING UNLESS OTHERWISE SHOWN IN THE PLANS OR THESE STANDARDS.

GUARDRAIL SECTION
N.T.S.

NOTE:
1. GUARDRAIL INSTALLATION SHALL INCLUDE REFLECTIVE GUARDRAIL DELINEATORS (MASSDOT ITEM M9.30.7) IN ACCORDANCE WITH MASSDOT STANDARD SPECIFICATIONS.

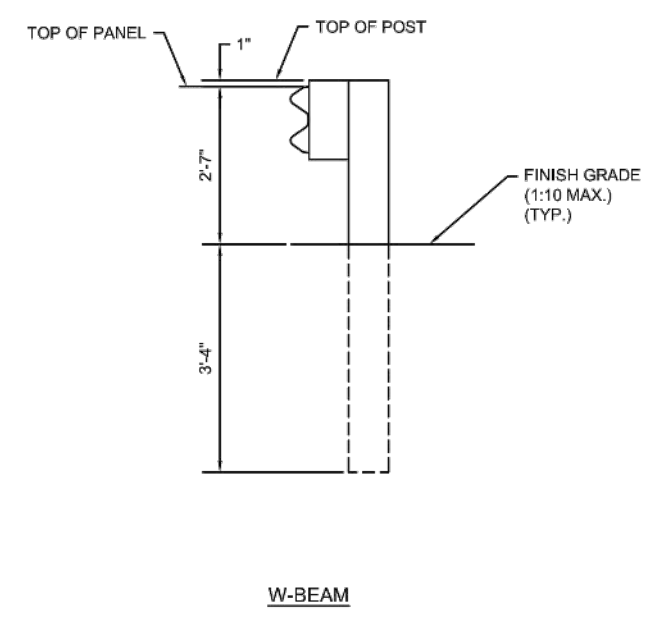
W-BEAM & THRIE BEAM PANEL DETAILS
N.T.S.

B



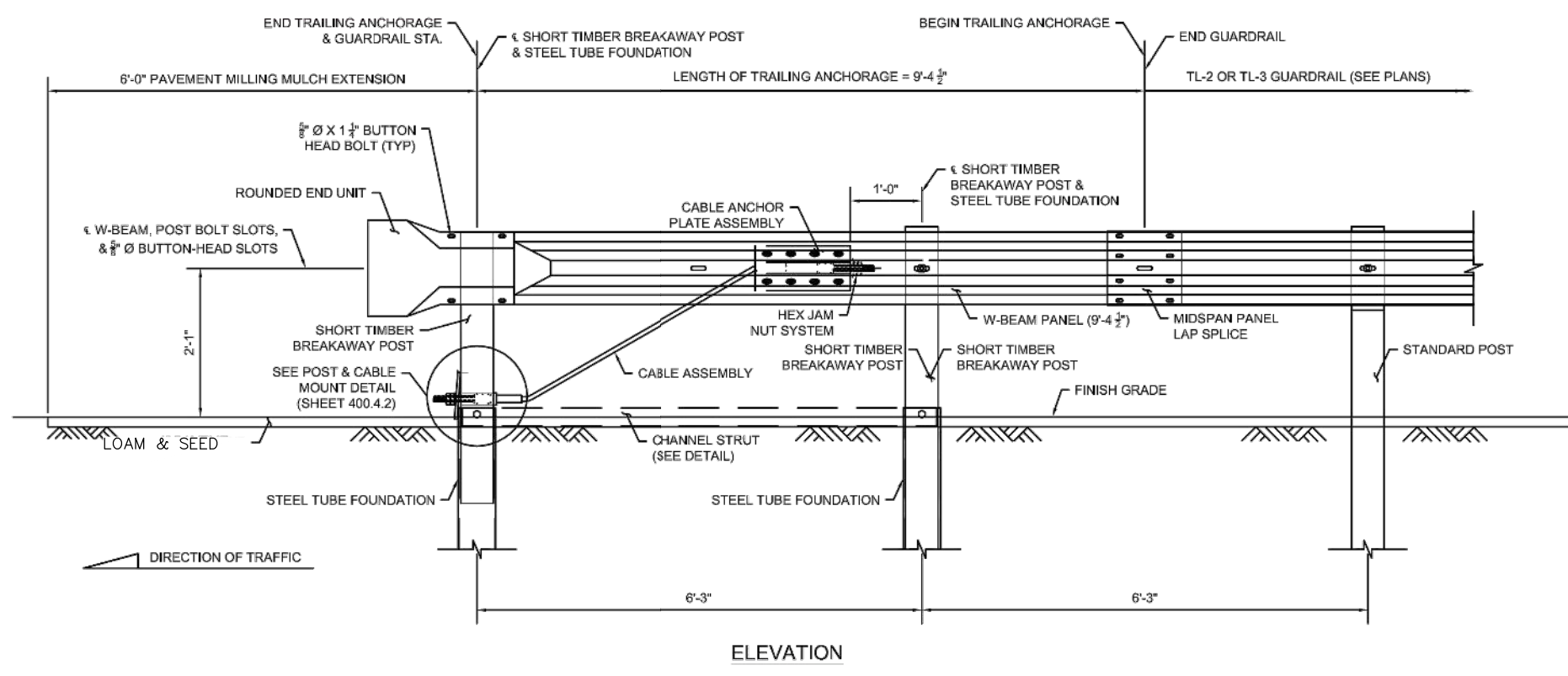
NOTES:
1. DRIVE ONE NAIL PER W BEAM TIMBER OFFSET BLOCK TO PREVENT BLOCK ROTATION. USE ASTM A153 HOT DIP GALVANIZED STEEL 3/16" TYPE 160 NAILS FOR STEEL POSTS. DRIVE THE NAIL THROUGH THE UNUSED FLANGE BOLT HOLE AND BEND THE NAIL SO ITS HEAD CONTACTS THE FLANGE.
2. DEEP STEEL POSTS SHALL ONLY BE USED WHERE INDICATED IN THESE STANDARDS OR THE PLANS.

POST & OFFSET BLOCK DETAILS
N.T.S.

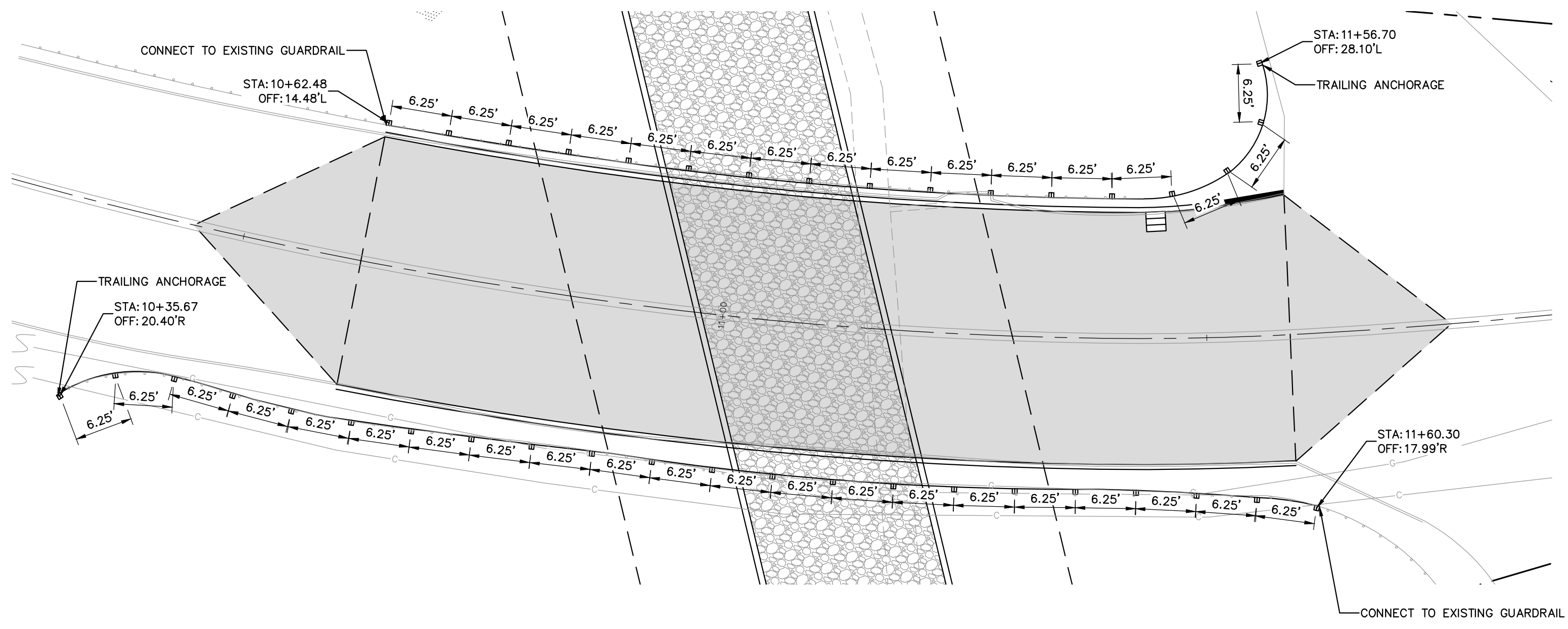


NOTES:
1. CONSTRUCTION TOLERANCE FOR PANEL HEIGHT ± 1/8\"/>

GUARDRAIL MOUNTING HEIGHTS & POST DEPTHS
N.T.S.



TRAILING ANCHORAGE
N.T.S.

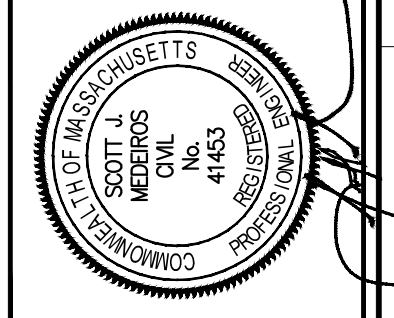


GUARDRAIL DETAIL PLAN VIEW
N.T.S.

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REV	DESCRIPTION	DATE	CHECKED BY	DATE
1	METAL INVERT REVISION	2/16/2023	KLD	2/16/2023
2	RESPONSE TO DEF COMMENTS	2/16/2023	KLD	2/16/2023

DESIGNED BY: KLD
DRAWN BY: BCM
CHECKED BY: RT
DATE: 02/24/2023

CIVIL DETAILS - 4

TOWN OF AGAWAM
AGAWAM, MA

WHITE BROOK OVER
NORTH STREET CULVERT
REPLACEMENT

JOB NO:	0234052.00
DATE:	JUNE 2023
SCALE:	AS NOTED
SHEET:	12 OF 12

C-203

ISSUED FOR BID

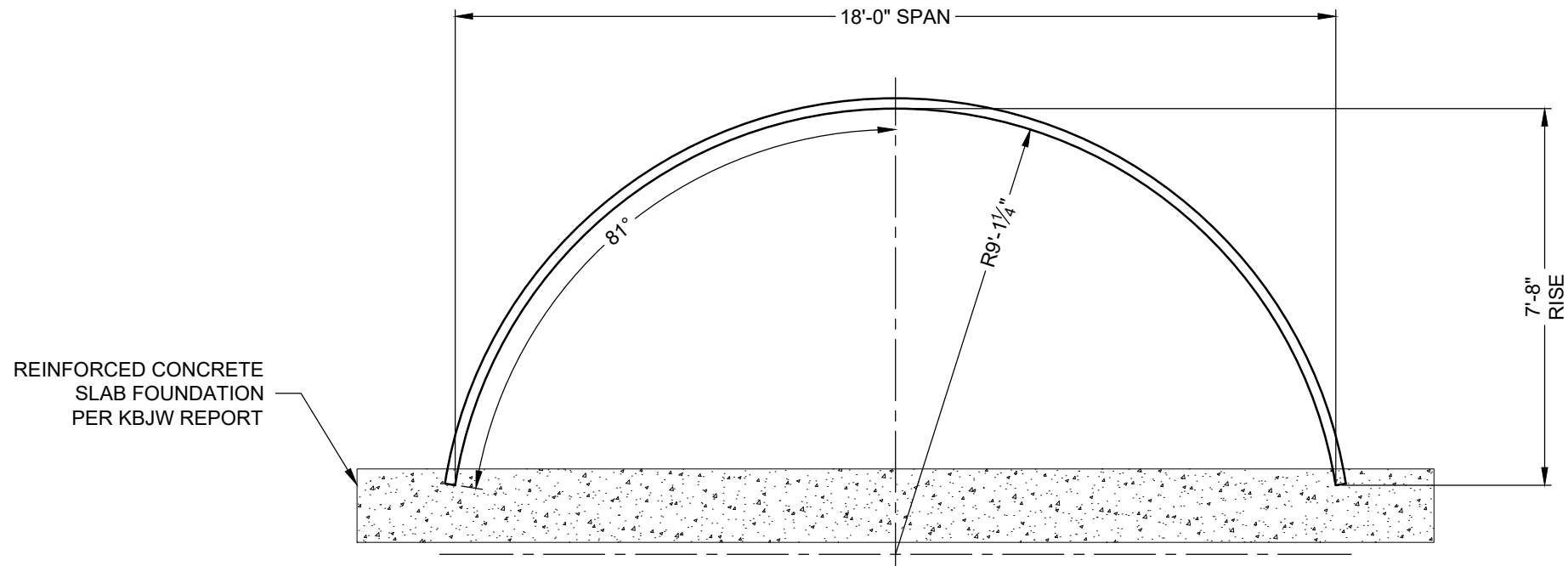
WoodardCurran.net\shared\Projects\0234052.00_Agawam MA - North Street Culvert\FSWP\Drawings\Civil\0234052.00-C-203.dwg, Jun 21, 2023 - 9:05am BMCDEV/TT

GENERAL NOTES:

1. THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE ALUMINUM STRUCTURAL PLATE (ALSP) SINGLE RADIUS ARCH STRUCTURE AS DETAILED IN THE PLANS. ANY INSTALLATION INFORMATION PROVIDED HEREIN SHALL BE REVIEWED AND APPROVED BY THE ENGINEER. CHANGES AND DISCREPANCIES MUST BE FORWARDED TO THE MANUFACTURER TO BE INCORPORATED IN A REVISED DRAWING SET.
2. THE ENGINEER SHALL VERIFY THAT THE PROPOSED STRUCTURE IS APPROPRIATE FOR THE SITE CONDITIONS AND THE DESIGN PARAMETERS ARE CONSISTENT WITH THE PROJECT REQUIREMENTS. ALL ASPECTS OF THE STRUCTURE DESIGN AND SITE LAYOUT NOT EXPLICITLY INCLUDED IN THESE DRAWINGS SHALL BE PROVIDED OR COORDINATED BY THE ENGINEER. THIS MAY INCLUDE BUT IS NOT LIMITED TO: FOUNDATIONS, BACKFILL, END TREATMENTS, HYDRAULIC ANALYSIS AND SCOUR ANALYSIS AS REQUIRED.
3. CONTECH PRODUCT DRAWINGS MAY NOT BE USED, REPRODUCED, COPIED, OR ISSUED TO A THIRD PARTY WITHOUT THE PRIOR WRITTEN PERMISSION OF CONTECH ENGINEERED SOLUTIONS.
4. ALL DIMENSIONS ARE TO THE INSIDE CREST OF THE CORRUGATION PROFILE UNLESS NOTED OTHERWISE AND ARE SUBJECT TO MANUFACTURING TOLERANCES.
5. THE STRUCTURE GEOMETRY, DESIGN, AND MATERIALS AS SHOWN IN THESE DRAWINGS ONLY APPLY TO THE ALSP SINGLE RADIUS ARCH, DESIGNED AND FABRICATED BY CONTECH ENGINEERED SOLUTIONS (CONTECH). ALTERNATIVE SYSTEMS SHALL BE FULLY DESIGNED AND APPROVED PRIOR TO BIDDING, WITH SEALED DRAWINGS AND CALCULATIONS PROVIDED TO DEMONSTRATE COMPLIANCE WITH THE SAME GEOMETRY, DESIGN, AND MATERIAL REQUIREMENTS AS SHOWN HEREIN.
6. CIRCUMFERENTIAL PLATE LENGTHS ARE IN TERMS OF $N = 9.625$ INCHES.
7. FOR WATER CONVEYANCE APPLICATIONS THE STRUCTURE MUST MEET HYDRAULIC REQUIREMENTS OF THE SITE AS DETERMINED BY THE ENGINEER. SHEET PILING, INLET AND OUTLET APRONS, CUTOFF WALLS, RIP RAP, AND/OR OTHER MEASURES SHALL BE INSTALLED AS NECESSARY TO PREVENT LOSS OF ENGINEERED BACKFILL AND/OR FOUNDATION SOILS DUE TO SCOUR. THE EXTENT, SIZE, AND LOCATION OF SCOUR PROTECTION SHALL BE DETERMINED BY THE ENGINEER.
8. PERIMETER DRAINAGE, SURFACE DRAINAGE, AND GRADING AROUND THE STRUCTURE SHALL BE DESIGNED, SPECIFIED, SUPPLIED, AND INSTALLED BY OTHERS.

DESIGN PARAMETERS

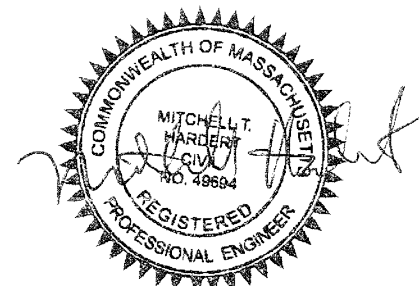
1. DESIGN BY CONTECH ENGINEERED SOLUTIONS IS BASED ON THE FOLLOWING DESIGN CRITERIA:
 VEHICLE LIVE LOAD: HL-93
 MINIMUM COVER: 10'
 MAXIMUM COVER: 12'
 UNIT WEIGHT OF ENGINEERED BACKFILL = 50 LBS/FT³
2. ENGINEERED BACKFILL MATERIAL SHALL COMPLY WITH THE ENGINEERED BACKFILL MATERIAL REQUIREMENTS SHOWN IN THESE DRAWINGS.
3. DESIGN COVER AND LATERAL EXTENT OF ENGINEERED BACKFILL ZONE SHALL BE AS SHOWN IN THESE DRAWINGS AND REQUIRED BY THE DESIGN STANDARDS REFERENCED IN THESE NOTES.
4. REFERENCE AASHTO LRFD SECTION 12.6.1 FOR SEISMIC DESIGN CONSIDERATIONS.
5. STRUCTURE DESIGN BASED ON SITE SOIL INFORMATION PROVIDED IN CONTRACT DOCUMENTS. IF UNEXPECTED SITE SOIL CONDITIONS ARE ENCOUNTERED, CONTECH MUST BE NOTIFIED TO DETERMINE IF DESIGN CHANGES ARE NEEDED.
6. TEMPORARY CONSTRUCTION VEHICLE LOADING HEAVIER THAN THE DESIGN VEHICLE LIVE LOAD SHALL NOT BE PERMITTED TO CROSS OVER THE STRUCTURE WITHOUT THE APPROVAL OF CONTECH. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY CONTECH OF THE SIZE, TYPE AND WEIGHT OF ANY CONSTRUCTION VEHICLES INTENDED TO CROSS OVER THE STRUCTURE.
7. STANDARD HIGHWAY LOADS THAT MEET PERMISSIBLE DESIGN LOAD LIMITS FOR AN ALSP SINGLE RADIUS ARCH ARE NOT ALLOWED ON THE STRUCTURE UNTIL IT IS BACKFILLED COMPLETELY AND PAVEMENT IS IN PLACE.
8. IT IS RECOMMENDED THAT UNPAVED ROADS INCORPORATE AT LEAST 6" MORE THAN MINIMUM ALLOWABLE COVER DEPTH TO ALLOW FOR RUTTING.



STRUCTURE CROSS-SECTION

APPROX. AREA= 104.5 SQ. FT.
 PLATE MAKE UP: 2 @ 16N
 TOTAL= 32N

- NOTES:**
1. ALL DIMENSIONS ARE TO THE INSIDE CORRUGATION, UNLESS NOTED.
 2. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.



Approved By	MTH	Date	5/5/23	 Formerly CBC Engineers	Rev.	Date	By	Description
Project No.	23-26882-001	Rev.	1		1	5/19/23	JE	REV.1

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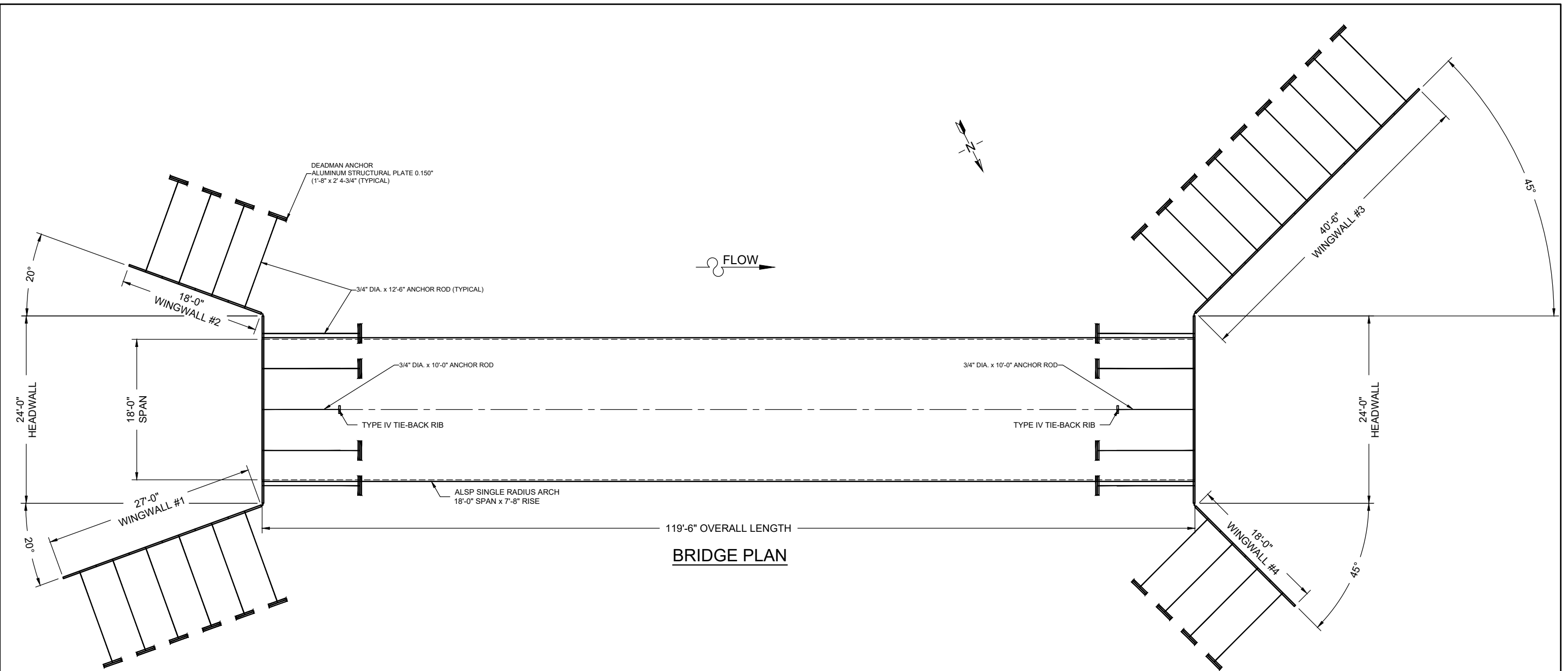
MARK	DATE	REVISION DESCRIPTION	BY
1	5/18/2023	PER REVIEW	JSC

CONTECH
 ENGINEERED SOLUTIONS LLC
 www.ContechES.com
 9100 Centre Pointe Dr., Suite 400, West Chester, OH 45069
 800-338-1122 513-645-7000 513-645-7993 FAX

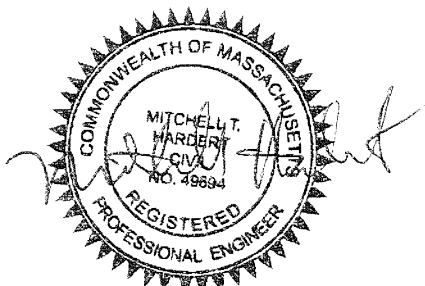
CONTECH
 STRUCTURAL PLATE
 CONTRACT DRAWING

ALSP SINGLE RADIUS ARCH W/ FULL INVERT
 18'-0" SPAN X 7'-8" RISE (32N)
 NORTH STREET, AGAWAM MA

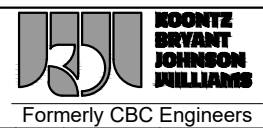
PROJECT No.:	744010	SEQ. No.:	010	DATE:	5/1/2023
DESIGNED:		DRAWN:	JSC	CHECKED:	APPROVED:
SHEET NO.:		1 OF 13			



BRIDGE PLAN



Approved By	MTH	Date	5/5/23
Project No.	23-26882-001	Rev.	1



Rev.	Date	By	Description
1	5/19/23	JE	REV.1

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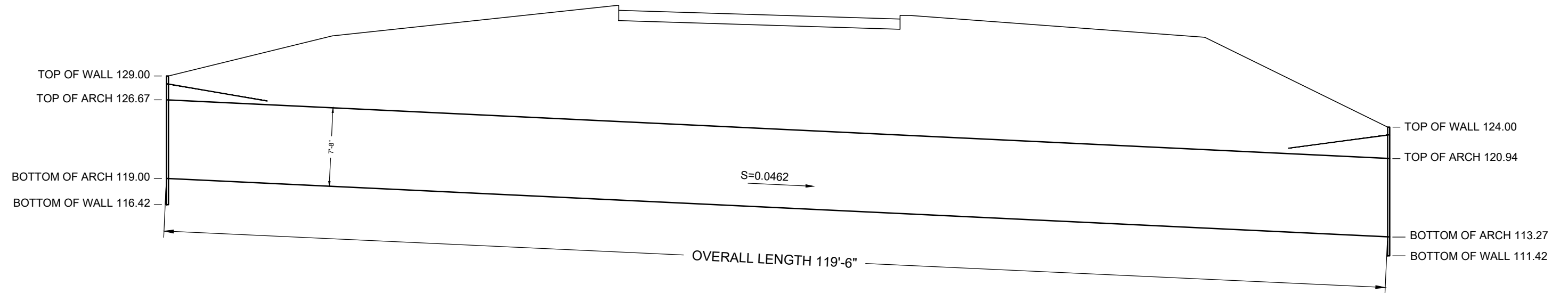
MARK	DATE	REVISION DESCRIPTION	BY
1	5/18/2023	PER REVIEW	JSC

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800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH
STRUCTURAL PLATE
CONTRACT DRAWING

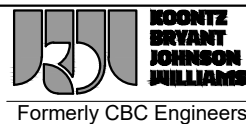
ALSP SINGLE RADIUS ARCH W/ FULL INVERT
18'-0" SPAN X 7'-8" RISE (32N)
NORTH STREET, AGAWAM MA

PROJECT No.:	744010	SEQ. No.:	010	DATE:	5/1/2023
DESIGNED:		DRAWN:	JSC	CHECKED:	
SHEET NO.:		2 OF 13			

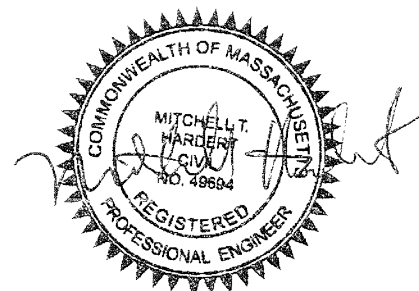


BRIDGE PROFILE

Approved By	MTH	Date	5/5/23
Project No.	23-26882-001	Rev.	1



Rev.	Date	By	Description
1	5/19/23	JE	REV.1



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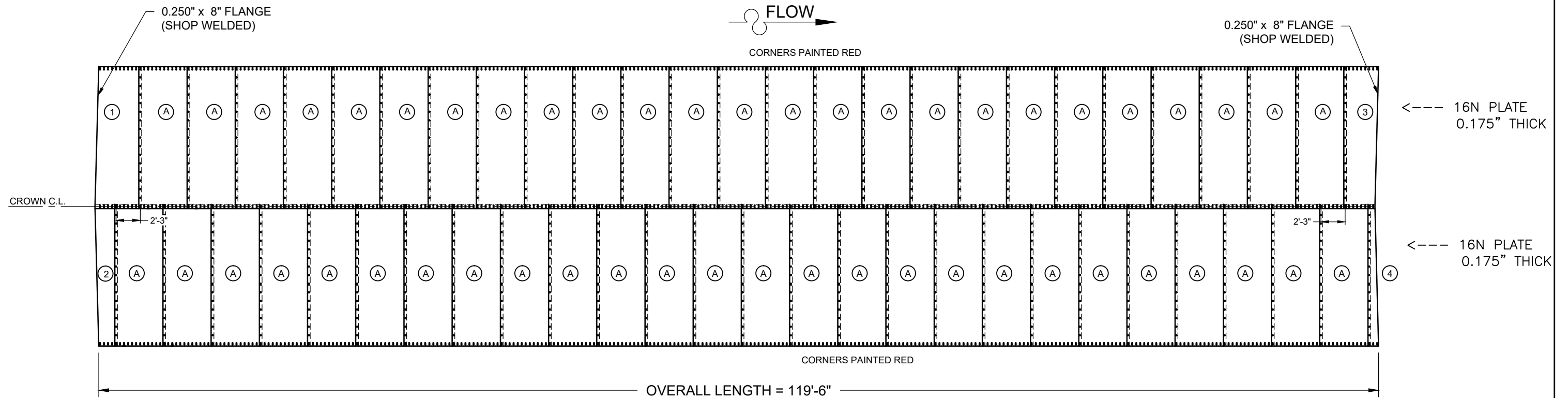
MARK	DATE	REVISION DESCRIPTION	BY
1	5/18/2023	PER REVIEW	JSC

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CONTECH
STRUCTURAL PLATE
CONTRACT DRAWING

ALSP SINGLE RADIUS ARCH W/ FULL INVERT
18'-0" SPAN X 7'-8" RISE (32N)
NORTH STREET, AGAWAM MA

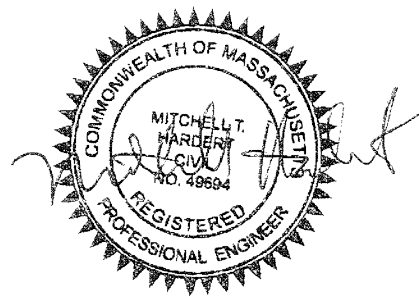
PROJECT No.:	744010	SEQ. No.:	010	DATE:	5/1/2023
DESIGNED:		DRAWN:	JSC	CHECKED:	
SHEET NO.:		3 OF 13			



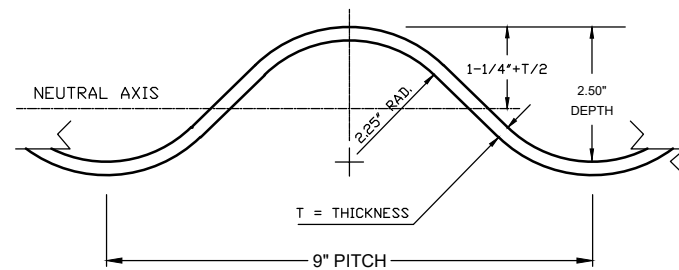
OVERALL LENGTH = 119'-6"
PLATE LAYOUT --- OUTSIDE VIEW
 ENDS ARE GRADE CORRECTED FOR 4.62% GRADE

GENERAL NOTES:

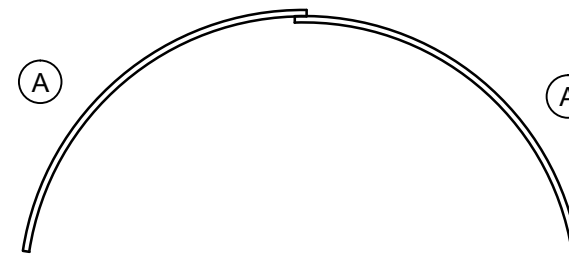
- For proper bolt size usage, refer to following:
 Plate 2 plate lap 3 plate lap
 0.175" thk. plate 1-1/4" 1-1/2"
- Nuts may be located on structure's interior or exterior to allow conventional access during assembly and torquing. Only one side of nut has a curved surface and it should be in direct contact with plate valley.
- All plate laps and reinforcing ribs must be properly mated in a tangent fashion using proper alignment techniques and held in alignment by fasteners (finger tightened only). Before backfilling commences, all fasteners must be torqued for adequate component contact. Good component fit is better than high torque.
- Fastener torque requirements: 100-150 foot-pounds. Torque levels are for installation, not residual, in-service requirements. Since torquing may loosen previously tightened fasteners, multiple passes may be necessary.
- See ASSEMBLY INSTRUCTIONS shipped with material in fastener container. Also refer to specific product catalog for additional product information.
- All aluminum structural plate material is manufactured in accordance with AASHTO M219, ASTM B746 and ASTM B864 specifications.
- See ASSEMBLY INSTRUCTIONS shipped with material in fastener container. Also refer to specific product catalog for additional product information.



ALUMINUM STRUCTURAL PLATE



CORRUGATION PROFILE



**2 PLATE STRUCTURE
 PLATE LAPPING DETAIL**

Approved By	Date		Rev.	Date	By	Description
MTH	5/5/23		1	5/19/23	JE	REV.1
Project No.	Rev.					
23-26882-001	1					

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MARK	DATE	REVISION DESCRIPTION	BY
1	5/18/2023	PER REVIEW	JSC

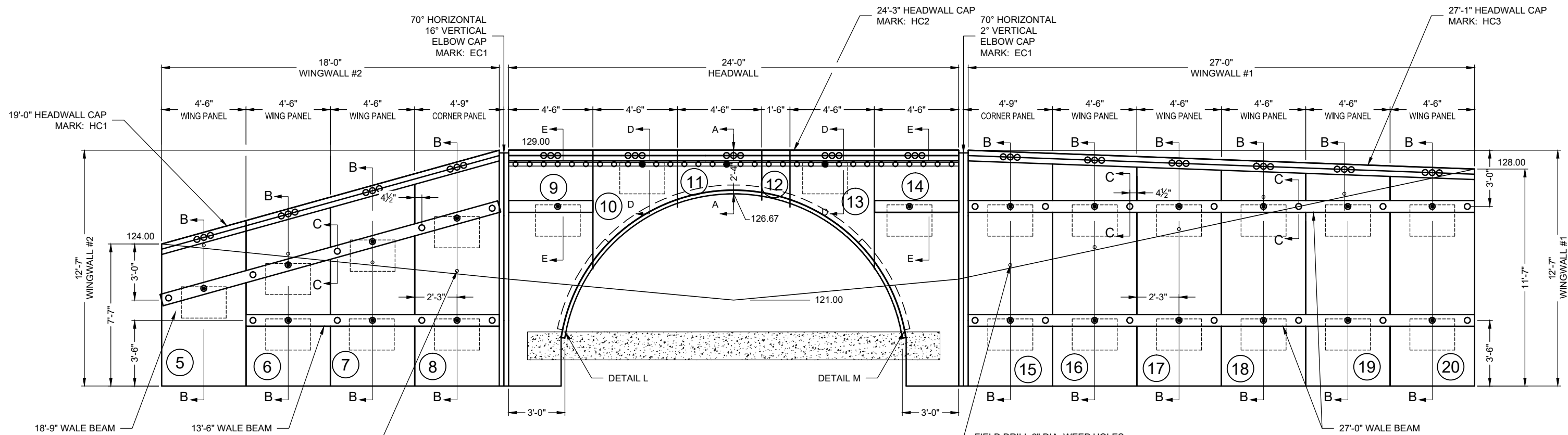
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CONTECH
 STRUCTURAL PLATE

CONTRACT
 DRAWING

ALSP SINGLE RADIUS ARCH W/ FULL INVERT
 18'-0" SPAN X 7'-8" RISE (32N)
 NORTH STREET, AGAWAM MA

PROJECT No.:	SEQ. No.:	DATE:
744010	010	5/1/2023
DESIGNED:	DRAWN:	
CHECKED:	APPROVED:	
SHEET NO.:		
4 OF 13		



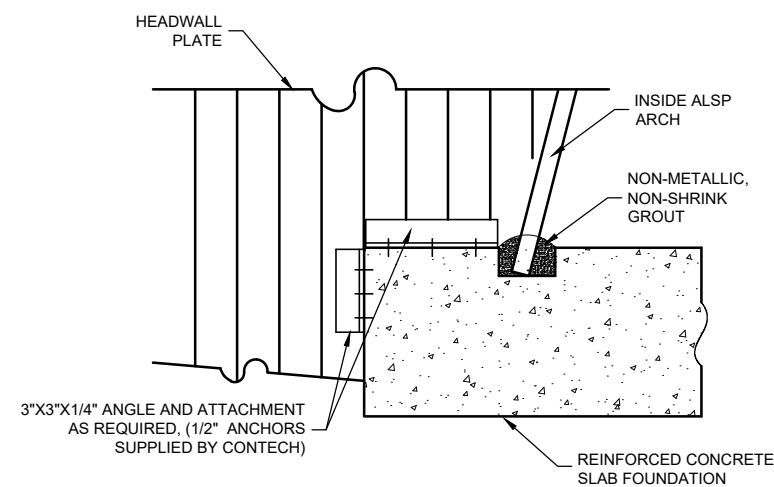
FIELD DRILL 2" DIA. WEEP HOLES AT CENTER OF EVERY 54" WINGWALL PANEL 3" TO 6" ABOVE GRADE. PLACE FILTER FABRIC BEHIND WEEP HOLES TO MAINTAIN A SOIL-TIGHT SYSTEM.

INLET END EXPANDED END VIEW

FIELD DRILL 2" DIA. WEEP HOLES AT CENTER OF EVERY 54" WINGWALL PANEL 3" TO 6" ABOVE GRADE. PLACE FILTER FABRIC BEHIND WEEP HOLES TO MAINTAIN A SOIL-TIGHT SYSTEM.

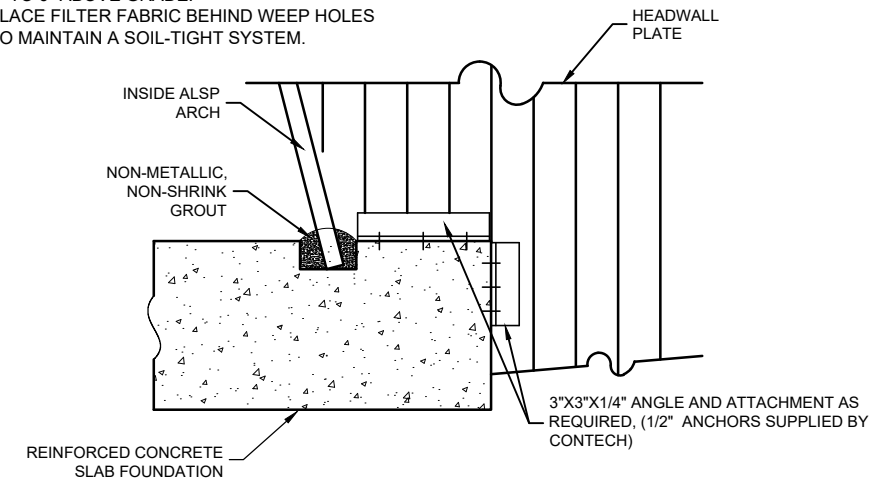
NOTES:

1. WALL PANEL NUMBERS ARE MARKED ON THE SOIL SIDE.
2. BOLT HEADWALL TO REINFORCING RIB AT END OF STRUCTURE.
3. 2'-3" DIMENSIONS ARE RELATIVE TO SECTION B-B.
4. 4 1/2" DIMENSIONS ARE RELATIVE TO SECTION C-C.
5. ○ DENOTES BOLTS CONNECTION
6. ● DENOTES ANCHOR ROD CONNECTION



DETAIL "L"

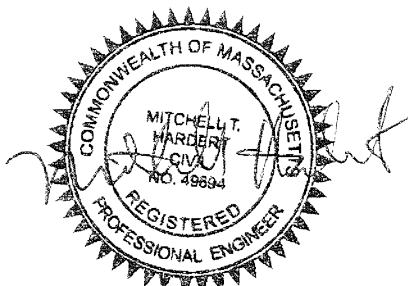
NOTE: FIELD CUT HEADWALL TO MATCH FOOTING.



DETAIL "M"

NOTE: FIELD CUT HEADWALL TO MATCH FOOTING.

NOTE: THE BOTTOM OF ALL WINGWALL PANELS MUST BE PERMANENTLY EMBEDDED AT LEAST 4.0 FEET BELOW THE FINISHED GROUNDLINE AT THE FACE OF THE WALL. THE SOIL IN FRONT OF THE WALL PROVIDING RESISTANCE TO THE TOE OF THE WALL MUST HAVE A MINIMUM INTERNAL FRICTION ANGLE OF AT LEAST 34° (TO BE FIELD VERIFIED). 2H:1V MAX. SLOPE BEHIND WALLS.



Approved By	Date		Rev.	Date	By	Description
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Project No.	Rev.					
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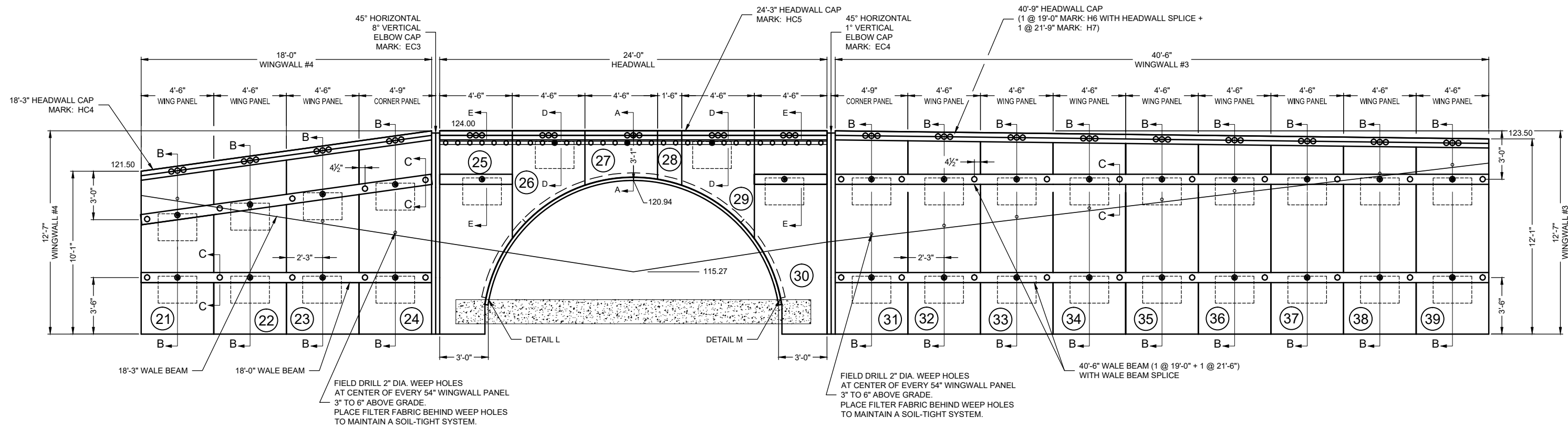
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CONTRACT DRAWING

ALSP SINGLE RADIUS ARCH W/ FULL INVERT
18'-0" SPAN X 7'-8" RISE (32N)
NORTH STREET, AGAWAM MA

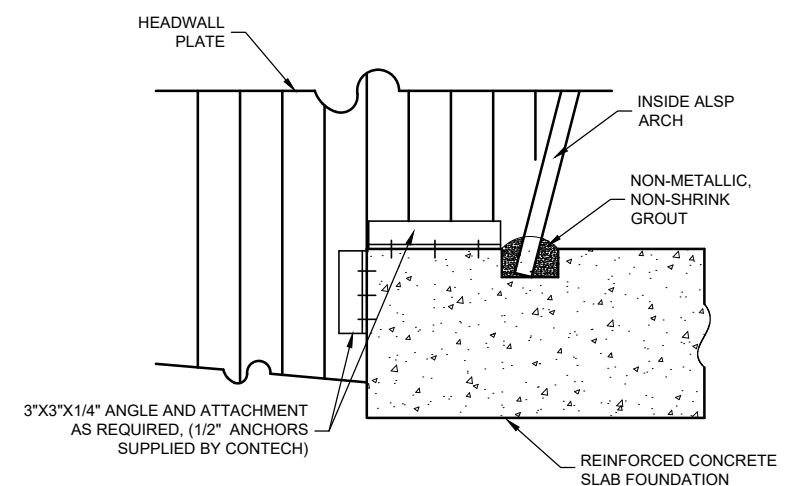
PROJECT No.:	SEQ. No.:	DATE:
744010	010	5/1/2023
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SHEET NO.:	5 OF 13	



OUTLET END EXPANDED END VIEW

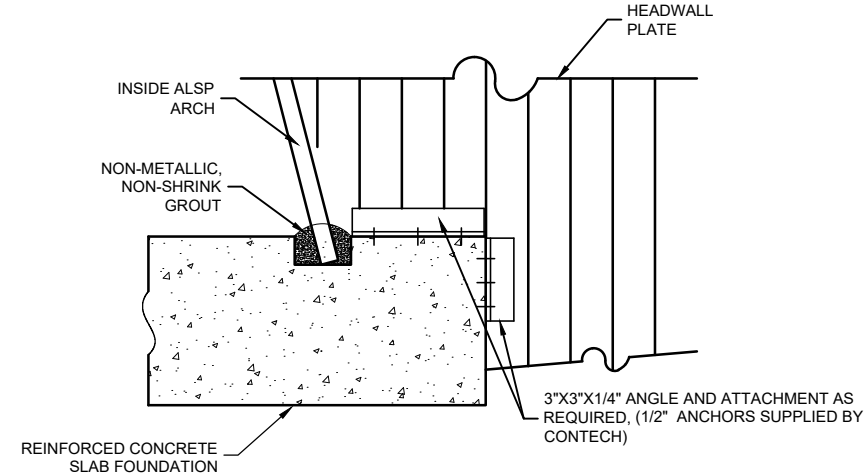
NOTES:

1. WALL PANEL NUMBERS ARE MARKED ON THE SOIL SIDE.
2. BOLT HEADWALL TO REINFORCING RIB AT END OF STRUCTURE.
3. 2'-3" DIMENSIONS ARE RELATIVE TO SECTION B-B.
4. 4 1/2" DIMENSIONS ARE RELATIVE TO SECTION C-C.
5. ○ DENOTES BOLTS CONNECTION
6. ● DENOTES ANCHOR ROD CONNECTION



DETAIL "L"

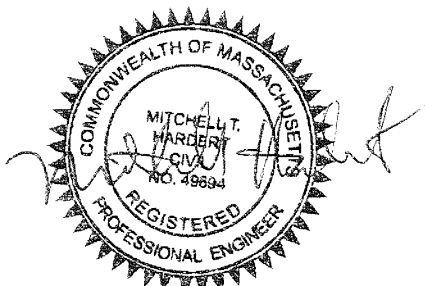
NOTE: FIELD CUT HEADWALL TO MATCH FOOTING.



DETAIL "M"

NOTE: FIELD CUT HEADWALL TO MATCH FOOTING.

NOTE:
THE BOTTOM OF ALL WINGWALL PANELS MUST BE PERMANENTLY EMBEDDED AT LEAST 4.0 FEET BELOW THE FINISHED GROUNDLINE AT THE FACE OF THE WALL. THE SOIL IN FRONT OF THE WALL PROVIDING RESISTANCE TO THE TOE OF THE WALL MUST HAVE A MINIMUM INTERNAL FRICTION ANGLE OF AT LEAST 34° (TO BE FIELD VERIFIED).
2H:1V MAX. SLOPE BEHIND WALLS.



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Project No.	23-26882-001	Rev.	1

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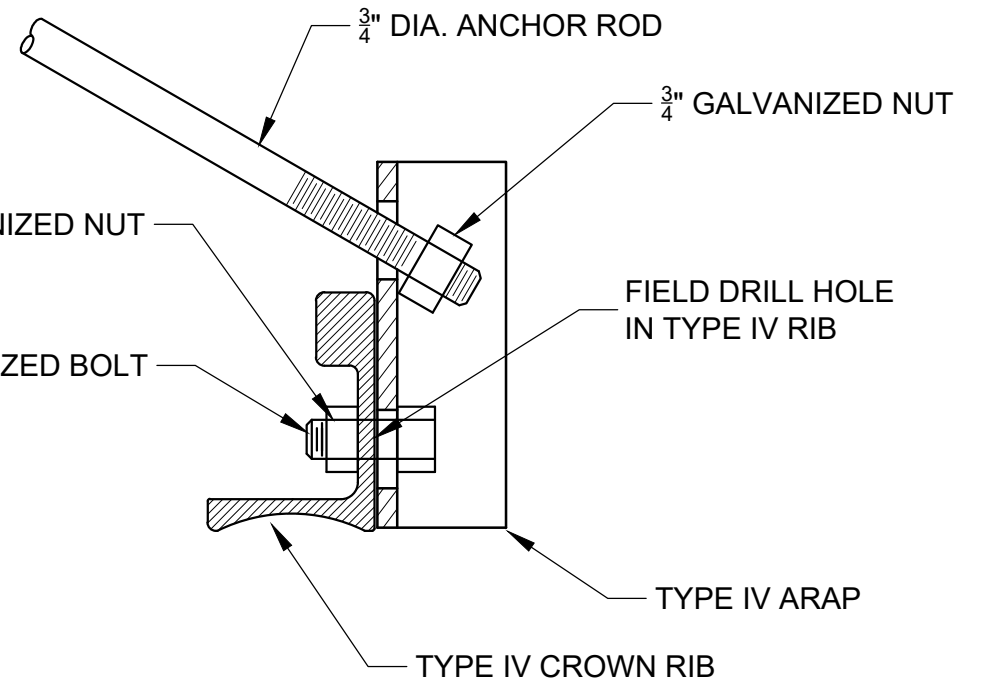
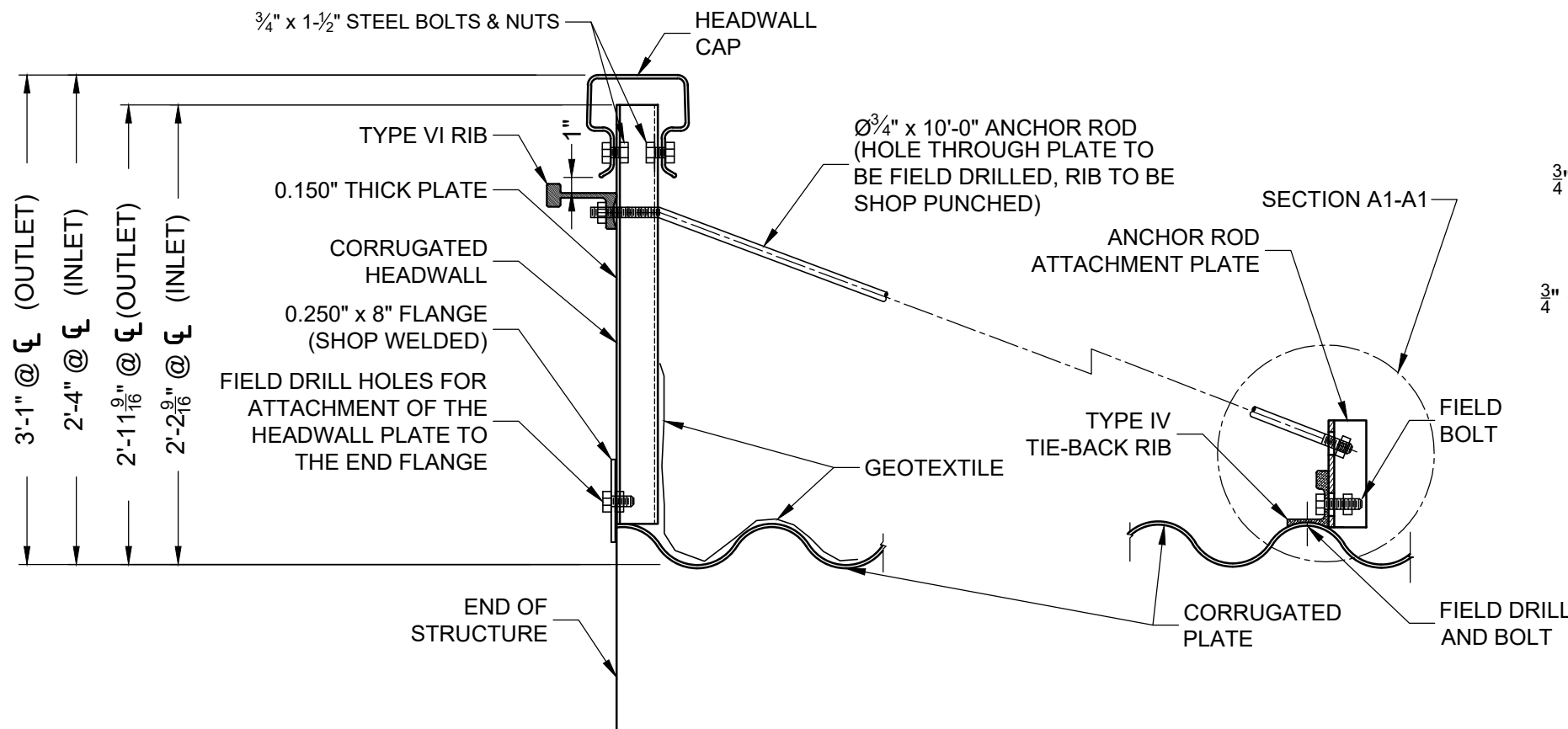
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NORTH STREET, AGAWAM MA

PROJECT No.:	744010	SEQ. No.:	010	DATE:	5/1/2023
DESIGNED:		DRAWN:	JSC	APPROVED:	
CHECKED:		APPROVED:			
SHEET NO.:	6 OF 13				

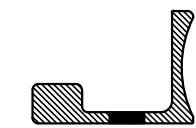
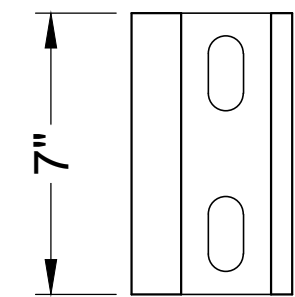


SECTION A-A
HEADWALL ATTACHMENT TO
CROWN OF STRUCTURE

NOTES:

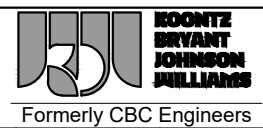
- 1) REVERSE CROWN RIBS AT THIS CORRUGATION IF NECESSARY FOR PROPER ANCHOR ROD ATTACHMENT PLATE ORIENTATION.
- 2) GEOTEXTILE PREVENTS INFILTRATION OF THE BACKFILL BETWEEN THE HEADWALL AND STRUCTURE. A ROLL OF GEOTEXTILE IS PROVIDED FOR THIS PURPOSE.

SECTION A1-A1

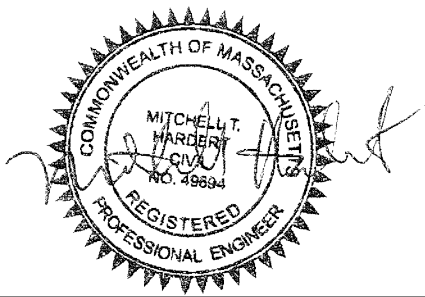


**TYPE IV ANCHOR ROD
ATTACHMENT PLATE
(ARAP)**

Approved By	MTH	Date	5/5/23
Project No.	23-26882-001	Rev.	1



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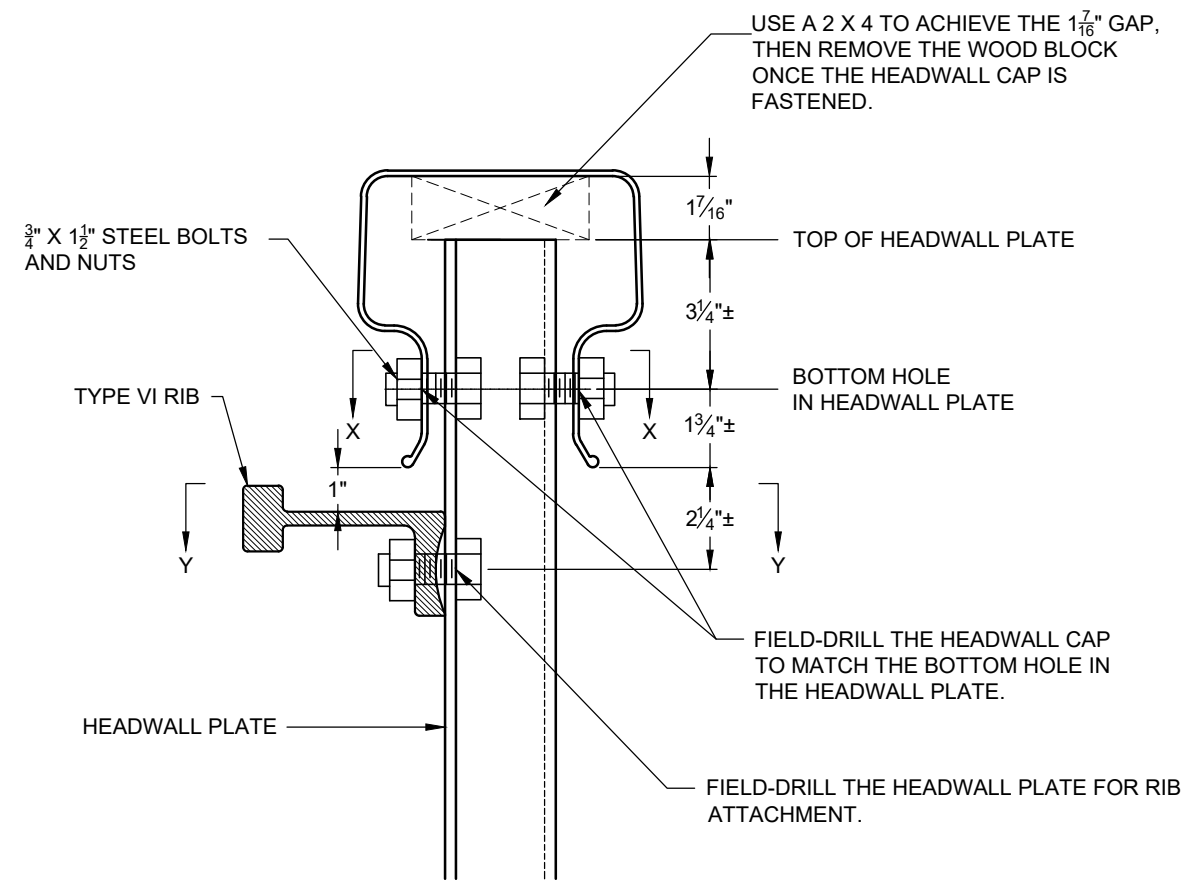
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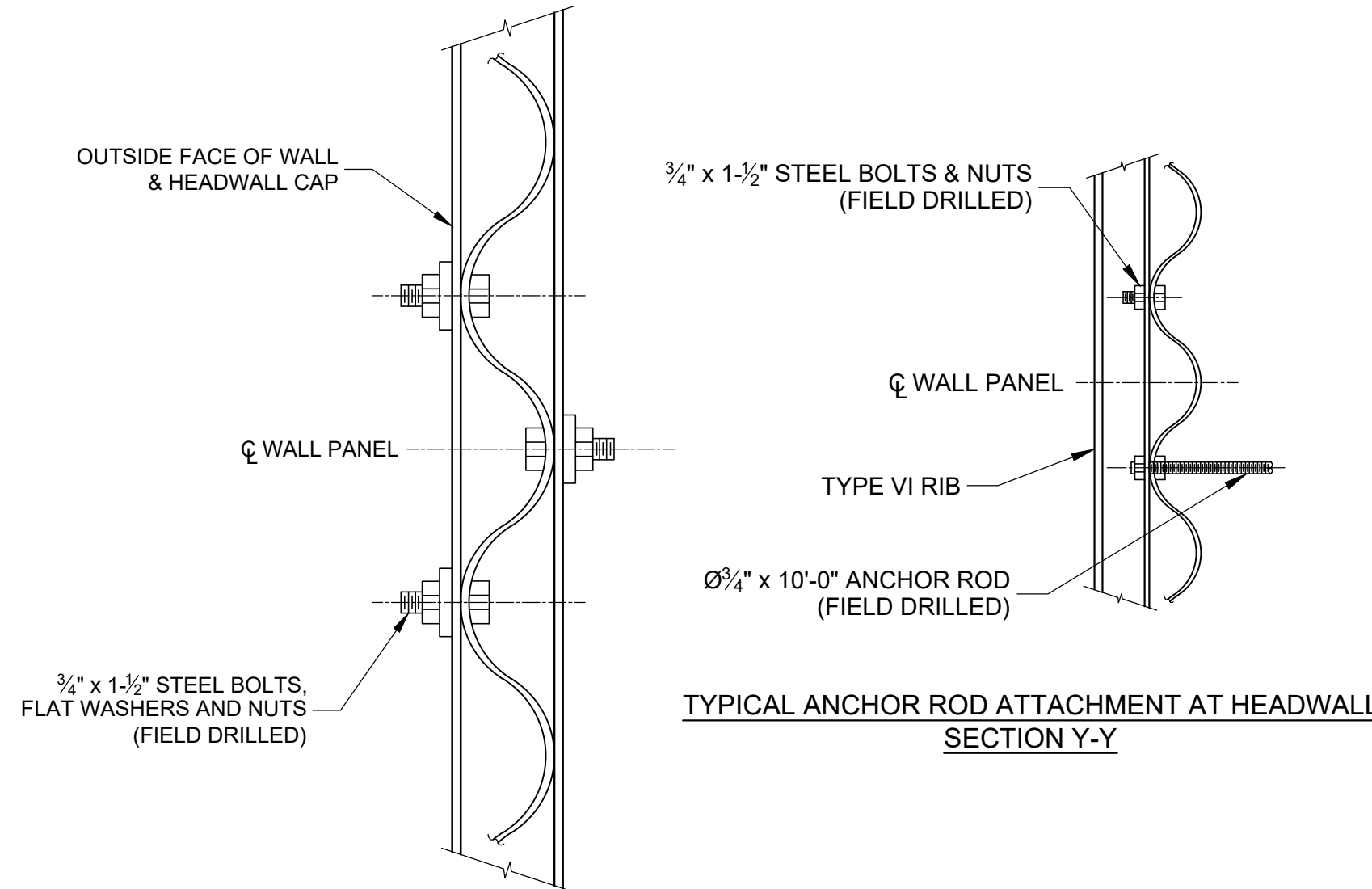
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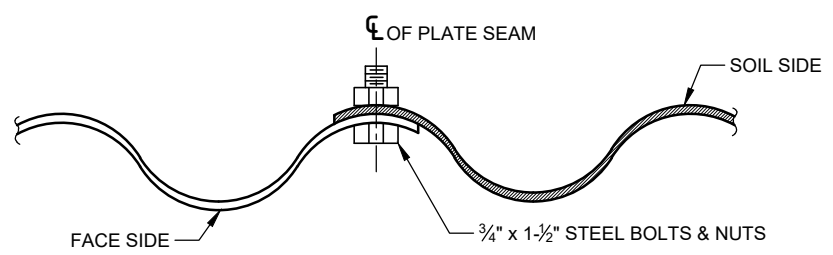
PROJECT No.:	744010	SEQ. No.:	010	DATE:	5/1/2023
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SHEET NO.:		7 OF 13			



HEADWALL CAP AND RIB ATTACHMENT

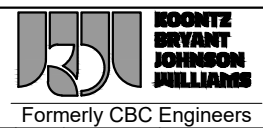


HEADWALL / WINGWALL CAP AT ATTACHMENT TO PANEL DETAIL SECTION X-X

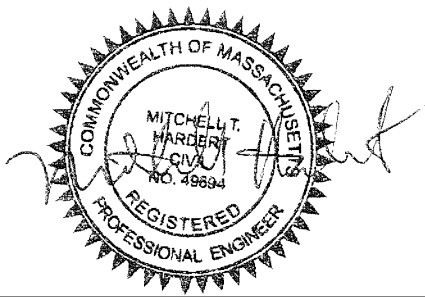


TYPICAL PANEL LAP DETAIL

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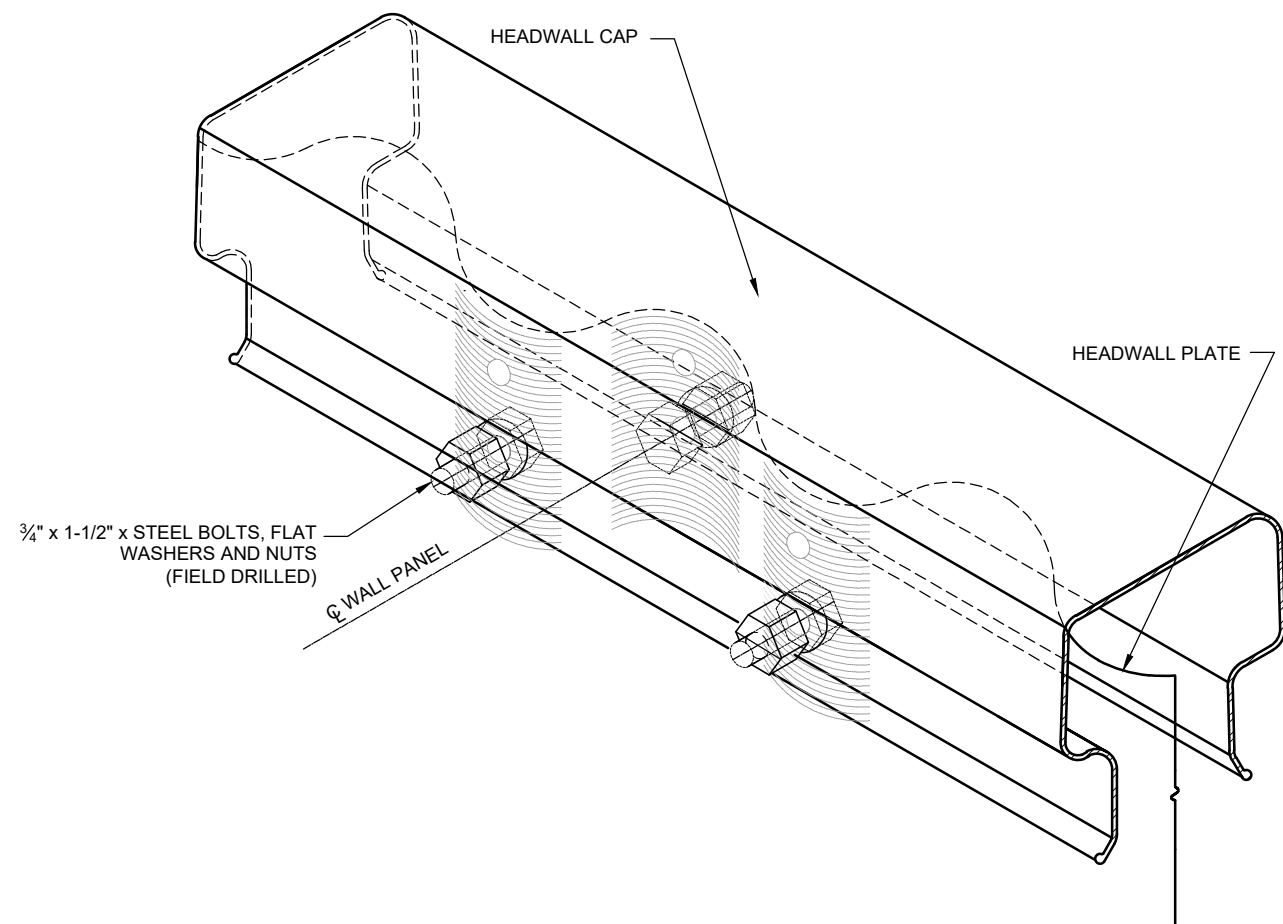
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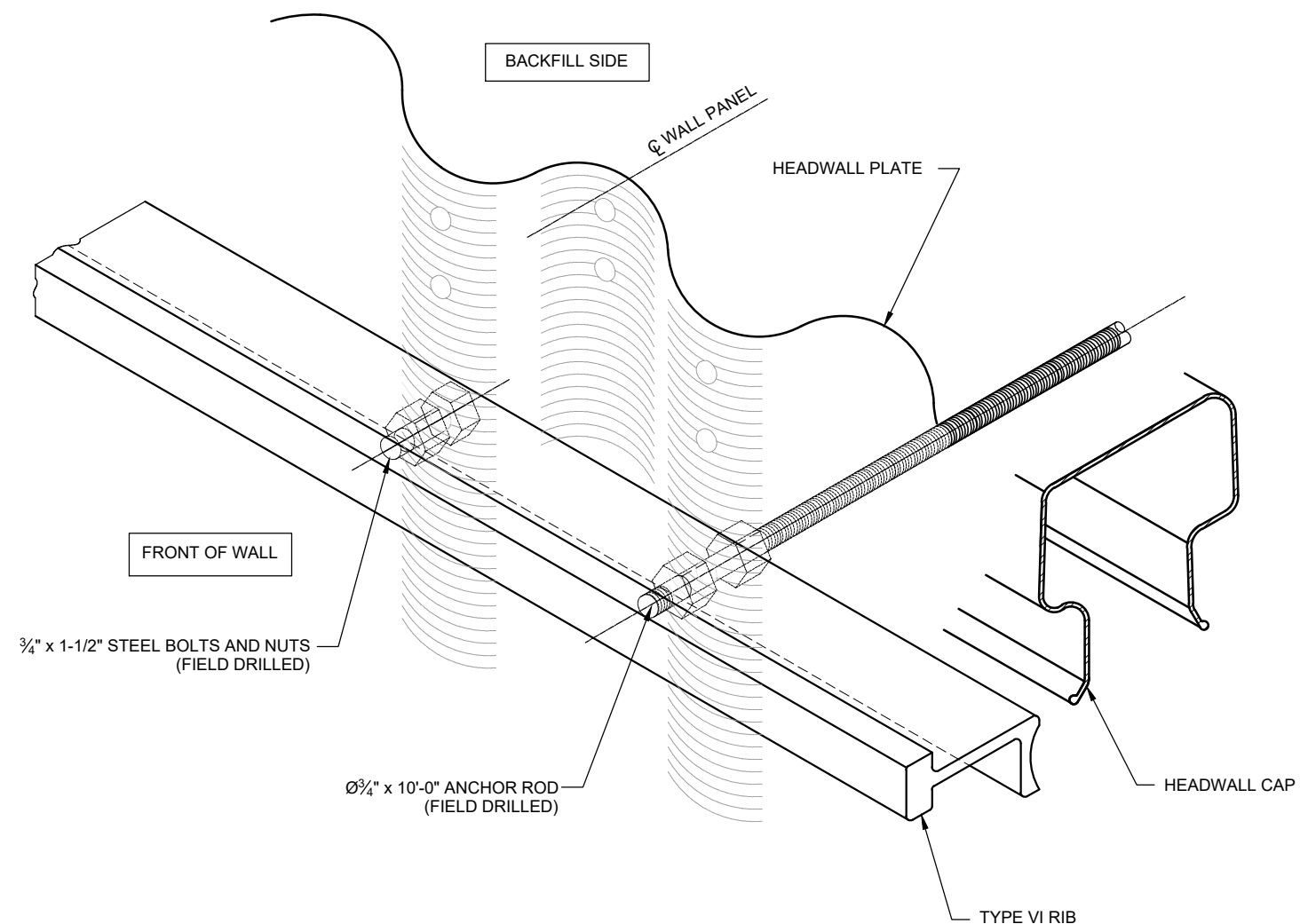
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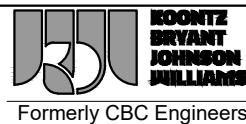


**HEADWALL / WINGWALL CAP AT ATTACHMENT TO PANEL DETAIL
SECTION X-X (ISOMETRIC VIEW)**

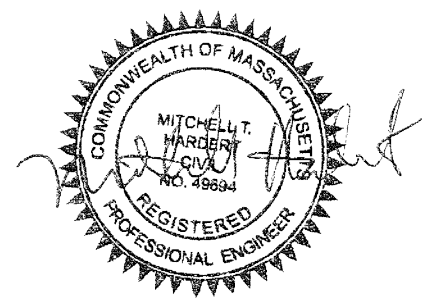


**TYPICAL ANCHOR ROD ATTACHMENT AT HEADWALL
SECTION Y-Y (ISOMETRIC VIEW)**

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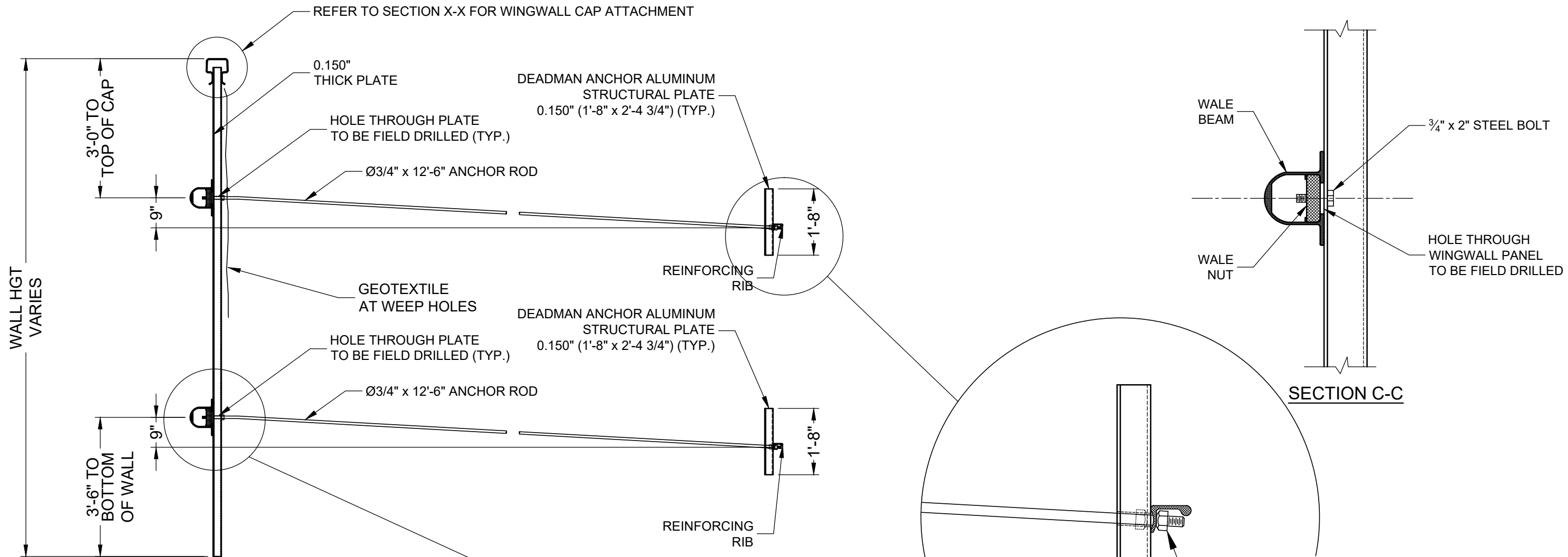
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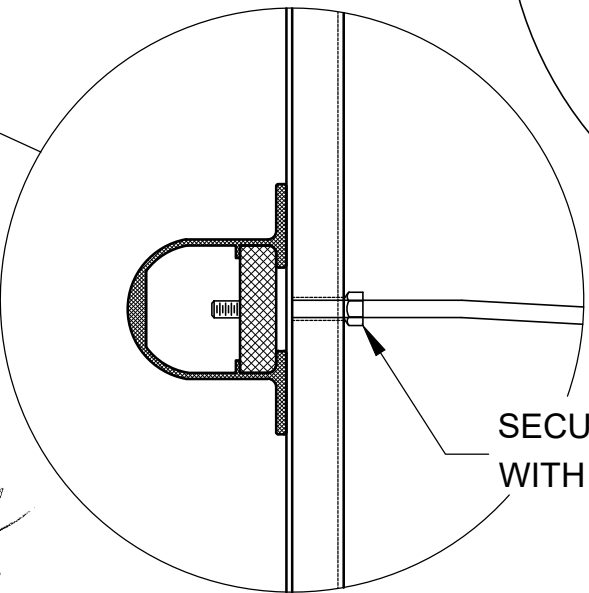
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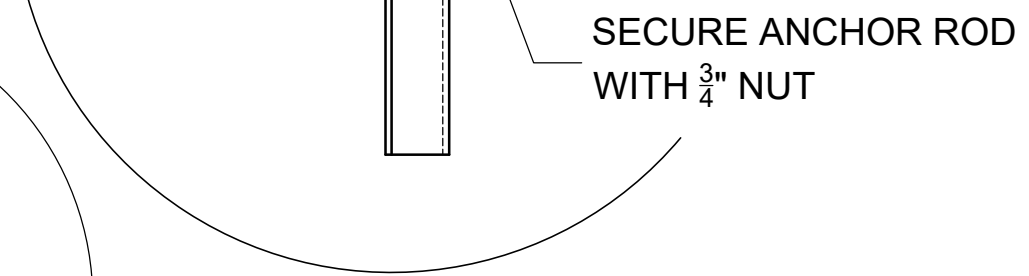
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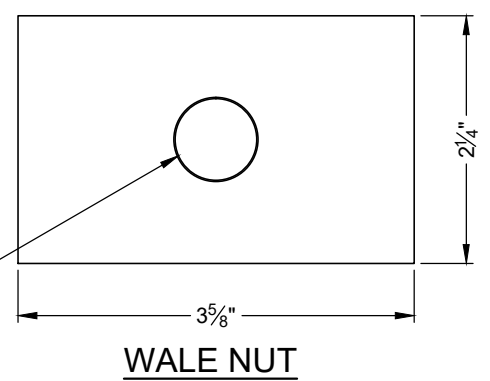
SECTION B-B



SECURE ANCHOR ROD WITH 3/4" NUT

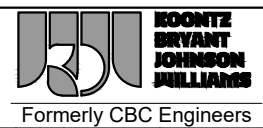


SECURE ANCHOR ROD WITH 3/4" NUT

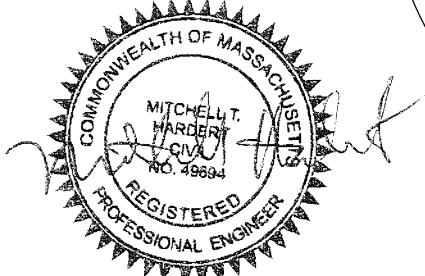


WALE NUT

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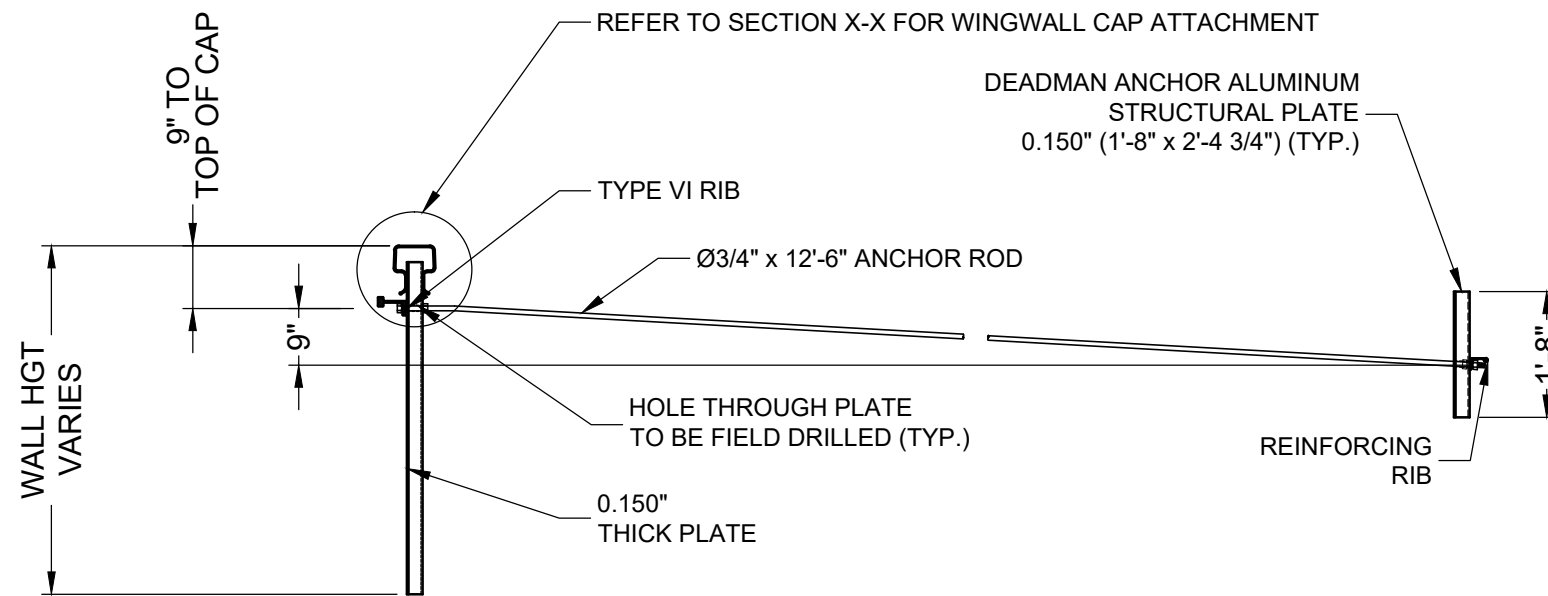
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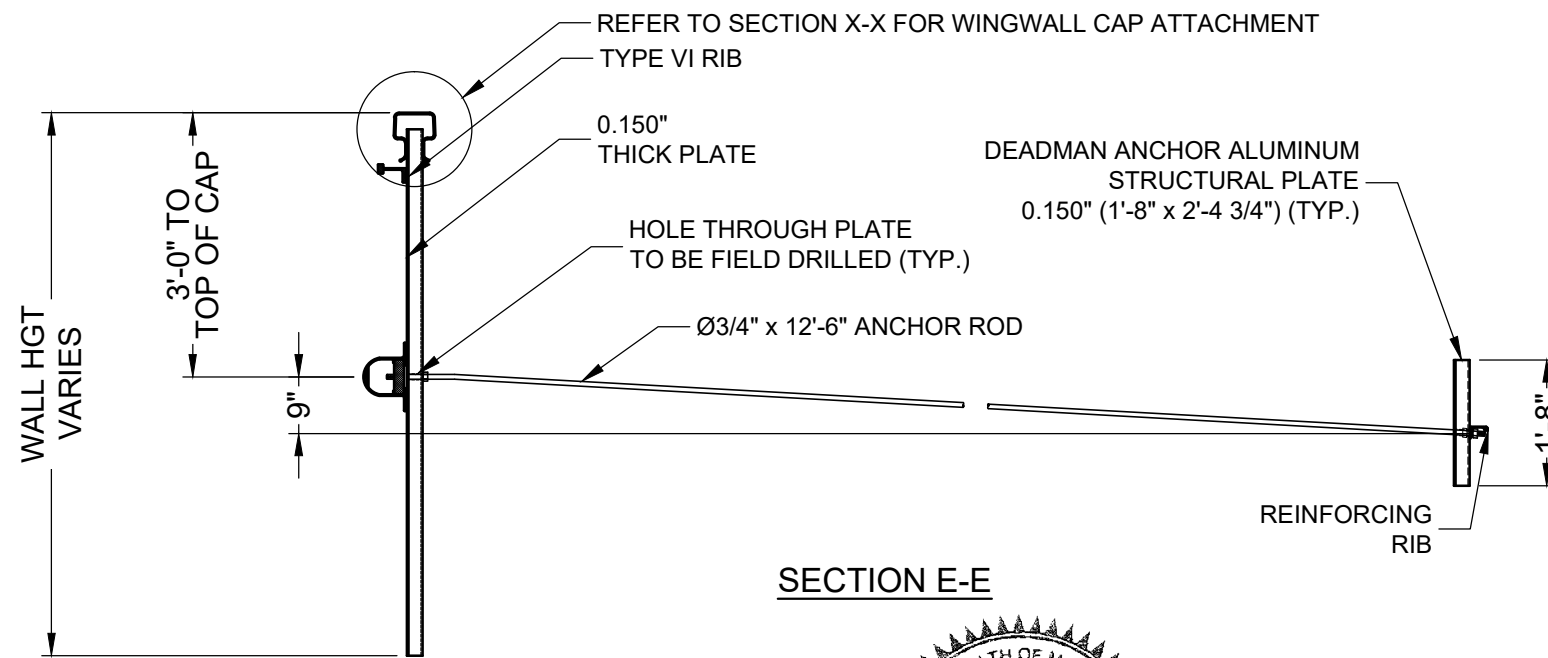
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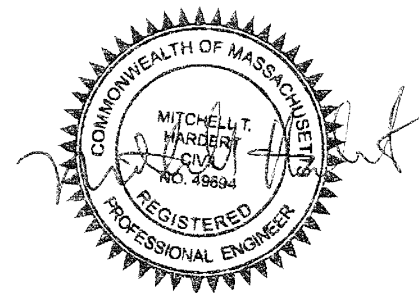
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SECTION D-D

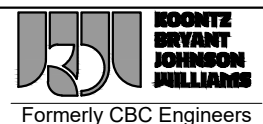


SECTION E-E



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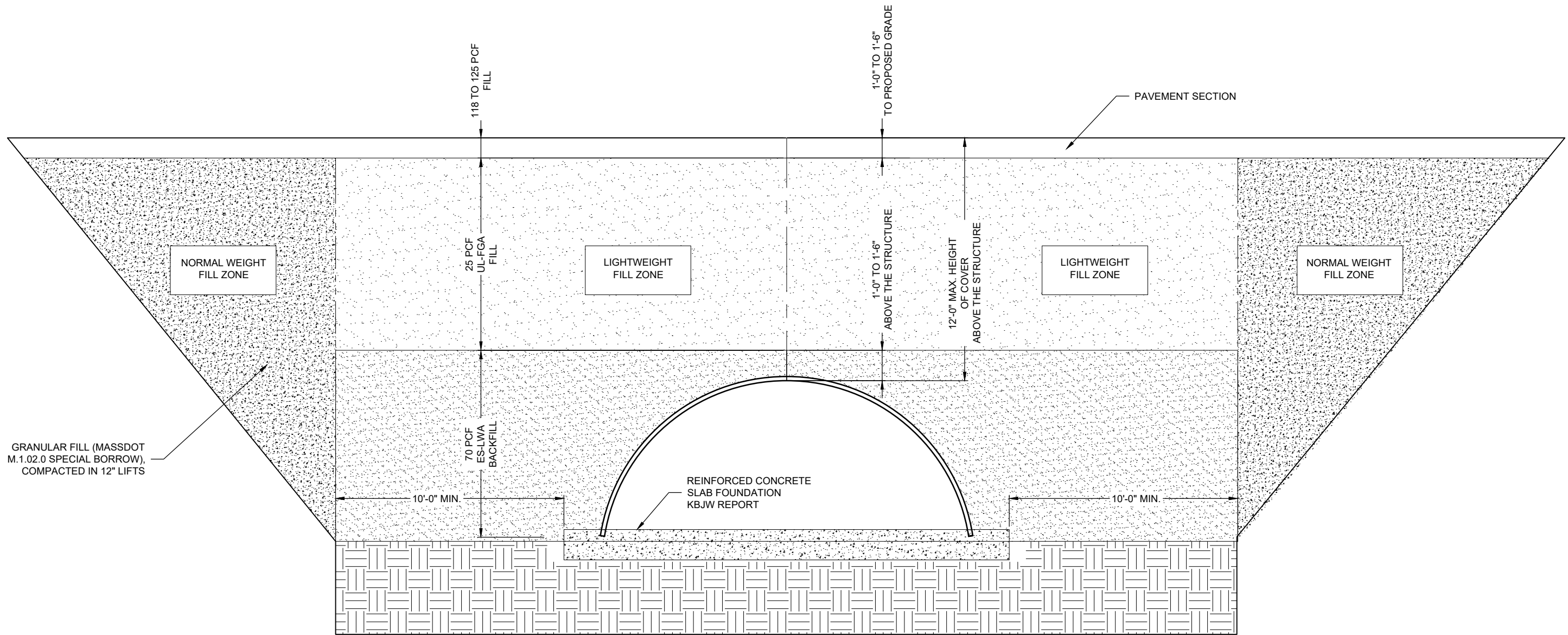
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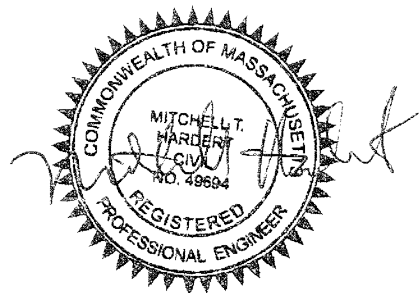
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BACKFILL ZONE SECTION

NOTE: REFERENCE GEOTECH REPORT



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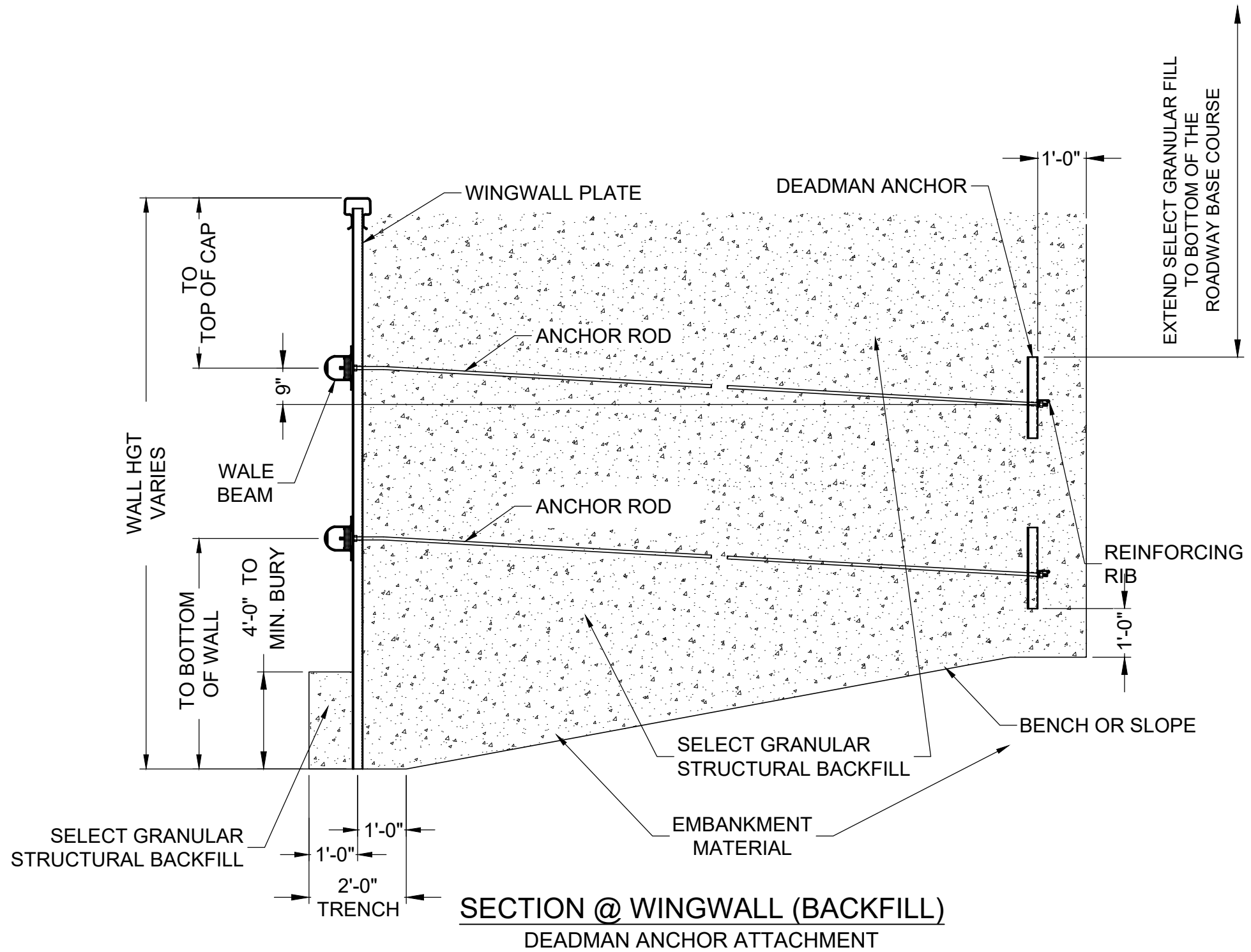
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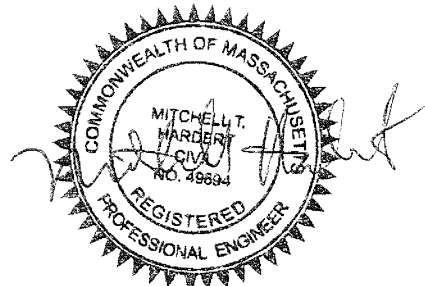
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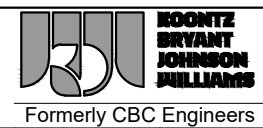
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SECTION @ WINGWALL (BACKFILL)
DEADMAN ANCHOR ATTACHMENT



Approved By	MTH	Date	5/5/23
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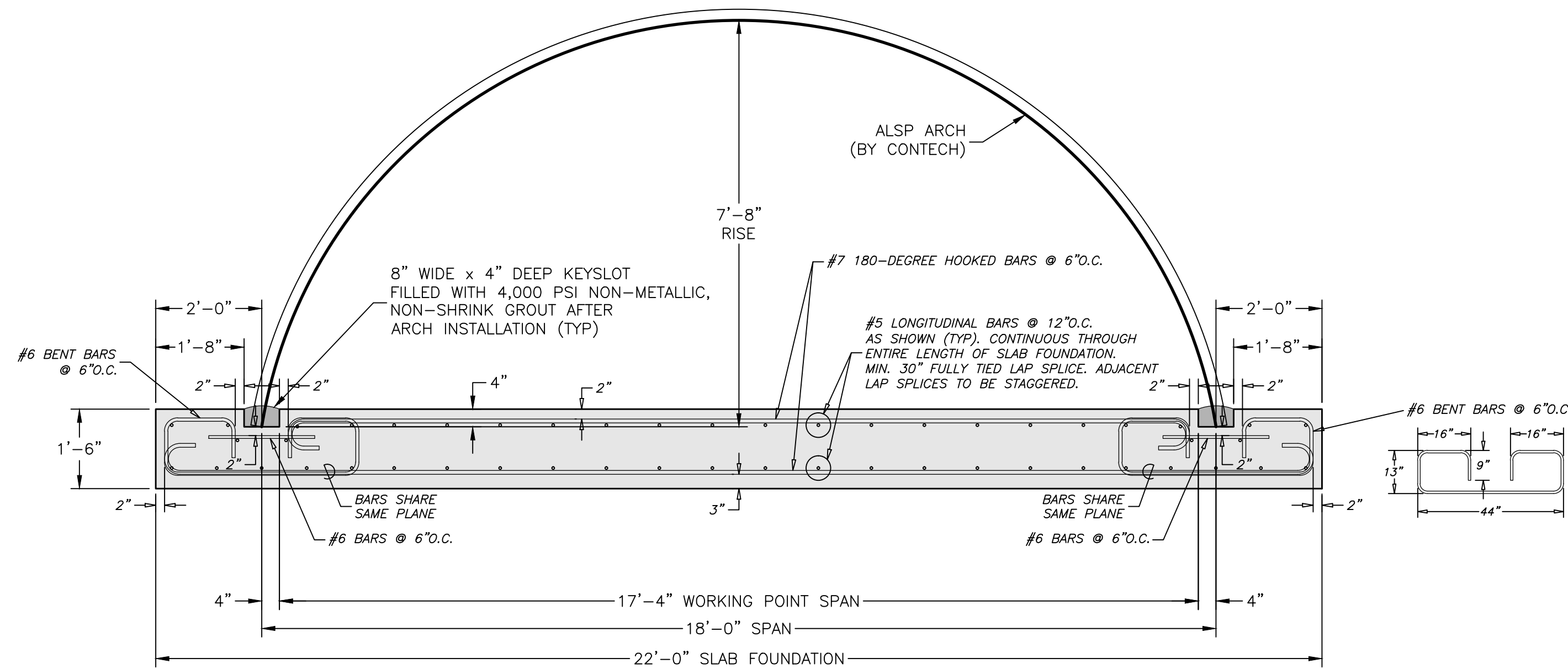
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TYPICAL SECTION VIEW OF SLAB FOUNDATION



- NOTES:**
- 1.) CONCRETE SHALL BE $f'c = 4,000$ psi.
 - 2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60.
 - 3.) FOUNDATION IS DESIGNED FOR A 20 pci MINIMUM MODULUS OF SUBGRADE REACTION (BY OTHERS). FACTORED BEARING RESISTANCE SHALL ALSO BE AT LEAST 2000 pcf. VALUES MUST BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
 - 4.) SCOUR, FROST PROTECTION AND DIFFERENTIAL SETTLEMENT ARE NOT ADDRESSED HEREIN AND ARE THE RESPONSIBILITY OF OTHERS THAN KBJW.
 - 5.) FOUNDATION LENGTH TO BE 6" PAST BOTH ENDS OF STRUCTURE. FIRST AND LAST TRANSVERSE REINFORCEMENT TO BE 3" FROM ENDS OF FOUNDATION.

I - GENERAL

1.0 STANDARDS AND DEFINITIONS

- 1.1 STANDARDS** - All standards refer to latest edition unless otherwise noted.
- 1.1.1 ASTM D-698 (Method C) "Standard Test Methods for Moisture, Density Relations of Soils and Soil Aggregate Mixtures Using 5.5-lb (2.5 kg.) Rammer and 12-inch (305-mm) Drop".
 - 1.1.2 ASTM D-2922 "Standard Test Method for Density of Soil and Soil Aggregate in Place by Nuclear methods (Shallow Depth)".
 - 1.1.3 ASTM D-1556 "Standard Test Method for Density of Soil in place by the Sand-Cone Method".
 - 1.1.4 ASTM D-1557 "Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort".
 - 1.1.5 All construction and materials shall be in accordance with the latest AASHTO standards.
- 1.2 DEFINITIONS**
- 1.2.1 Owner - In these specifications the word "Owner" shall mean Town of Agawam, MA.
 - 1.2.2 Engineer - In these specifications the word "Engineer" shall mean the Owner designated engineer.
 - 1.2.3 Design Engineer - In these specifications the words "Design Engineer" shall mean KBJW.
 - 1.2.4 Contractor - In these specifications the word "Contractor" shall mean the firm or corporation undertaking the execution of any work under the terms of these specifications.
 - 1.2.5 Approved - In these specifications the word "approved" shall refer to the approval of the Engineer or his designated representative.
 - 1.2.6 As Directed - In these specifications the words "as directed" shall refer to the directions to the Contractor from the Owner or his designated representative.

2.0 GENERAL CONDITIONS

- 2.1** The Contractor shall furnish all labor, material and equipment and perform all work and services except those set out and furnished by the Owner, necessary to complete in a satisfactory manner the site preparation, excavation, foundation installation, filling, compaction, and grading as shown on the plans and as described therein.
- This work shall consist of all mobilization clearing and grading, grubbing, stripping, removal of existing material unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications.
- This work is to be accomplished under the observation of the Owner or his designated representative.

- 2.2** Prior to bidding the work, the Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including, without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work.
- If conditions other than those indicated are discovered by the Contractor, the Owner should be notified immediately. The material which the Contractor believes to be a changed condition should not be disturbed so that the owner can investigate the condition.
- 2.3** The construction shall be performed under the direction of an experienced engineer who is familiar with the design plan.

II - SLAB FOUNDATION

1.0 EXCAVATION FOR SLAB FOUNDATION

- 1.1** Slab foundation excavation shall consist of the removal of all material, of whatever nature, necessary for the construction of foundations.
- 1.2** It shall be the responsibility of the Contractor to identify and relocate all existing utilities which conflict with the proposed slab foundation locations shown on the plan. The Contractor must call the appropriate utility company at least 48 hours before any excavation to request exact field location of utilities, and coordinate removal and installation of all utilities with the respective utility company.
- 1.3** The side of all excavations shall be cut to prevent sliding or caving of the material above the mat foundation.
- 1.4** Excavated material shall be disposed in accordance with the plan established by the Engineer.
- 1.5** The foundation is designed for a modulus of subgrade reaction of 20 pci (min.) and a factored bearing resistance of 2,000 psf (min.) for the non-yielding foundation material as recommended by GZA GeoEnvironmental, Inc., and these values and conditions shall be verified in the field prior to construction. The evaluation and design of any foundation improvement required to achieve a modulus of subgrade reaction of 20 pci (min.) and a factored bearing resistance of 2,000 psf and to protect against frost and scour and settlement/heave, is the responsibility of others than KBJW. The foundation bottom should be permanently protected against frost action in accordance with regional design requirements.

2.0 CONCRETE SLAB FOUNDATION DIMENSIONS

- 2.1** The concrete slab foundation for the structure shall be approximately 22 feet wide and have a minimum thickness of 18 inches.
- 2.2** The slab foundation shall be reinforced according to the construction drawings.

III - CONCRETE FOR SLAB FOUNDATION

1.0 CODES AND STANDARDS

- 1.1** Reinforced concrete shall conform to the requirements of AASHTO Standard Specifications for Highway Bridges, Division II - Construction, Section 8, "Concrete Structures", for Class A concrete, having a minimum compressive strength of 4,000 psi.

2.0 STANDARDS FOR MATERIALS

- 2.1** Portland Cement - Conforming to ASTM Specification C-150, Type I or II.
- 2.2** Water - The water shall be drinkable, clean free from injurious amounts of oils, acids, alkalis, organic materials, or deleterious substances.
- 2.3** Aggregates - Fine and coarse aggregates shall conform to current ASTM Specification C-33 "Specification for Concrete Aggregates" except that local aggregates which have been shown by tests and by actual service to produce satisfactory qualities may be used when approved by the Engineer.
- 2.4** Submittals - Test data and/or certifications to the Owner shall be furnished upon request.

3.0 PROPORTIONING OF CONCRETE

- 3.1 COMPOSITION**
- 3.1.1** The concrete shall be composed of cement, fine aggregate, coarse aggregate and water.
- 3.1.2** The concrete shall be homogeneous, readily placeable and uniformly workable and shall be proportioned in accordance with ACI-211.1.
- 3.1.3** Proportions shall be established on the basis of field experience with the materials to be employed. The amount of water used shall not exceed the maximum 0.45 water/cement ratio, and shall be reduced as necessary to produce concrete of the specified consistency at the time of placement.
- 3.1.4** An air-entraining admixture, conforming to the requirements of ASTM C260, shall be used in all concrete furnished under this contract. The quantity of admixture shall be such as to produce an air content in the freshly mixed concrete of 6 percent plus or minus 1.5 percent as determined in accordance with ASTM C231 or C173, unless otherwise noted on the Drawings.
- 3.2** Qualities Required - As indicated in the table below:

TABLE III-1
QUALITIES REQUIRED

ITEM	QUALITY REQUIRED
AASHTO Class	A
Type of Cement	I or II
Compressive Strength $f'c$ @ 28 days	4,000 psi
Slump, inches	2 - 4 in.

- 3.3** Maximum Size of Coarse Aggregates - Maximum size of coarse aggregates shall not be larger than 19 mm (3/4 inches).
- 3.4** Rate of Hardening of Concrete - Concrete mix shall be adjusted to produce the required rate of hardening for varied climatic conditions:
- Under 40°F Ambient Temperature - All work to be in accordance with the recommendations of ACI-306R "Cold Weather Concreting."

4.0 MIXING AND PLACING

- 4.1** Equipment - Ready Mix Concrete shall be used and shall conform to the "Specifications for Ready-Mix Concrete," ASTM C-94. Approval is required prior to using job mixed concrete.
- 4.2** Preparation - All work shall be in accordance with ACI-304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete." All construction debris and extraneous matter shall be removed from within the forms. Concrete shall be placed on clean surfaces, free from water. Concrete that has to be dropped four (4) feet or more shall be placed through a tremie.
- 4.3** All concrete shall be consolidated by internal mechanical vibration immediately after placement. Vibrators shall be of a size appropriate for the work, capable of transmitting vibration to concrete at frequencies of not less than 4,500 impulses per minute.

5.0 FORM WORK

- 5.1** Forms shall be of wood, steel or other approved material and shall be set and held true to the dimensions, lines and grades of the structure prior to and during the placement of concrete.
- 5.2** Forms shall not be removed until the concrete has sufficient strength to prevent concrete damage and/or drainage.

6.0 CURING

- 6.1** Fresh concrete shall be protected from rains, flowing water and mechanical injury for a period of at least seven (7) days. The arch shall not be assembled on the foundation, or backfill placed against the foundation, until the concrete in the foundation has reached its design strength.

7.0 REINFORCING STEEL

7.1 MATERIAL

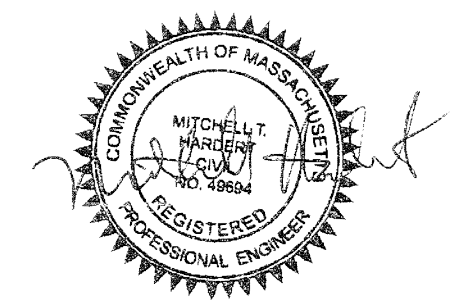
- 7.1.1** All reinforcing bars shall be deformed bars (ASTM-A615) Grade 60.

7.2 BENDING AND SPLICING

- 7.2.1** Bar reinforcement shall be cut and bent to the shapes shown on the plans. Fabrication tolerances shall be in accordance with ACI 315. All bars shall be bent cold, unless otherwise permitted.
- 7.2.2** All reinforcement shall be furnished in the full lengths indicated on the plans unless otherwise permitted. Except for splices shown on the plans and splices for No. 5 or smaller bars, splicing of bars will not be permitted without written approval. Splices shall be staggered as far as possible.
- 7.2.3** In lapped splices, the bars shall be placed and wired in such a manner as to maintain the minimum distance to the surface of the concrete shown on the plans.
- 7.2.4** Substitution of different size bars will be permitted only when authorized by the engineer. The substituted bars shall have an area equivalent to the design area, or larger.

7.3 PLACING AND FASTENING

- 7.3.1** Steel reinforcement shall be accurately placed as shown on the plans and firmly held in position during the placing and setting of concrete. Bars shall be tied at all intersections around the perimeter of each mat and at not less than 2-foot centers or at every intersection, whichever is greater, elsewhere. Welding of cross bars (tack welding) will not be permitted for assembly of reinforcement.
- 7.3.2** Reinforcing steel shall be supported in its proper position by use of mortar blocks, wire bar supports, supplementary bars or other approved devices. Such devices shall be of such height and placed at sufficiently frequent intervals so as to maintain the distance between the reinforcing and the formed surface or the top surface within 1/4 inch of that indicated on the plans.



1	5/19/23	JBE	REV .1
TYPICAL SECTION & SPECIFICATIONS			
Drawn By DJH	Date 5/3/23	CONTECH ENGINEERED SOLUTIONS, LLC DESIGN OF CONCRETE SLAB FOUNDATION FOR AN ALSP ARCH (744010)	
Approved By	Date	NORTH STREET CULVERT REPLACEMENT AGAWAM MASSACHUSETTS	
Scale GRAPHIC	Project No. 23-26882-001	Rev. 1	Sheet 1 OF 1