

TOWN OF MONTEREY MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23 BRIDGE OVER KONKAPOT RIVER (BRIDGE NO. M-29-003)

PROJECT OWNER

TOWN OF MONTEREY DPW
40 GOULD ROAD
MONTEREY, MA 01245



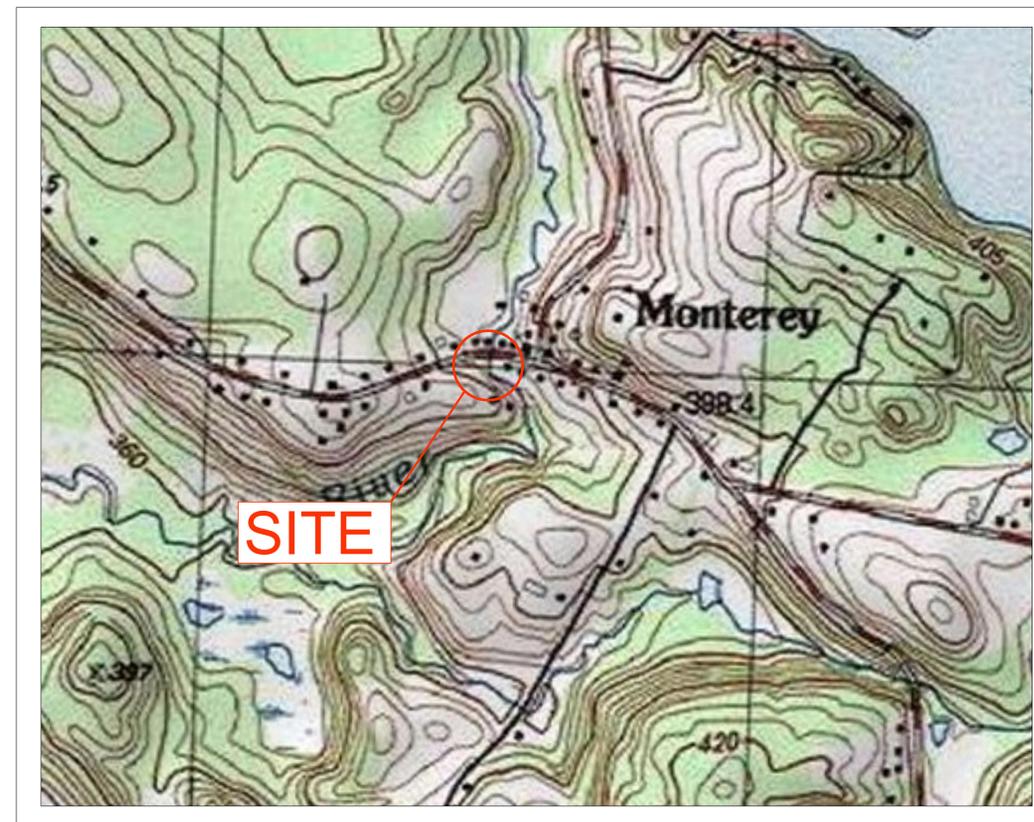
PROJECT ENGINEER

GZA GEOENVIRONMENTAL, INC.
249 VANDERBILT AVE.
NORWOOD, MASSACHUSETTS 02062



PROJECT SUPPORTER

COMMONWEALTH OF MASSACHUSETTS
MUNICIPAL VULNERABILITY
PREPAREDNESS ACTION GRANT



PROJECT LOCUS MAP
MONTEREY, MA

SOURCE: THIS MAP CONTAINS THE ESRI ARCGIS ONLINE USA TOPOGRAPHIC MAP SERVICE, PUBLISHED DECEMBER 2009 BY ESRI RCIMS SERVICES. LAST UPDATED MARCH 2014.

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NO.	ISSUE/DESCRIPTION	BY	DATE
<small>UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.</small>			
PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23 BRIDGE OVER KONKAPOT RIVER MONTEREY, MA			
TITLE SHEET, SITE LOCUS AND INDEX OF DRAWINGS			
<small>PREPARED BY:</small> GZA GeoEnvironmental, Inc. www.gza.com		<small>PREPARED FOR:</small> TOWN OF MONTEREY	
<small>PROJ MGR:</small> KH <small>DESIGNED BY:</small> CC <small>DATE:</small> JUNE 2023	<small>REVIEWED BY:</small> KH <small>DRAWN BY:</small> TF <small>PROJECT NO.:</small> 01.0174558.10	<small>CHECKED BY:</small> KH <small>SCALE:</small> AS NOTED <small>REVISION NO.:</small>	DWG G-001

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JULY 1, 2015, THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1988 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN EXCEPT AS MODIFIED BY THESE PLANS.

PROJECT PURPOSE

MAIN ROAD BRIDGE OVER KONKAPOT RIVER (BRIDGE NO. M-29-003), IS LOCATED IN MONTEREY MASSACHUSETTS. PROPOSED PROJECT INCLUDES DEMOLITION OF THE EXISTING METAL ARCH CULVERT STRUCTURE AND INSTALLATION OF A NEW PRECAST 25-FOOT WIDE CULVERT/ BRIDGE. THE PROPOSED STRUCTURE IS SUBJECT TO MGL CHAPTER 85 SECTION 35 REVIEW FOR SPANS GREATER THAN 25 FEET. THE STRUCTURE SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH AASHTO LRFD FOR HL-93 DESIGN LOADING. THE EXISTING WATERMAIN SHALL BE RELOCATED AND INSULATED AS NECESSARY TO PREVENT FREEZING AS DESCRIBED IN THE CONTRACT DRAWINGS AND SPECIFICATIONS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK NEEDED TO ACHIEVE INDICATED FINAL CONDITIONS AS SHOWN ON THE PLANS AND AS STATED IN THE SPECIFICATIONS.

GENERAL CONDITIONS

- LOCATIONS OF UNDERGROUND UTILITIES (IF SHOWN) ARE APPROXIMATE ONLY, AND ARE NOT WARRANTED TO BE CORRECT. ADDITIONAL UTILITIES MAY EXIST WHICH ARE NOT INDICATED ON THESE PLANS. ALL EXISTING UTILITIES SHALL BE VERIFIED FOR SERVICE, SIZE, INVERT ELEVATION, LOCATION, ETC. PRIOR TO ANY CONSTRUCTION WORK IN THE VICINITY THEREOF. THE CONTRACTOR MUST NOTIFY DIG SAFE (811) AT LEAST 3 FULL WORKING DAYS PRIOR TO ANY CONSTRUCTION. THE MONTEREY WATER COMPANY AND APPROPRIATE MUNICIPAL DEPARTMENTS MUST ALSO BE NOTIFIED. NOTIFY OWNER AND ENGINEER IN WRITING OF ANY AND ALL DISCREPANCIES PRIOR TO COMMENCING WORK.
- TEMPORARY BENCHMARKS AND CONTROL POINTS WERE LOCATED OR SET BY HANCOCK ASSOCIATES INC. NO GUARANTEE IS MADE AS TO THE EXISTENCE OR ACCURACY OF SUCH MARKS AT THE TIME OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINDING, VERIFYING, AND RE-SETTING (IF NECESSARY) CONTROL POINTS AND BENCHMARKS FOR THE WORK OF THE CONTRACT.
- THE RESPONSIBILITY FOR SAFETY IN, ON, OR ABOUT THE JOBSITE SHALL BE THAT OF THE CONSTRUCTION CONTRACTOR. THESE DRAWINGS DO NOT INCLUDE COMPONENTS WHICH MAY BE NECESSARY FOR CONSTRUCTION SAFETY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION, EXCEPT WHERE SPECIFICALLY DETAILED IN THE PLANS AND SPECIFICATIONS. LIKEWISE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SEQUENCE OF THE WORK, EXCEPT WHERE SPECIFICALLY DETAILED IN THE PLANS AND SPECIFICATIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SURFACE AND GROUNDWATER CONTROL DURING THE WORK OF THE CONTRACT. TEMPORARY WATER CONTROL MEASURES SHALL BE, AT MINIMUM, AS REQUIRED BY THE PROJECT PLANS, SPECIFICATIONS, AND PERMIT CONDITIONS INCLUDING TEMPORARY DIVERSION OF THE BROOK AS NECESSARY DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ADDITIONAL MEASURES NECESSARY FOR WATER CONTROL NECESSARY TO EXECUTE THE WORK OF THE CONTRACT "IN THE DRY." WATER CONTROL MEASURES ARE SUBJECT TO SPECIFIC LIMITS AND CONDITIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY SEDIMENT AND EROSION CONTROL DURING THE WORK OF THE CONTRACT. TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE, AT MINIMUM, AS REQUIRED BY THE PROJECT PLANS, SPECIFICATIONS, AND PERMIT CONDITIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADDITIONAL MEASURES NECESSARY FOR THE PREVENTION OF SEDIMENT DISCHARGE OR EROSION AT THE SITE.
- SPECIFIC AREAS HAVE BEEN DESIGNATED AND DELINEATED ON THE PLANS AS CONTRACTOR STAGING AREAS DURING EACH PHASE OF WORK. THE CONTRACTOR SHALL USE THESE AREAS FOR ON-SITE PARKING, OFFICE TRAILERS (IF NECESSARY), EQUIPMENT AND MATERIAL STORAGE, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY NECESSARY SIGNAGE, FENCING, SAFETY, SEDIMENT/EROSION CONTROL, IMPROVEMENTS, RESTORATIONS ETC. IN THESE AREAS. AREAS WITHIN THE LIMITS OF THE WORK MAY BE USED FOR TEMPORARY STORAGE, HAUL ROADS, PARKING, ETC.; HOWEVER, NO ADDITIONAL CONSIDERATION OR PAYMENT WILL BE MADE FOR WORK NECESSARY TO RE-GRADE AND RESTORE SUCH AREAS TO PRE-CONSTRUCTION CONDITIONS OR RELOCATE ANY MATERIALS OR EQUIPMENT TEMPORARILY STORED WITHIN THE LIMITS OF THE WORK. IF THE CONTRACTOR REQUIRES AND IDENTIFIES ADDITIONAL STAGING AREAS ON THE OWNER'S PROPERTY, THE CONTRACTOR SHALL MAKE A WRITTEN REQUEST TO THE OWNER AND ENGINEER DESCRIBING THE NEED AND LOCATION OF THE PROPOSED AREA. NO GUARANTEE IS MADE THAT ADDITIONAL LAY-DOWN AREAS WILL BE MADE AVAILABLE.
- THE CONTRACTOR SHALL RESTORE AREAS DISTURBED BY CONSTRUCTION AS PER THE PLANS AND SPECIFICATIONS. WHERE NO SPECIFIC INSTRUCTION IS GIVEN, RESTORATION SHALL BE TO THE ORIGINAL CONDITION OR BETTER AND AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR IS SPECIFICALLY INFORMED THAT THE RESTORATION REQUIREMENT APPLIES TO ALL AREAS DISTURBED AS A RESULT OF THE PROJECT.
- IN THE EVENT OF THE DISCOVERY OF THE PRESENCE OF AN ENDANGERED PLANT OR ANIMAL IN THE WORK AREA OR STAGING AREA, ALL WORK IN THE IMMEDIATE AREA OF THE FIND SHALL STOP AND THE OWNER AND ENGINEER SHALL BE NOTIFIED IMMEDIATELY. WORK IN THE IMMEDIATE AREA AND/OR THE ENTIRE SITE (AT THE DISCRETION OF THE OWNER) SHALL BE DISCONTINUED UNTIL CLEARANCE IS GRANTED BY THE OWNER.
- IN THE EVENT OF THE DISCOVERY OF A PREVIOUSLY UNKNOWN ARCHEOLOGICAL SITE, POTENTIAL CULTURAL ARTIFACTS OR RESOURCES, OR ANY OTHER UNUSUAL ITEMS OR CONDITIONS, ALL WORK IN THE IMMEDIATE AREA OF THE FIND SHALL STOP AND THE OWNER AND ENGINEER SHALL BE NOTIFIED IMMEDIATELY. WORK IN THE IMMEDIATE AREA SHALL BE DISCONTINUED UNTIL CLEARANCE IS GRANTED BY THE OWNER.
- PRIOR TO THE START OF WORK, THE CONTRACTOR SHALL DEVELOP, SUBMIT, AND MAINTAIN AN EMERGENCY CONTACT LIST WITH NAMES AND PHONE NUMBERS (DAY AND NIGHT) OF ALL KEY PERSONNEL INVOLVED WITH THE PROJECT. THE LIST SHALL SPECIFICALLY INCLUDE THE PERSON FROM THE CONTRACTOR WHO SHALL BE RESPONSIBLE FOR ENVIRONMENTAL COMPLIANCE. THE LIST SHALL BE PROVIDED TO THE OWNER, ENGINEER, CONSERVATION COMMISSION AND OTHER REGULATING ENTITIES HAVING JURISDICTION AND UPDATED AS NEEDED.
- IN THE EVENT OF UNANTICIPATED ENVIRONMENTAL AND/OR ARCHEOLOGICAL CONDITIONS WHICH PREVENT CONTINUED WORK, THE OWNER MAY DIRECT THE CONTRACTOR TO STOP WORK AND STABILIZE THE SITE. THE OWNER RESERVES THE RIGHT TO TERMINATE THE CONTRACT IN SUCH A CASE.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL PENALTIES AND DELAYS DUE TO NON-COMPLIANCE WITH PERMIT CONDITIONS.
- CONTRACTOR TO VERIFY ALL DIMENSIONS IN THE FIELD.

PLAN REFERENCES

- ELEVATIONS, IN FEET, ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (HEREAFTER REFERRED TO AS NAVD88).
- LIMITED TOPOGRAPHIC SURVEY PERFORMED BY HANCOCK ASSOCIATES INC. AND REPRESENTS CONDITIONS AT THE TIME OF THE SURVEY
- TEST BORINGS PERFORMED BY NEW ENGLAND BORING CONTRACTORS OF BROCKTON, MASSACHUSETTS ON APRIL 8 AND APRIL 9 OF 2020. OBSERVED AND LOGGED BY GZA PERSONNEL.

HYDROLOGY AND HYDRAULICS

HYDRAULIC DESIGN DATA- PROPOSED 25 FT SPAN ARCH CULVERT	
DRAINAGE AREA:	7.10 SQUARE-MILES
DESIGN FLOOD DISCHARGE:	842 CFS
DESIGN STORM RECURRENCE INTERVAL (CURRENT CLIMATE):	25 YEARS (4%)
DESIGN FLOOD ELEVATION:	1,251.71 FT, NAVD88
DESIGN FLOOD VELOCITY:	4.9 FPS
BASE (CURRENT CLIMATE) 100-YEAR (1%) FLOOD DATA - GZA ANALYSES	
BASE FLOOD DISCHARGE:	1,479 CFS
BASE FLOOD ELEVATION:	1,254.7 FT, NAVD88
DESIGN AND CHECK SCOUR DATA	
SCOUR DESIGN FLOOD ANNUAL CHANCE (FREQUENCY):	50-YEAR (2%)
DESIGN FLOOD ABUTMENT SCOUR DEPTH:	1.4 FEET
SCOUR CHECK FLOOD ANNUAL CHANCE (FREQUENCY):	100-YEAR (1%)
CHECK FLOOD ABUTMENT SCOUR DEPTH:	2.1 FEET
FLOOD OF RECORD	
MAXIMUM DISCHARGE:	UNKNOWN
MAXIMUM ELEVATION:	UNKNOWN
DATE:	UNKNOWN
HISTORY OF ICE FLOWS:	UNKNOWN

SEISMIC GROUND SHAKING HAZARD

DESIGN SPECTRA:
 $A_s = 0.093$
 $S_{DS} = 0.207$
 $S_{D1} = 0.092G$
 SITE CLASS = D
 SEISMIC DESIGN CATEGORY (SDC) = A

PRE-CAST CONCRETE DESIGN

DESIGN LOADING:
 BRIDGE UNITS: HL-93
 HEADWALLS: EARTH PRESSURE + LIVE LOAD SURCHARGE
 WINGWALLS: EARTH PRESSURE ONLY
 DESIGN FILL HEIGHT: 0'-6" TO 1'-0" FROM TOP OF CROWN TO TOP OF PAVEMENT
 DESIGN METHOD: LOAD RESISTANCE FACTOR DESIGN PER AASHTO LRFD SPECIFICATION
 ASSUMED FACTORED BEARING RESISTANCE: 6,000 PSF

CONCRETE SHALL BE IN ACCORDANCE WITH THE SPECIFIED MINIMUM 28-DAY COMPRESSIVE STRENGTH AS FOLLOWS:

CONCRETE TYPE	APPLICATION
5000 PSI, 3/4 IN., 685* HP CEMENT CONCRETE	PRECAST BRIDGE 3-SIDED FRAME UNITS, TRAINING WALLS, AND TRAFFIC BARRIER SAFETY CURBS ON BRIDGE FRAMES

ALL CONCRETE MATERIALS SHALL CONFORM TO MASSDOT STANDARD SPECIFICATIONS SECTION M4 AND CONCRETE WORK SHALL CONFORM TO MASSDOT STANDARD SPECIFICATIONS SECTION 901. PROVIDE A 3/8" CHAMFER ON ALL CONCRETE EDGES UNLESS OTHERWISE NOTED. A CONCRETE PENETRATE / SEALER CONFORMING TO MASSDOT M9.15.0 SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES PRIOR TO BACKFILLING. THE SEALER SHALL BE APPLIED IN ACCORDANCE WITH ALL MANUFACTURER RECOMMENDATIONS.

(*) - REFERS TO THE MINIMUM CEMENT CONTENT IN POUNDS PER CUBIC YARD OF CONCRETE

GENERAL SCOPE AND ANTICIPATED CONSTRUCTION SEQUENCE

THE GENERAL SCOPE OF WORK INCLUDES THE EXECUTION OF REMOVAL AND REPLACEMENT OF THE EXISTING METAL ARCH CULVERT AS PRESENTED ON THE PLANS AND SPECIFICATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIAL, EQUIPMENT, AND LABOR NECESSARY TO CONSTRUCT THE PROJECT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS AND AS SHOWN ON THE FINAL CONDITIONS PLAN. THE INTENT OF THE ANTICIPATED CONSTRUCTION SEQUENCE IS TO PROVIDE GUIDANCE TO THE CONTRACTOR TOWARDS MEETING THE TERMS AND CONDITIONS OF ENVIRONMENTAL PROTECTION PERMITS AND BEST MANAGEMENT PRACTICES. CERTAIN ASPECTS OF THE ANTICIPATED CONSTRUCTION SEQUENCE MAY BE ALTERED BY THE CONTRACTOR WITH APPROVAL FROM THE OWNER, EXCEPT AS REQUIRED BY PERMIT CONDITIONS AND SPECIFIC INSTRUCTIONS CONTAINED IN THE SPECIFICATIONS. THE FOLLOWING LIST IS NOT COMPREHENSIVE AND DOES NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR EXECUTING ALL REQUIRED WORK AS PER THE CONTRACT PLANS AND SPECIFICATIONS.

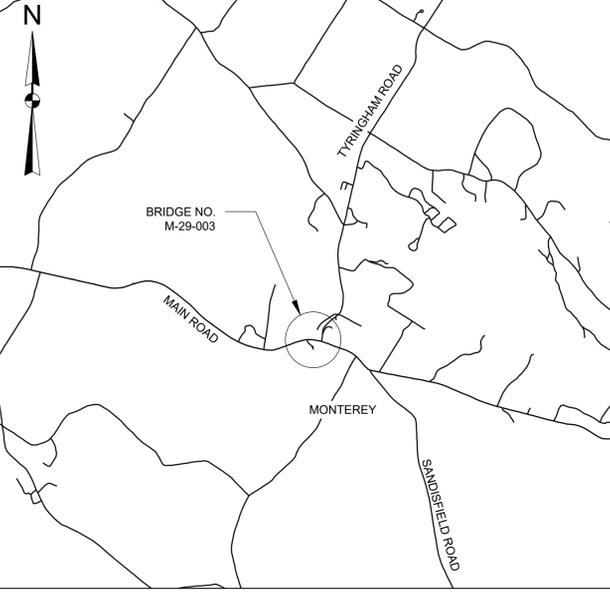
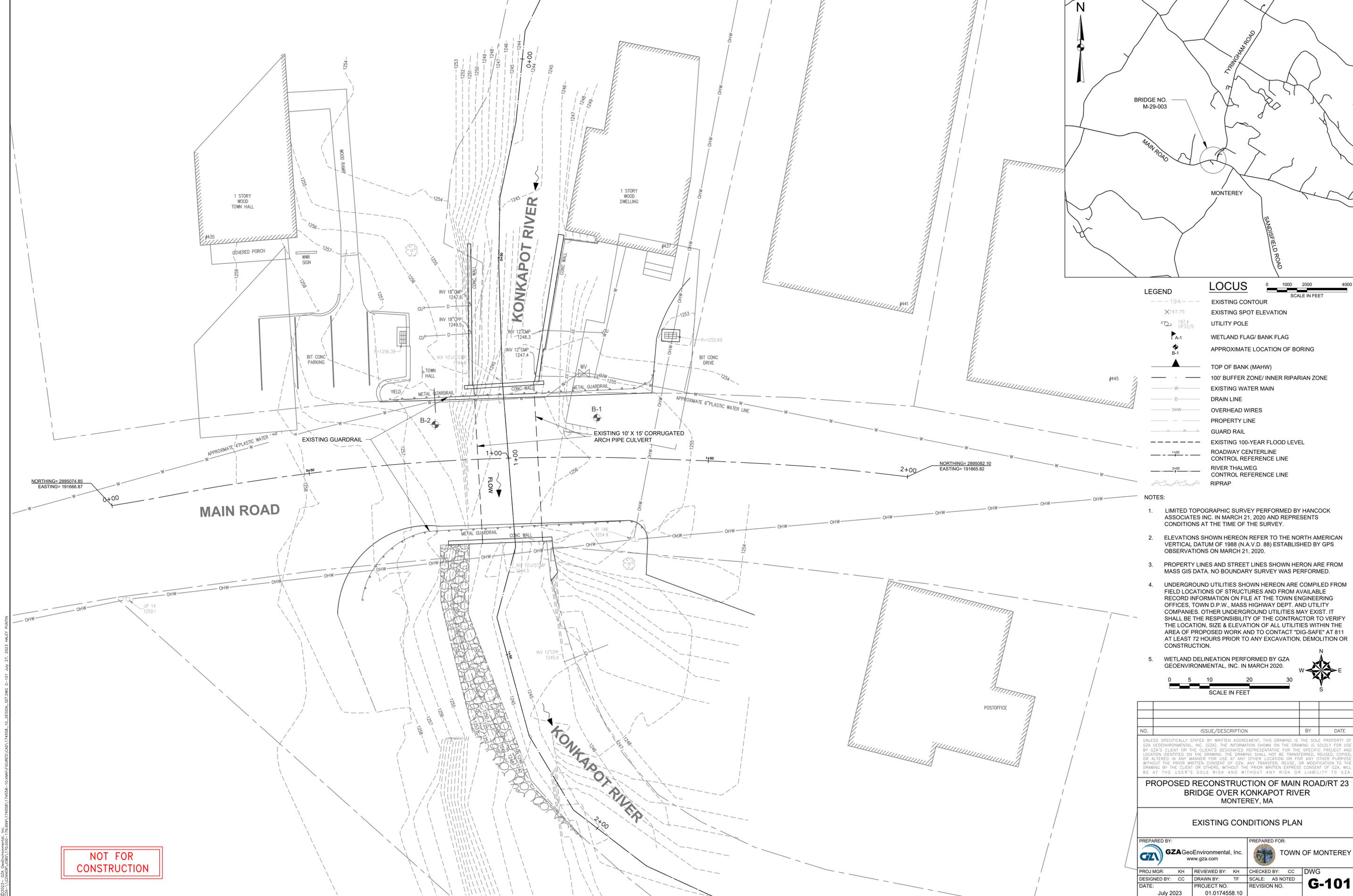
- MOBILIZE TO THE SITE AND ESTABLISH TRAFFIC CONTROLS AND DETOUR ROUTE. DEPLOY TEMPORARY SEDIMENT AND EROSION CONTROLS ASSOCIATED WITH THE PROJECT, INCLUDING PERIMETER EROSION AND SEDIMENT CONTROL BARRIERS, AND OTHER BMPs. ESTABLISH AND MAINTAIN CONTROLS AS NECESSARY TO PROTECT THE WORK ZONE.
- NOTIFY OWNER, ENGINEER, AND REPRESENTATIVES FROM THE VARIOUS ENVIRONMENTAL AGENCIES HAVING JURISDICTION, SCHEDULE AND CONDUCT SITE WALK TO INSPECT SEDIMENT AND EROSION CONTROL MEASURES. MODIFY SEDIMENT AND EROSION CONTROL MEASURES AS REQUIRED. WORK MAY PROCEED ONCE APPROVAL HAS BEEN GRANTED FROM SAID ENTITIES.
- INSTALL TEMPORARY WATERMAIN BYPASS.
- INSTALL TEMPORARY WATER CONTROL SYSTEMS TO MAINTAIN DRY WORK AREA.
- COMPLETE EARTHWORK PREPARATION FOR CULVERT INSTALLATION. REMOVE EXISTING CULVERT AND TRAINING WALLS.
- CONSTRUCT NEW FOUNDATION & FOOTING SYSTEM.
- INSTALL NEW PRE-CAST CULVERT SYSTEM AND TRAINING WALLS. BACKFILL WITH APPROVED MATERIAL.
- INSTALL NEW GUARDRAIL AND BRIDGE RAILING SYSTEM, AND REPAVE EXISTING ROADWAY TO LIMITS SHOWN ON PLANS.
- INSTALL NEW PERMANENT INSULATED WATERMAIN IN UPSTREAM HEADWALL.
- NOTIFY OWNER, ENGINEER, AND ENVIRONMENTAL PERSONNEL HAVING JURISDICTION OF FINAL STABILIZATION. SCHEDULE AND CONDUCT SITE INSPECTION.
- MODIFY/STABILIZE AREAS AS NECESSARY.
- UPON APPROVAL REMOVE ALL PERIMETER SEDIMENT AND SITE ACCESS CONTROLS. RESTORE EXISTING TRAFFIC PATTERN AND REMOVE ALL TRAFFIC CONTROLS & DETOUR SIGNAGE.
- COMPLETE DEMOBILIZATION.

REGULATORY AND DESIGN STANDARDS

- COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES 2023 EDITION.
- MASSACHUSETTS HIGHWAY DEPARTMENT PROJECT DEVELOPMENT & DESIGN GUIDE (2006)
- MASSACHUSETTS DEPARTMENT OF TRANSPORTATION LRFD BRIDGE MANUAL 2013 EDITION (REVISED 2020)
- AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020)

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PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23 BRIDGE OVER KONKAPOT RIVER MONTEREY, MA			
GENERAL NOTES			
PREPARED BY:  GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR:  TOWN OF MONTEREY	
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG G-002
DESIGNED BY: CC	DRAWN BY: TF	SCALE: AS NOTED	
DATE: July 2023	PROJECT NO: 01.0174558.10	REVISION NO:	



LEGEND

- 194 --- EXISTING CONTOUR
- X197.75 EXISTING SPOT ELEVATION
- 197.4 UTILITY POLE
- 193.5/5 UTILITY POLE
- ▲ A-1 WETLAND FLAG/ BANK FLAG
- ◆ B-1 APPROXIMATE LOCATION OF BORING
- ▲ TOP OF BANK (MAHW)
- 100' BUFFER ZONE/ INNER RIPARIAN ZONE
- W --- EXISTING WATER MAIN
- D --- DRAIN LINE
- OHW --- OVERHEAD WIRES
- P --- PROPERTY LINE
- G --- GUARD RAIL
- F --- EXISTING 100-YEAR FLOOD LEVEL
- 1+00 --- ROADWAY CENTERLINE CONTROL REFERENCE LINE
- 3+00 --- RIVER THALWEG CONTROL REFERENCE LINE
- RIPRAP --- RIPRAP

- NOTES:**
- LIMITED TOPOGRAPHIC SURVEY PERFORMED BY HANCOCK ASSOCIATES INC. IN MARCH 21, 2020 AND REPRESENTS CONDITIONS AT THE TIME OF THE SURVEY.
 - ELEVATIONS SHOWN HEREON REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (N.A.V.D. 88) ESTABLISHED BY GPS OBSERVATIONS ON MARCH 21, 2020.
 - PROPERTY LINES AND STREET LINES SHOWN HEREON ARE FROM MASS GIS DATA. NO BOUNDARY SURVEY WAS PERFORMED.
 - UNDERGROUND UTILITIES SHOWN HEREON ARE COMPILED FROM FIELD LOCATIONS OF STRUCTURES AND FROM AVAILABLE RECORD INFORMATION ON FILE AT THE TOWN ENGINEERING OFFICES, TOWN D.P.W., MASS HIGHWAY DEPT. AND UTILITY COMPANIES. OTHER UNDERGROUND UTILITIES MAY EXIST. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG-SAFE" AT 811 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION.
 - WETLAND DELINEATION PERFORMED BY GZA GEOENVIRONMENTAL, INC. IN MARCH 2020.



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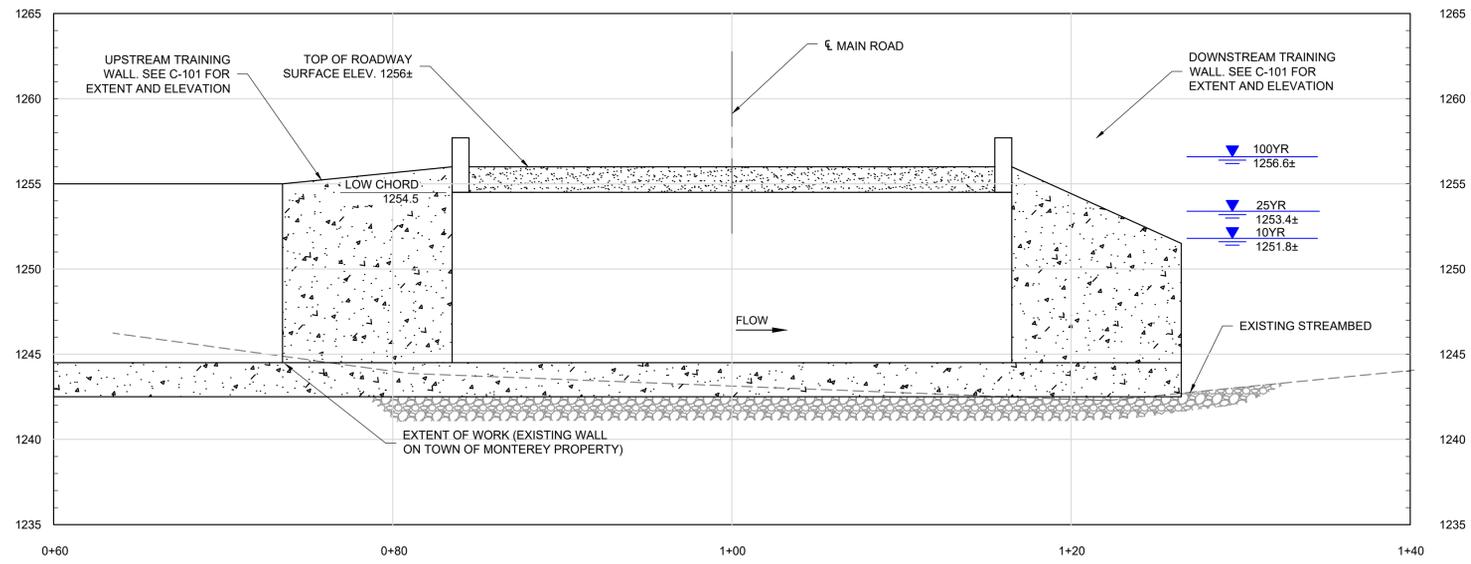
**PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23
BRIDGE OVER KONKAPOT RIVER
MONTEREY, MA**

EXISTING CONDITIONS PLAN

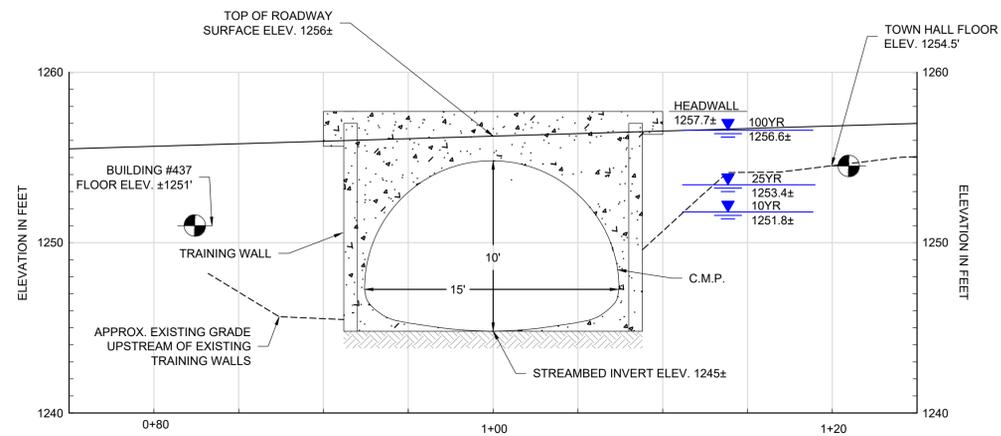
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF MONTEREY	
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: CC	DRAWN BY: TF	SCALE: AS NOTED	G-101
DATE: July 2023	PROJECT NO. 01.0174558.10	REVISION NO.	

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CONSTRUCTION**

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EXISTING PROFILE- KONKAPOT RIVER
SCALE: 1" = 5'



EXISTING PROFILE- MAIN ROAD
SCALE: 1" = 5'



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**PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23
BRIDGE OVER KONKAPOT RIVER
MONTEREY, MA**

EXISTING CONDITIONS PROFILES

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: TOWN OF MONTEREY		
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: CC	DRAWN BY: TF	SCALE: AS NOTED	G-102
DATE: July 2023	PROJECT NO. 01.0174558.10	REVISION NO.	

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TEST BORING LOG												
		Monterey Culvert Replacement Main Road over Konkapot River Monterey, Massachusetts				BORING NO.: B-1 SHEET: 1 of 1 PROJECT NO: 01.0174558.00 REVIEWED BY: HLA						
Drilling Co.: New England Boring Contractors		Type of Rig: Truck Rig		Boring Location: See Plan		H. Datum: See Plan						
Foreman: P. Labossiere		Rig Model: Falling F-15 Strawn Star		Ground Surface Elev. (ft.): 1256		V. Datum: NAVD88						
Logged By: L. Williams		Drilling Method: Drive & Wash		Final Boring Depth (ft.): 20								
				Date Start - Finish: 4/8/2020 - 4/8/2020								
Auger/Casing Type: HW		Sampler Type: Split Spoon		Groundwater Depth (ft.)								
I.D./O.D. (in.): 4 7/4.5"		I.D./O.D. (in.): 1.375"/2"		Date		Time		Water Depth		Casing		
Hammer Weight (lb.): 140		Sampler Hmr Wt (lb): 140		4/8/20		1330		2.8		17		
Hammer Fall (in.): 30		Sampler Hmr Fall (in): 30		4/8/20		1335		8.8		12		
Other: Automatic Hammer		Other: Automatic Hammer										
Depth (ft)	Casing Blows (ft/min)	Sample				Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remarks	Field Test Data	Stratum Description	Stratum Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)							
5		S-1	0.5-2.5	24	12	20	13	S-1: Medium dense, brown, fine to medium SAND, little Gravel, trace Silt, dry.	1		ASPHALT	1255.5'
		S-2	2.5-4.5	24	18	18	14	S-2: Medium dense, brown, fine to coarse SAND, some Silt, little Gravel, dry.				
		S-3	4.5-6.5	24	12	19	12	S-3: Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel, dry.				
		S-4	6.5-8.5	24	7	13	4	S-4: Loose, gray, fine to coarse SAND and GRAVEL, little Silt, wet.				
		S-5	8.5-10.5	24	12	9	5	S-5: (Top 9") Loose, brown, fine to medium SAND, some Silt, trace Gravel, wet.				
		S-6	10.5-11.7	14	11	18	48	S-5: (Bottom 3") Black, fibrous PEAT, little Silt, little fine Sand, trace Wood Debris, wet. S-6: (Top 3") Brown, fine to coarse SAND and GRAVEL, trace Silt, trace Organics, wet. S-6: (Bottom 10") Wood.				
		S-7	14-16	24	6	37	12	S-7: (Top 3") Black, fine to medium SAND, little fibrous Peat. S-7: (Bottom 3") Medium dense, dark brown, fine to medium SAND, little Organic Silt, trace Organics, wet.				
		S-8	19-19.2	2	2	50/2"		S-8: Very dense, tan, fine to coarse SAND, little Gravel, trace Silt.				
Bottom of boring at 20 feet.												

174558.00 MONTEREY CULVERT.GPJ; STRATUM ONLY; 5/1/2020

- REMARKS
1. Ground surface elevation estimated from a plan entitled "Topographic Plan of Land in Monterey, MA", prepared by Hancock Associates and dated April 6, 2020.
 2. Asphalt measured 6 inches in thickness.
 3. Groundwater observed at 7 feet below ground surface (bgs) in sample S-4.
 4. Drilled through a 2-foot-thick piece of wood from 11 to 13 feet bgs.
 5. Weathered rock observed in cuttings at 17 feet bgs. Roller bit advanced 3 feet into apparent weathered bedrock.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: B-1

TEST BORING LOG												
		Monterey Culvert Replacement Main Road over Konkapot River Monterey, Massachusetts				BORING NO.: B-2 SHEET: 1 of 1 PROJECT NO: 01.0174558.00 REVIEWED BY: HLA						
Drilling Co.: New England Boring Contractors		Type of Rig: Truck Rig		Boring Location: See Plan		H. Datum: See Plan						
Foreman: P. Labossiere		Rig Model: Falling F-15 Strawn Star		Ground Surface Elev. (ft.): 1257		V. Datum: NAVD88						
Logged By: L. Williams		Drilling Method: Drive & Wash		Final Boring Depth (ft.): 25								
				Date Start - Finish: 4/9/2020 - 4/9/2020								
Auger/Casing Type: HW		Sampler Type: Split Spoon		Groundwater Depth (ft.)								
I.D./O.D. (in.): 4 7/4.5"		I.D./O.D. (in.): 1.375"/2"		Date		Time		Water Depth		Casing		
Hammer Weight (lb.): 140		Sampler Hmr Wt (lb): 140		4/9/20		1201		6.4		20		
Hammer Fall (in.): 30		Sampler Hmr Fall (in): 30		4/9/20		1206		9.0		15		
Other: Automatic Hammer		Other: Automatic Hammer										
Depth (ft)	Casing Blows (ft/min)	Sample				Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remarks	Field Test Data	Stratum Description	Stratum Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)							
5		S-1	0.5-2.5	24	14	20	26	S-1: Dense, brown, fine to coarse SAND, some Gravel, trace Silt, dry.	1		ASPHALT	1256.5'
		S-2	2.5-4.5	24	10	11	11	S-2: Medium dense, brown, fine to medium SAND, little Silt, trace Gravel, dry.				
		S-3	4.5-6.5	24	11	10	9	S-3: Medium dense, brown, fine to medium SAND, little Silt, trace Gravel, wet.				
		S-4	6.5-8.5	24	6	9	9	S-4: Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel, wet.				
		S-5	8.5-10.5	24	7	5	4	S-5: (Top 5") Loose, brown, fine to coarse SAND, trace Silt, trace Gravel, wet.				
		S-6	10.5-12.5	24	9	4	2	S-5: (Bottom 2") WOOD. S-6: Soft, black, Organic SILT, trace Peat, trace Sand, wet.				
		S-7	14-16	24	4	4	2	S-7: (Top 3") Medium stiff, brown, fibrous PEAT, trace Gravel, Wood Debris, wet. S-7: (Bottom 1") Gray, fine GRAVEL, some fine to coarse Sand, trace Silt, wet.				
		S-8	19-21	24	14	20	15	S-8: Medium dense, gray, fine to medium SAND, little Silt, trace Gravel, we. (Decomposed Bedrock)				
		S-9	25-25	0	0	50/0"		Bottom of boring at 25 feet.				
Bottom of boring at 25 feet.												

174558.00 MONTEREY CULVERT.GPJ; STRATUM ONLY; 5/1/2020

- REMARKS
1. Ground surface elevation estimated from a plan entitled "Topographic Plan of Land in Monterey, MA", prepared by Hancock Associates and dated April 6, 2020.
 2. Asphalt measured 6 inches in thickness.
 3. Probable bedrock encountered at 22.5 feet below ground surface (bgs). Roller bit advanced to 24 feet bgs. Split spoon refusal at 25 feet bgs.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

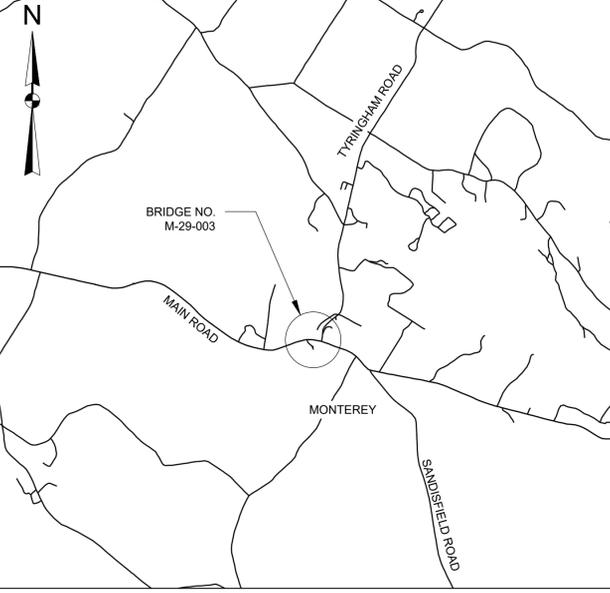
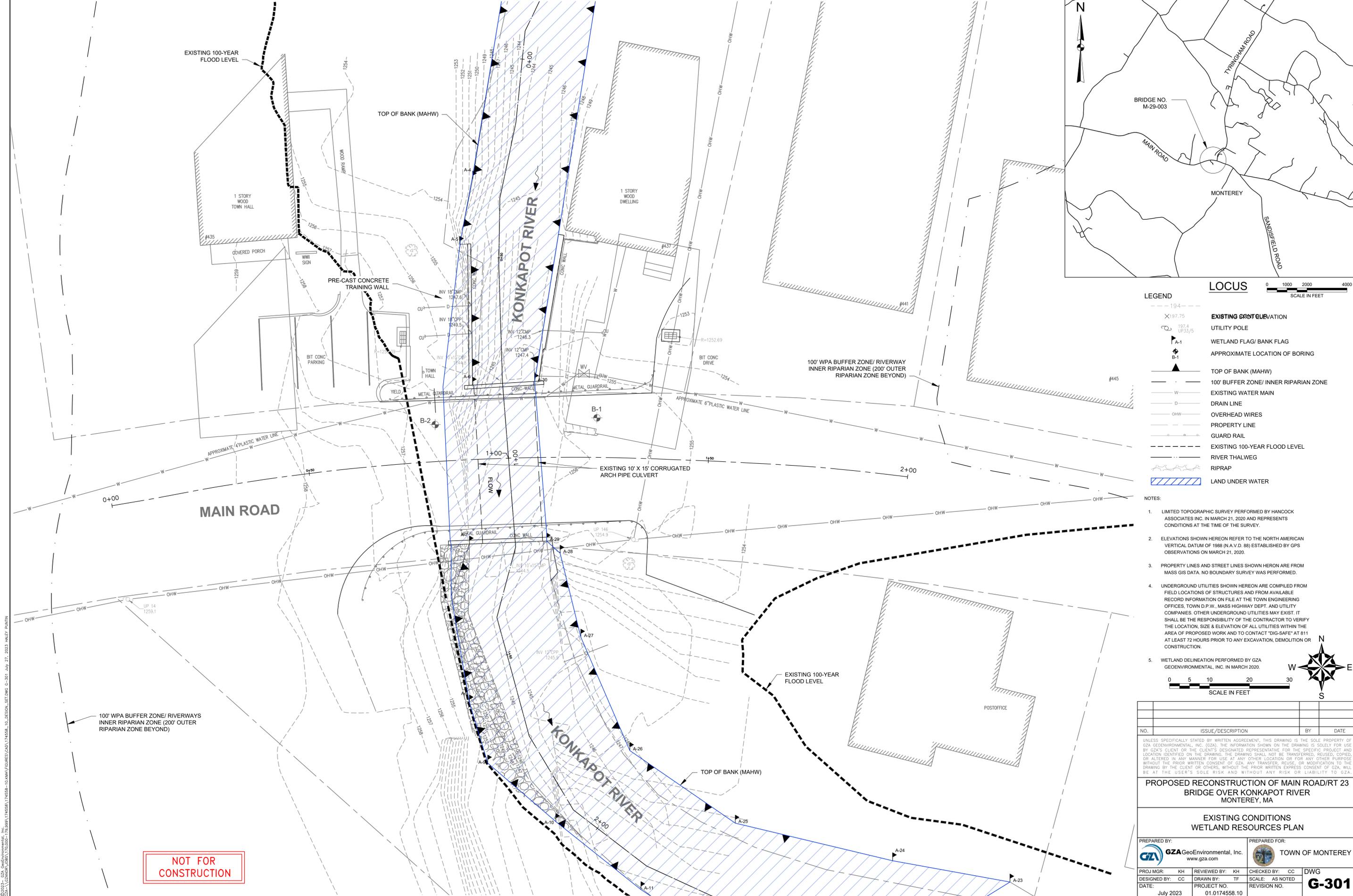
Boring No.: B-2

NOT FOR CONSTRUCTION

BORING NOTES:

1. LOCATION OF DRIVE ARE SHOWN ON THE PLANS THUS:
2. BORINGS ARE TAKEN FOR THE PURPOSE OF DESIGN AND SHOW CONDITIONS AT THE BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
3. WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
4. FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 3/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
5. BORINGS WERE MADE ON 4/8/2020 AND 4/9/2020.
6. ALL BORINGS WERE MADE BY NEW ENGLAND BORING CONTRACTORS OF 40 FORDWAY STREET, DERRY, NH 03038.
7. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

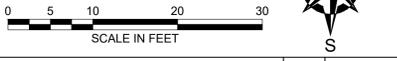
NO.		ISSUE/DESCRIPTION		BY	DATE
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PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23 BRIDGE OVER KONKAPOT RIVER MONTEREY, MA					
BORING LOGS					
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com			PREPARED FOR: TOWN OF MONTEREY		
PROJ MGR: KH	DESIGNED BY: CC	REVIEWED BY: KH	DRAWN BY: TF	CHECKED BY: CC	DWG
DATE: July 2023	PROJECT NO. 01.0174558.10	SCALE: AS NOTED	REVISION NO.	G-201	



LOCUS 0 1000 2000 4000
SCALE IN FEET

- LEGEND**
- 194 --- EXISTING ELEVATION
 - X 197.75 UTILITY POLE
 - 197.4 UP 33/5 WETLAND FLAG/BANK FLAG
 - A-1 APPROXIMATE LOCATION OF BORING
 - B-1 TOP OF BANK (MAHW)
 - 100' BUFFER ZONE/ INNER RIPARIAN ZONE
 - W EXISTING WATER MAIN
 - D DRAIN LINE
 - OHW OVERHEAD WIRES
 - PROPERTY LINE
 - GUARD RAIL
 - 100 --- EXISTING 100-YEAR FLOOD LEVEL
 - RIVER THALWEG
 - RIPRAP
 - LAND UNDER WATER

- NOTES:**
- LIMITED TOPOGRAPHIC SURVEY PERFORMED BY HANCOCK ASSOCIATES INC. IN MARCH 21, 2020 AND REPRESENTS CONDITIONS AT THE TIME OF THE SURVEY.
 - ELEVATIONS SHOWN HEREON REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (N.A.V.D. 88) ESTABLISHED BY GPS OBSERVATIONS ON MARCH 21, 2020.
 - PROPERTY LINES AND STREET LINES SHOWN HEREON ARE FROM MASS GIS DATA. NO BOUNDARY SURVEY WAS PERFORMED.
 - UNDERGROUND UTILITIES SHOWN HEREON ARE COMPILED FROM FIELD LOCATIONS OF STRUCTURES AND FROM AVAILABLE RECORD INFORMATION ON FILE AT THE TOWN ENGINEERING OFFICES, TOWN D.P.W., MASS HIGHWAY DEPT. AND UTILITY COMPANIES. OTHER UNDERGROUND UTILITIES MAY EXIST. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG-SAFE" AT 811 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION.
 - WETLAND DELINEATION PERFORMED BY GZA GEOENVIRONMENTAL, INC. IN MARCH 2020.



NO.	ISSUE/DESCRIPTION	BY	DATE

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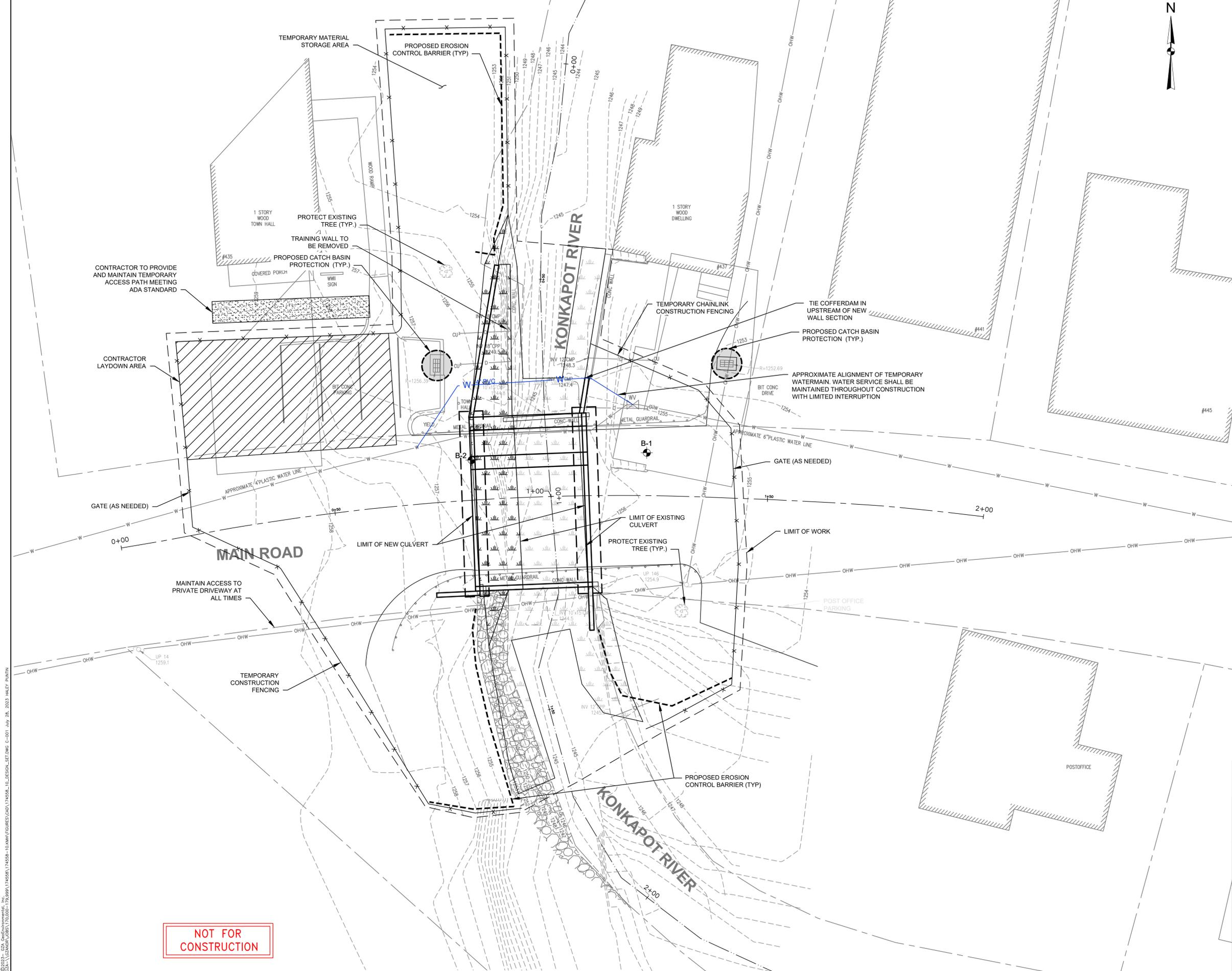
**PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23
BRIDGE OVER KONKAPOT RIVER
MONTEREY, MA**

**EXISTING CONDITIONS
WETLAND RESOURCES PLAN**

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: TOWN OF MONTEREY
PROJ MGR: KH DESIGNED BY: CC DATE: July 2023	REVIEWED BY: KH DRAWN BY: TF PROJECT NO.: 01.0174558.10
CHECKED BY: CC SCALE: AS NOTED REVISION NO.:	DWG G-301

**NOT FOR
CONSTRUCTION**

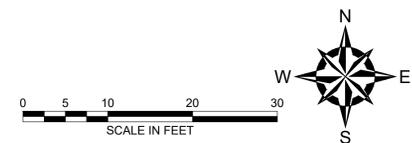
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LEGEND

--- 194 ---	EXISTING CONTOUR
X 197.75	EXISTING SPOT ELEVATION
○ 193.4 UF33/5	UTILITY POLE
▲ A-1	WETLAND FLAG/ BANK FLAG
⊕ B-1	APPROXIMATE LOCATION OF BORING
▲	TOP OF BANK (MAHW)
---	100' BUFFER ZONE/ INNER RIPARIAN ZONE
W	EXISTING WATER MAIN
D	DRAIN LINE
OHW	OVERHEAD WIRES
---	PROPERTY LINE
---	GUARD RAIL
---	EXISTING 100-YEAR FLOOD LEVEL
---	RIVER THALWEG
---	RIPRAP
X	TEMPORARY CONSTRUCTION FENCING (6" CHAIN LINK)
---	WATER CONTROL STRUCTURE (STEEL SHEETING AND OR COFFER DAM)
---	LIMIT OF WORK
---	EXISTING LAND UNDER WATER TEMPORARILY IMPACTED
---	NEW LAND UNDER WATER ANTICIPATED POST CONSTRUCTION
---	EROSION CONTROL BARRIER
⊕	PROPOSED CATCHBASIN PROTECTION

- NOTES:**
- LIMITED TOPOGRAPHIC SURVEY PERFORMED BY HANCOCK ASSOCIATES INC. IN MARCH 21, 2020 AND REPRESENTS CONDITIONS AT THE TIME OF THE SURVEY.
 - ELEVATIONS SHOWN HEREON REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (N.A.V.D. 88) ESTABLISHED BY GPS OBSERVATIONS ON MARCH 21, 2020.
 - PROPERTY LINES AND STREET LINES SHOWN HEREON ARE FROM MASS GIS DATA. NO BOUNDARY SURVEY WAS PERFORMED.
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 - WETLAND DELINEATION PERFORMED BY GZA GEOENVIRONMENTAL, INC. IN MARCH 2020.



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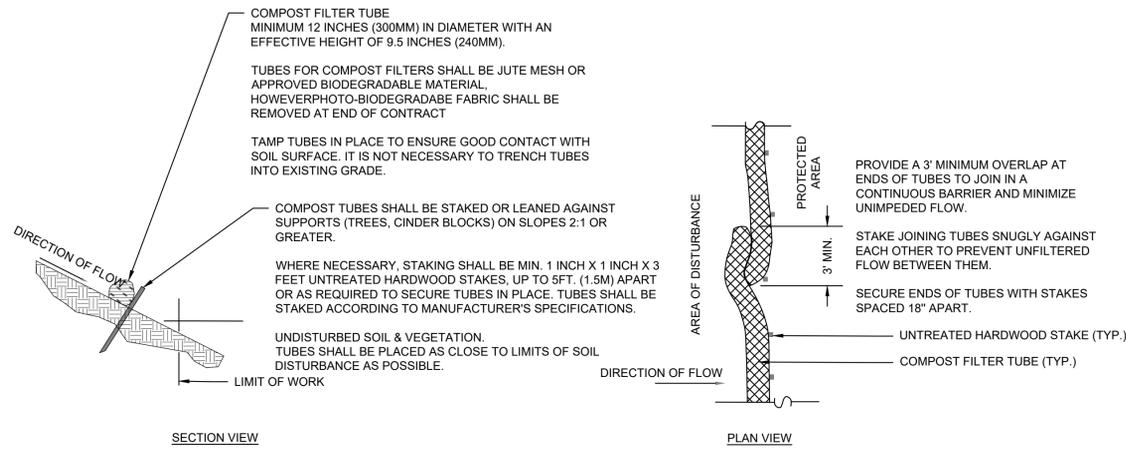
**PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23
BRIDGE OVER KONKAPOT RIVER
MONTEREY, MA**

SEDIMENT, EROSION, AND ACCESS CONTROL PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF MONTEREY	
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: CC	DRAWN BY: TF	SCALE: AS NOTED	C-001
DATE: July 2023	PROJECT NO: 01.0174558.10	REVISION NO:	

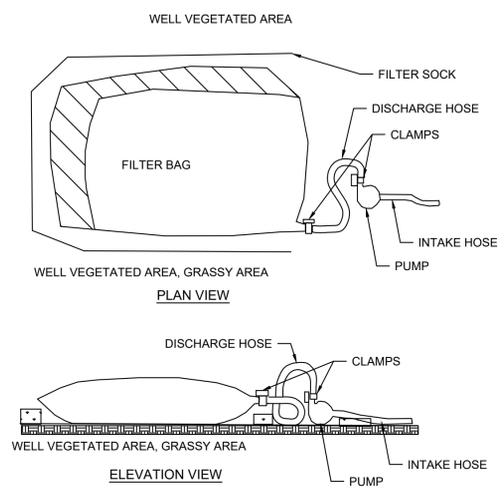
**NOT FOR
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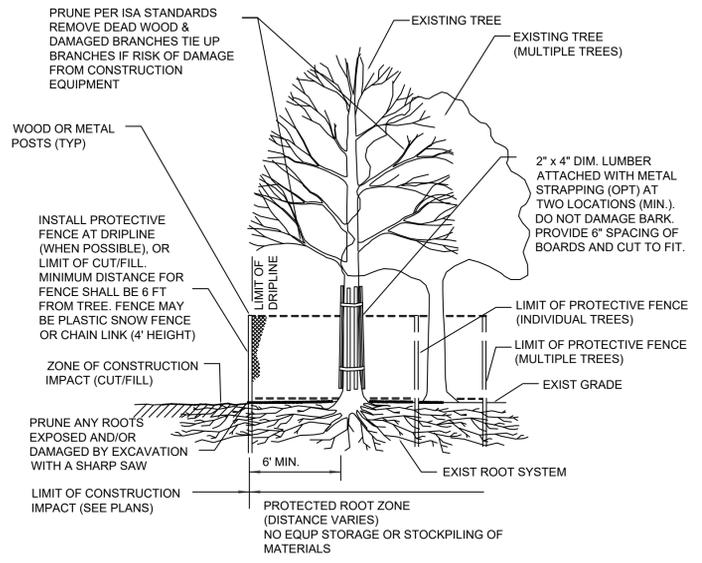
COMPOST FILTER TUBE DETAIL
NTS

- GENERAL NOTES:**
1. PROVIDE A MINIMUM DIAMETER OF 12 INCHES (300MM) FOR SLOPES UP TO 50 FEET (15.24M) IN LENGTH WITH A SLOPE RATIO 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 SITUATIONS WITH LONGER OR STEEPER SLOPES.
 2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
 3. TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.
 4. DO NOT INSTALL IN PERENNIAL EPHEMERAL OR INTERMITTENT STREAMS.
 5. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
 6. ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.

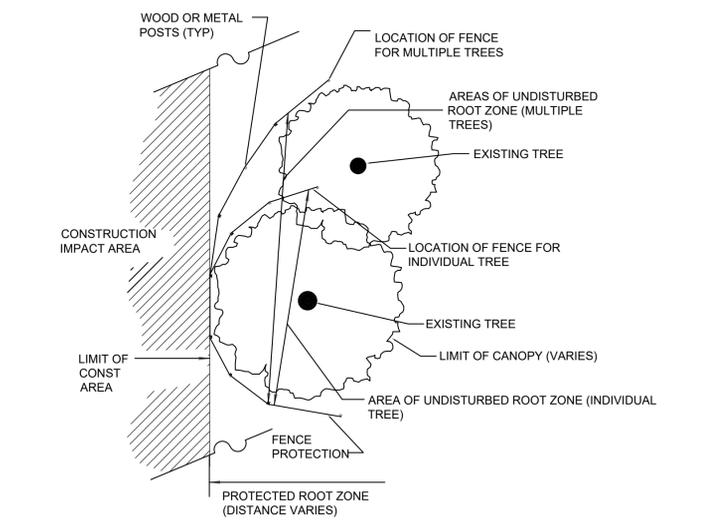


PUMPED WATER FILTER BAG DETAIL
NTS

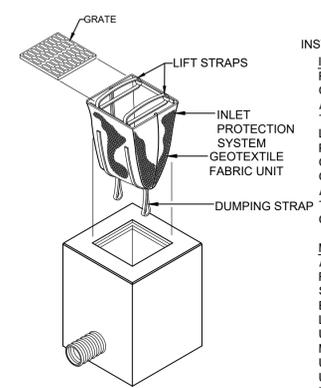
- PUMPED WATER FILTER BAG NOTES:**
1. CONTRACTOR SHALL LOCATE FILTER BAG TO COMPLY WITH REQUIREMENTS BELOW. LOCATION IS SUBJECT TO APPROVAL BY THE ENGINEER.
 2. FILTER BAGS SHALL BE USED TO FILTER WATER PUMPED FROM DISTURBED AREAS PRIOR TO DISCHARGING.
 3. FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. CONTRACTOR SHALL PROVIDE A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY (FOR DISPOSAL PURPOSES).
 4. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT.
 5. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED.
 6. BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, SURROUNDED BY FILTER SOCK AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
 7. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
 8. THE PUMPING RATE SHALL BE NO GREATER THAN 100 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.
 9. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.



EXISTING TREE PROTECTION
NTS

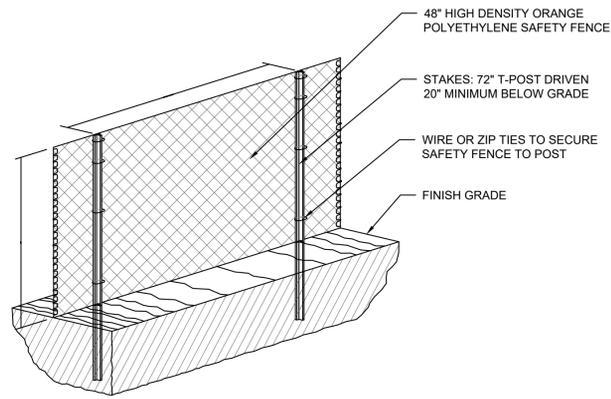


EXISTING TREE PROTECTION PLAN VIEW
NTS



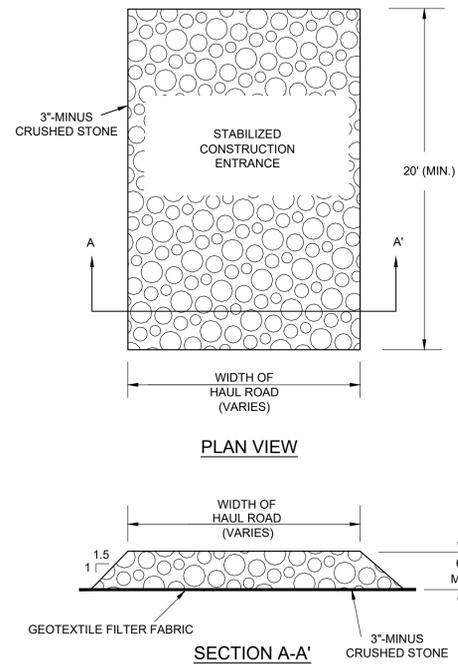
CATCH BASIN PROTECTION
NTS

- INSTALLATION AND MAINTENANCE GUIDELINES**
- INSTALLATION:** REMOVE THE GRATE FROM CATCH BASIN. IF USING OPTIONAL OIL ABSORBENTS, PLACE ABSORBENT PILLOW IN UNIT. STAND THE GRATE ON END. MOVE THE TOP LIFTING STRAPS OUT OF THE WAY AND PLACE THE GRATE INTO THE GEOTEXTILE FABRIC UNIT SO THAT THE GRATE IS BELOW THE TOP STRAPS AND ABOVE THE LOWER STRAPS. HOLDING THE LIFTING DEVICES, INSERT THE GRATE INTO THE INLET.
- MAINTENANCE:** REMOVE ALL ACCUMULATED SEDIMENT AND DEBRIS FROM VICINITY OF UNIT AFTER EACH STORM EVENT. AFTER EACH STORM EVENT AND AT REGULAR INTERVALS, LOOK INTO THE GEOTEXTILE FABRIC UNIT. IF THE CONTAINMENT AREA IS MORE THAN 1/3 FULL OF SEDIMENT, THE UNIT MUST BE EMPTIED. TO EMPTY UNIT, LIFT THE UNIT OUT OF THE INLET USING THE LIFTING STRAPS AND REMOVE THE GRATE. IF USING OPTIONAL OIL ABSORBENTS, REPLACE ABSORBENT WHEN NEAR SATURATION.



TEMPORARY CONSTRUCTION FENCE DETAIL
NTS

- NOTES:**
1. ALL SENSITIVE AREAS SHALL BE PROTECTED AS PER PLAN.
 2. ALL TREES IN THE CONSTRUCTION AREA NOT SPECIFICALLY DESIGNATED FOR REMOVAL SHALL BE PRESERVED AND PROTECTED WITH HIGH VISIBILITY FENCE AS PER PLAN.
 3. WHEN PRACTICABLE, INSTALL HIGH VISIBILITY 3 FEET OUTSIDE OF THE DRIP LINE OF THE TREE.
 4. SAFETY FENCE SHOULD BE FASTENED SECURELY TO THE T-POSTS.
 5. THE FENCING MUST REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION; ANY CHANGE OF THE PROTECTIVE FENCING MUST BE APPROVED.

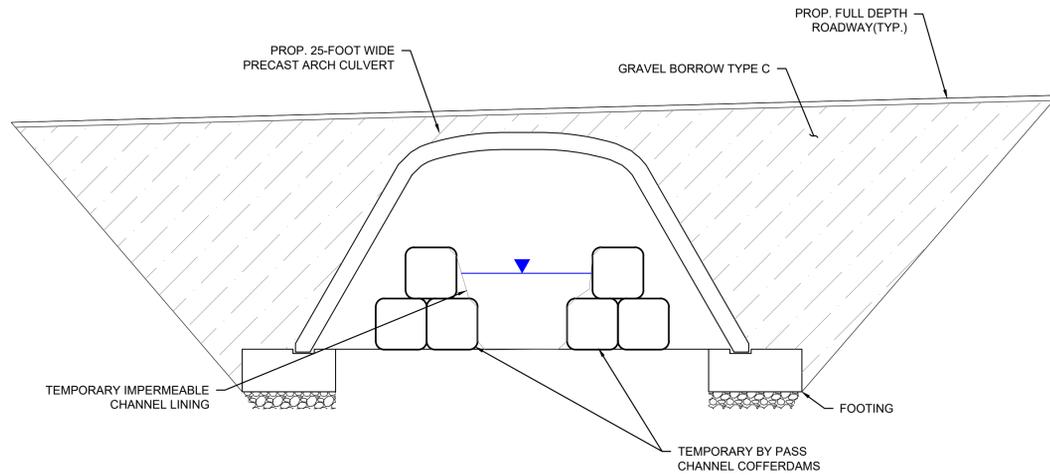


TEMPORARY CONSTRUCTION ENTRANCE AND ACCESS ROAD
NTS

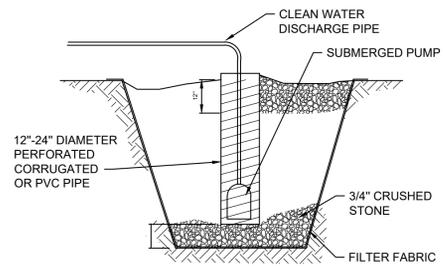
NOTE: REMOVE AT END OF PROJECT AND RESTORE AREA.

NOT FOR CONSTRUCTION

NO.	ISSUE/DESCRIPTION	BY	DATE
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PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23 BRIDGE OVER KONKAPOT RIVER MONTEREY, MA			
SEDIMENT, EROSION, AND ACCESS DETAILS			
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF MONTEREY	
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: CC	DRAWN BY: TF	SCALE: AS NOTED	C-002
DATE: July 2023	PROJECT NO: 01.0174558.10	REVISION NO:	

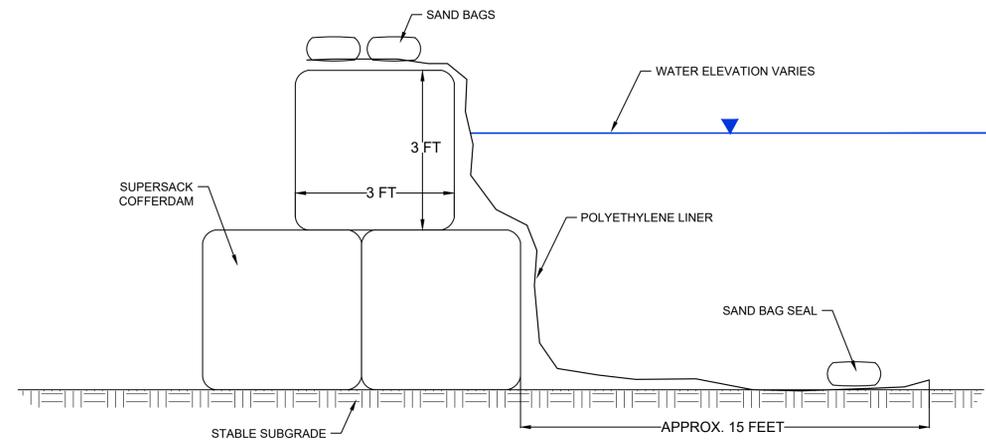


TYPICAL WATER CONTROL AND BACKFILL SECTION



DEWATERING SUMP DETAIL

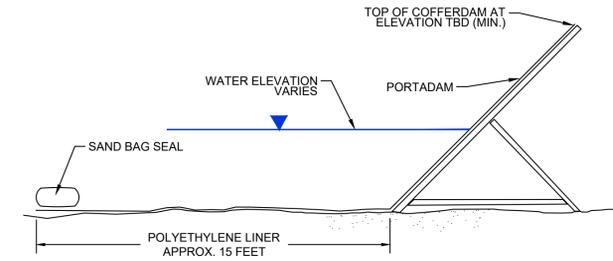
NTS



- NOTES:
1. TOTAL HEIGHT OF TEMPORARY COFFERDAM CONTEMPLATED FOR THE WORK OF THIS PROJECT IS TO BE MINIMUM OF 3 FEET.
 2. ALTERNATE MEANS OF WATER CONTROL MUST BE APPROVED AND ARE NOT GUARANTEED TO BE APPROVED
 3. SHOULD THE CONTRACTOR DESIRE TO EMPLOY A NON-PROPRIETARY TEMPORARY COFFERDAM WITH HEIGHTS GREATER THAN 6 FEET THEY SHALL (AT NO ADDITIONAL COST TO THE OWNER) ENGAGE A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MASSACHUSETTS TO DESIGN (AND STAMP) SAID TEMPORARY COFFERDAM AND SUBMIT TO ENGINEER FOR REVIEW.

BULK SAND BAG COFFERDAM DETAIL

NTS



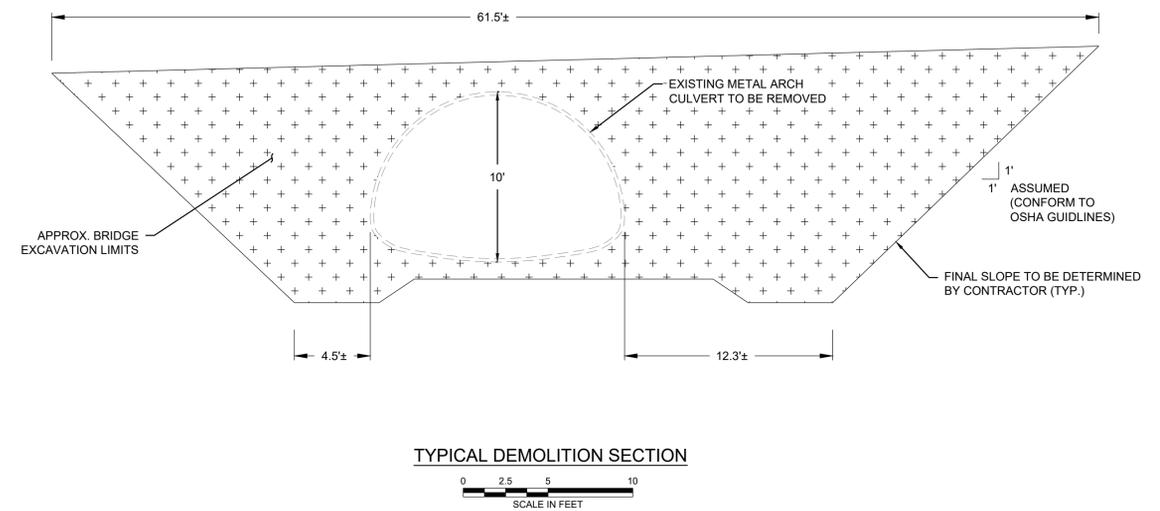
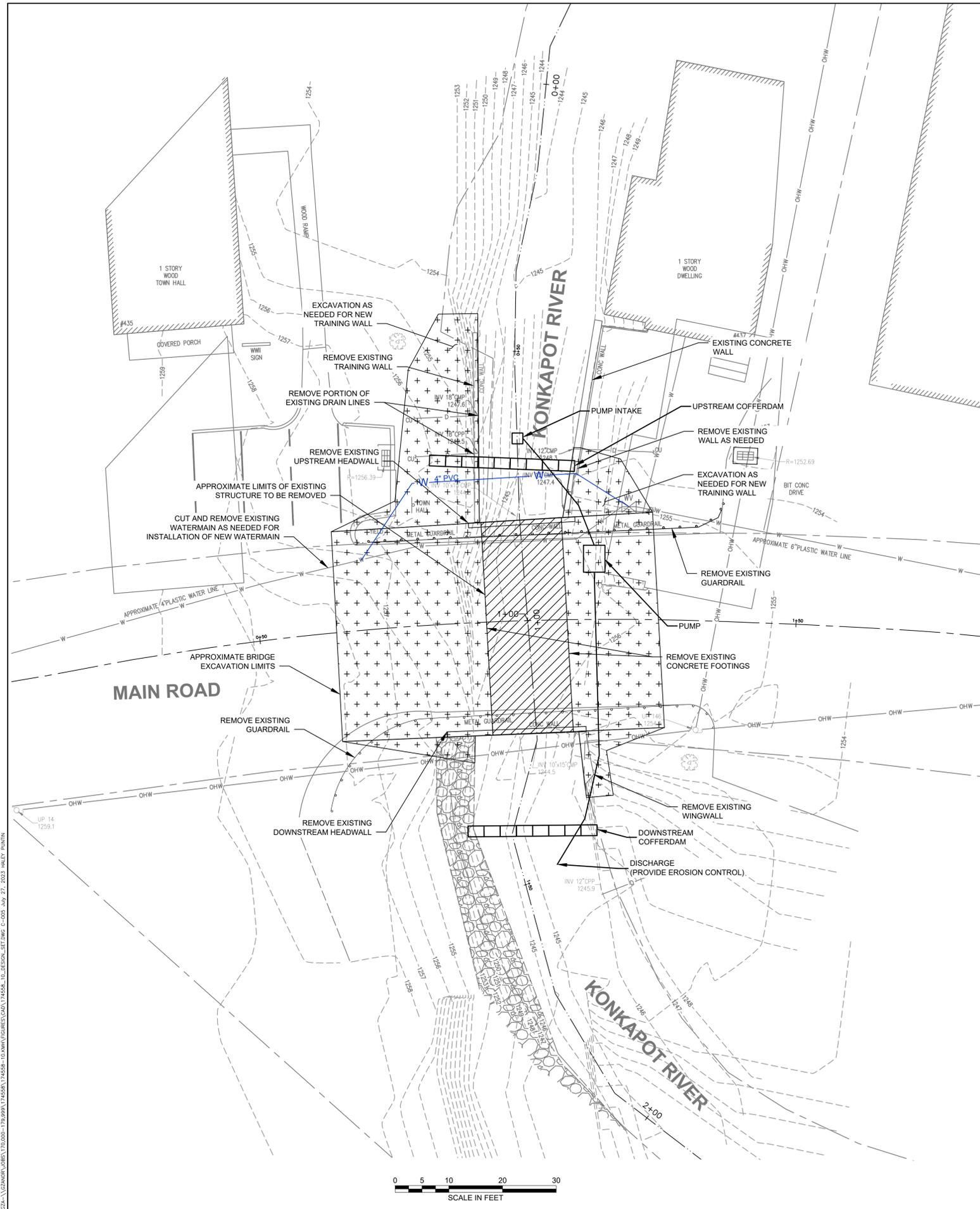
- OPTIONAL ATTACHMENTS:
- BACK BRACE POLE
 - HORIZONTAL, ADDITIONAL BRACING
 - SINGLE FRAME ATTACHMENTS FOR IRREGULAR CONTOURS

PORT-A-DAM DETAIL

NTS

NOT FOR CONSTRUCTION

NO.	ISSUE/DESCRIPTION	BY	DATE
<small>UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOTECHNICAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.</small>			
PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23 BRIDGE OVER KONKAPOT RIVER MONTEREY, MA			
WATER CONTROL SECTIONS AND DETAILS			
<small>PREPARED BY:</small> GZA GeoEnvironmental, Inc. <small>www.gza.com</small>		<small>PREPARED FOR:</small> TOWN OF MONTEREY	
<small>PROJ MGR:</small> KH <small>DESIGNED BY:</small> CC	<small>REVIEWED BY:</small> KH <small>DRAWN BY:</small> TF	<small>CHECKED BY:</small> CC <small>SCALE:</small> AS NOTED	<small>DWG</small> C-004
<small>DATE:</small> July 2023	<small>PROJECT NO.</small> 01.0174558.10	<small>REVISION NO.</small>	



LEGEND

--- 194 ---	EXISTING CONTOUR
X 97.75	EXISTING SPOT ELEVATION
○ 197.4 1P33/5	UTILITY POLE
▲ A-1	WETLAND FLAG/ BANK FLAG
⊕ B-1	APPROXIMATE LOCATION OF BORING
▲	TOP OF BANK (MAHW)
—	100' BUFFER ZONE/ INNER RIPARIAN ZONE
— W —	EXISTING WATER MAIN
— D —	DRAIN LINE
— OHW —	OVERHEAD WIRES
— P —	PROPERTY LINE
— G —	GUARD RAIL
---	EXISTING 100-YEAR FLOOD LEVEL
---	RIVER THALWEG
---	RIPRAP
[Hatched Area]	DENOTES BRIDGE SUPERSTRUCTURE TO BE DEMOLISHED
[+ + +]	DENOTES BRIDGE / TRAINING WALL EXCAVATION LIMITS

NOT FOR CONSTRUCTION



NO.	ISSUE/DESCRIPTION	BY	DATE

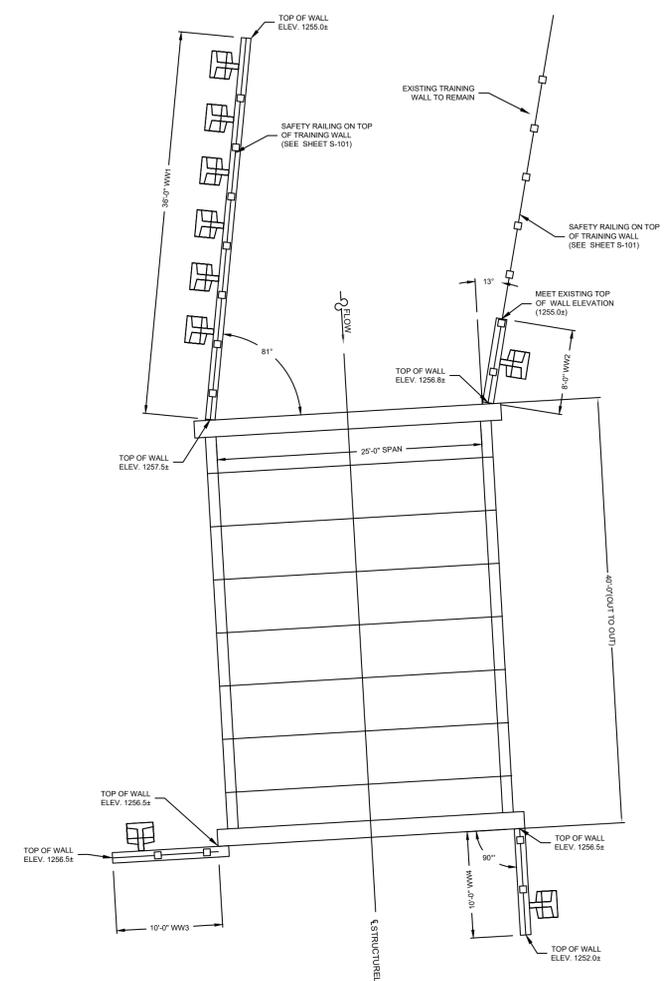
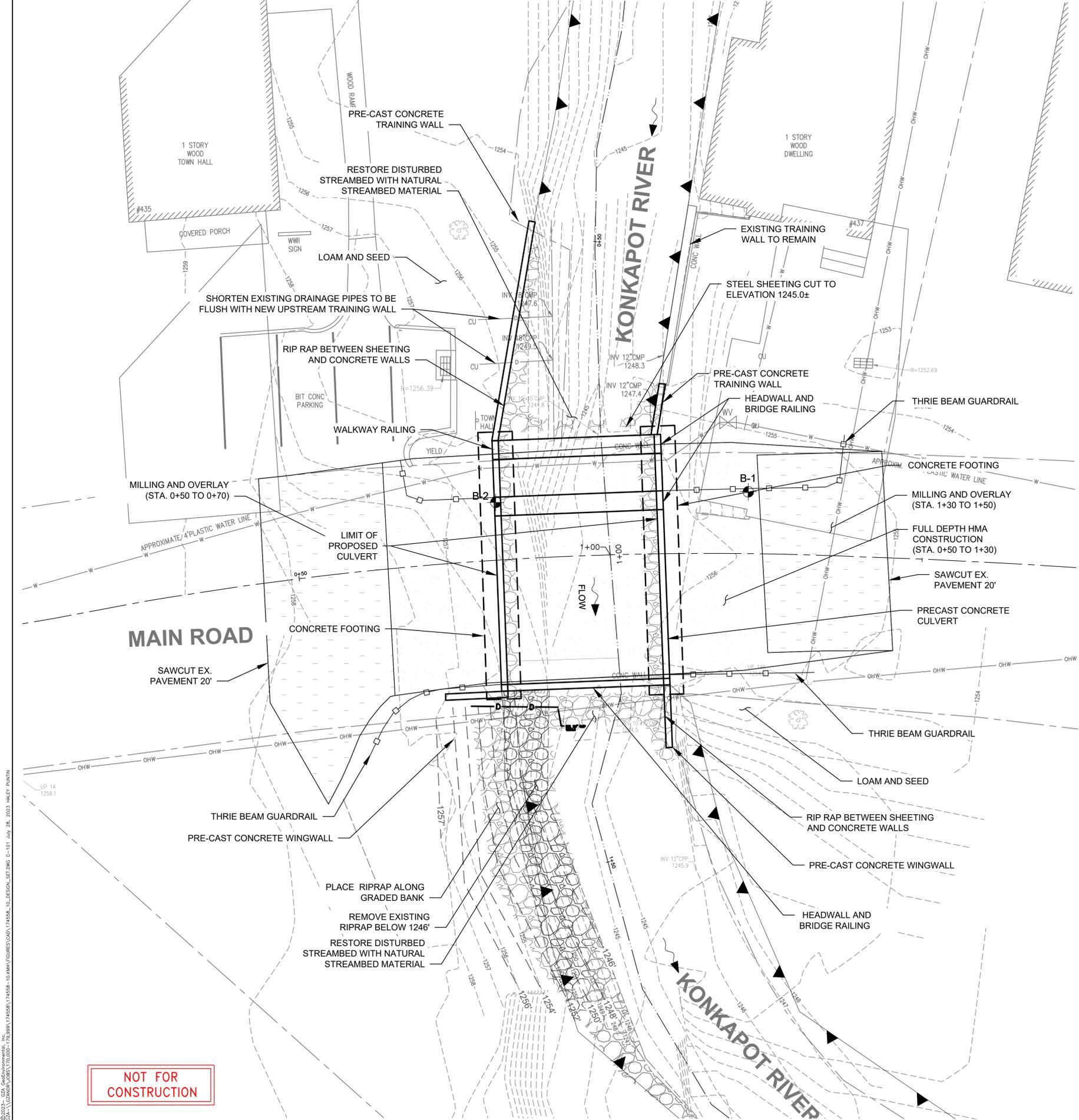
UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOTECHNICAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

**ROAD CULVERT REPLACEMENT
MAIN ROAD / RT 23
MONTEREY, MA**

**DEMOLITION AND EXCAVATION
PLAN AND SECTION**

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF MONTEREY	
PROJ MGR: KH DESIGNED BY: CC DATE: July 2023	REVIEWED BY: KH DRAWN BY: TF PROJECT NO.: 01.0174558.10	CHECKED BY: CC SCALE: AS NOTED REVISION NO.:	DWG C-005

© 2023 GZA GeoEnvironmental, Inc. GZA \LANDM\00811701000-130\PP\174558\174558-10\MAIN\PIRIBR\001\174558-10_DESIGN_SET.DWG C-005 July 27, 2023 HALEY PUNIN



CULVERT AND WINGWALL PLAN

LEGEND

	194	EXISTING CONTOUR
	197.75	EXISTING SPOT ELEVATION
	197.4	UTILITY POLE
	1933/5	WETLAND FLAG/ BANK FLAG
	B-1	APPROXIMATE LOCATION OF BORING
		TOP OF BANK (MAHW)
	W	EXISTING WATER MAIN
	D	DRAIN LINE
	OHW	OVERHEAD WIRES
		PROPERTY LINE
		GUARD RAIL
		RIVER THALWEG
		RIPRAP
		PROPOSED BITUMINOUS CONCRETE FULL DEPTH CONSTRUCTION
		PROPOSED BITUMINOUS CONCRETE MILL AND OVERLAY



NO.	ISSUE/DESCRIPTION	BY	DATE

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**PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23
BRIDGE OVER KONKAPOT RIVER
MONTEREY, MA**

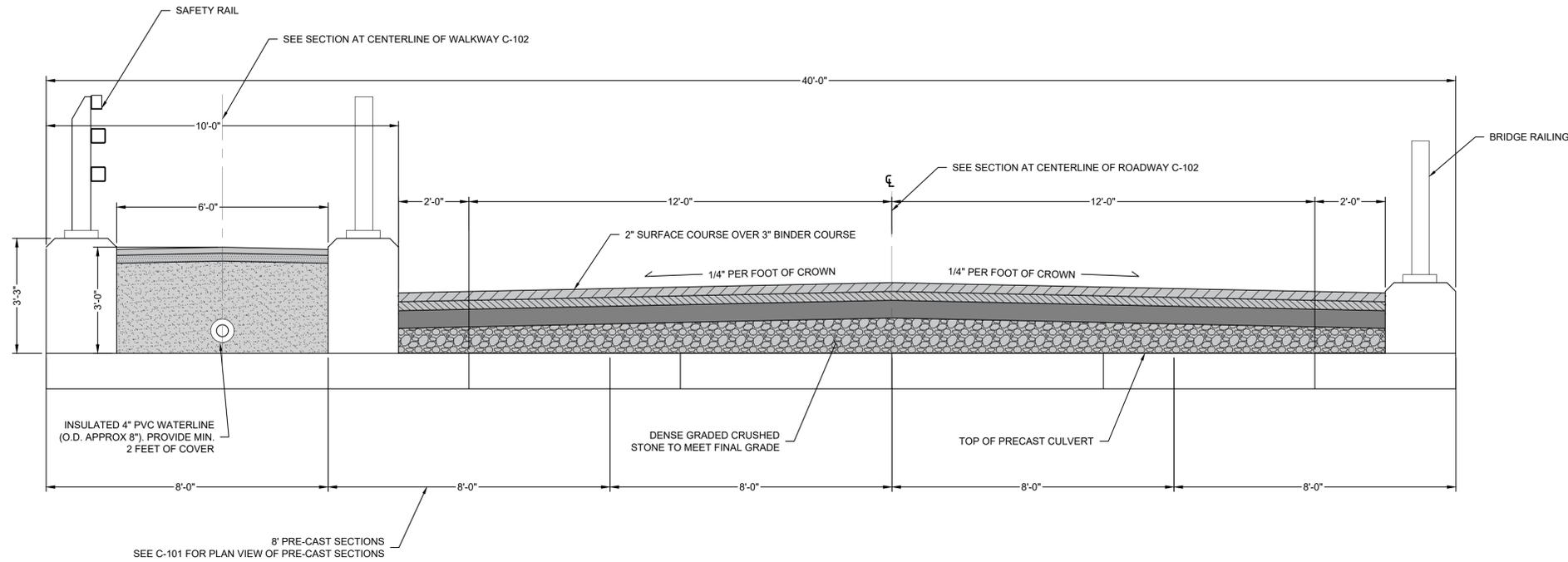
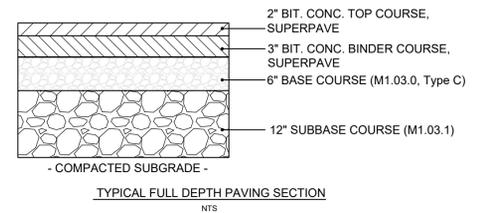
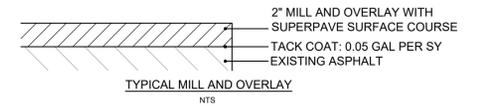
FINAL CONDITION PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com
 PREPARED FOR: TOWN OF MONTEREY

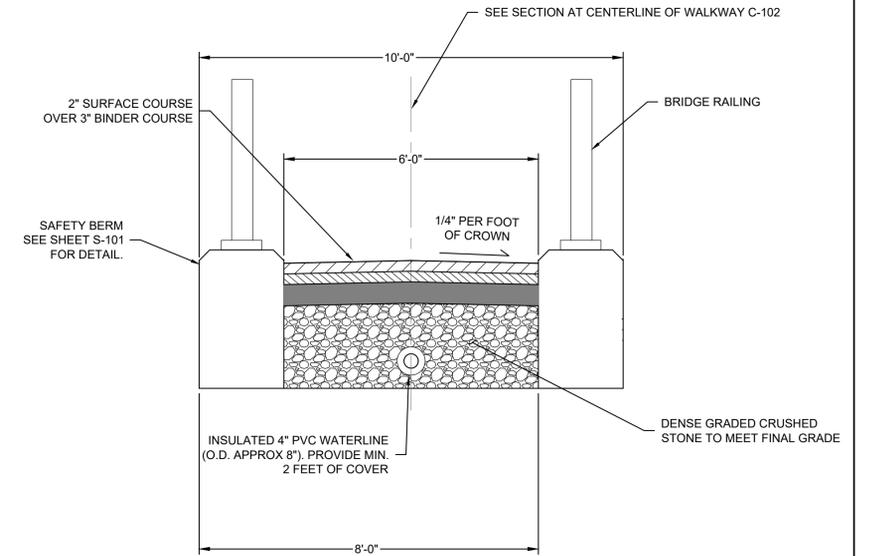
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: CC	DRAWN BY: TF	SCALE: 1" = 8'	C-101
DATE: July 2023	PROJECT NO. 01.0174558.10	REVISION NO.	

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CONSTRUCTION**

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ROADWAY SECTION



SIDEWALK SECTION



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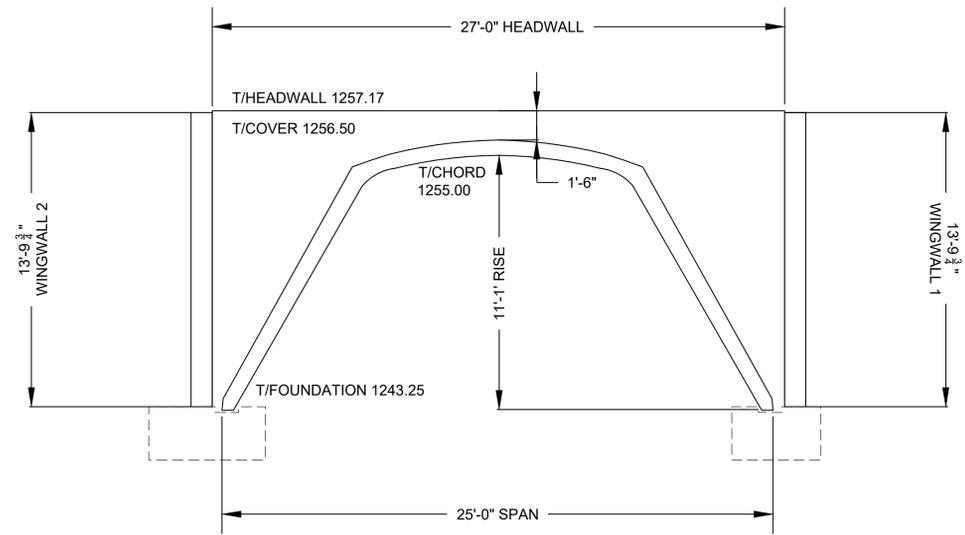
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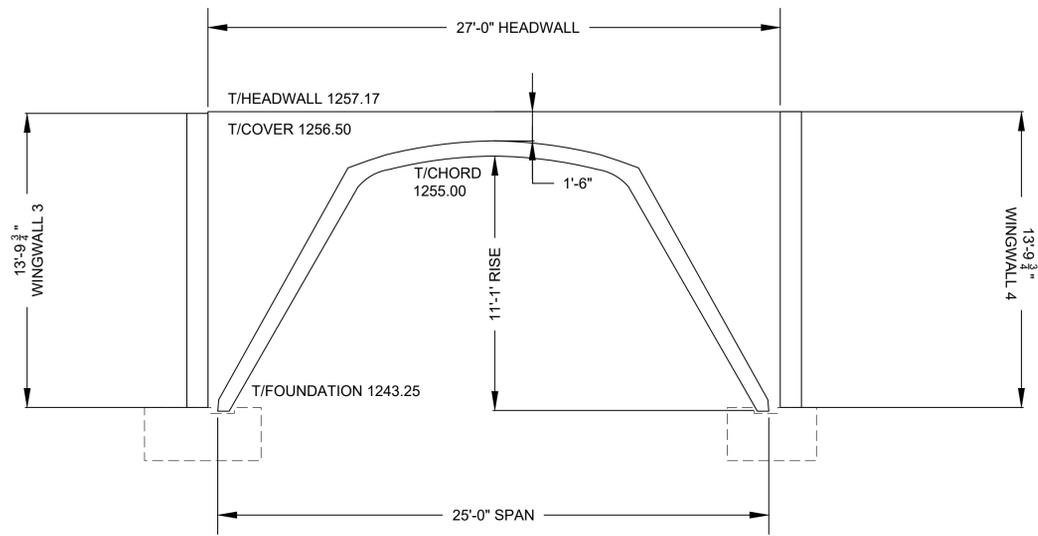
**PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23
BRIDGE OVER KONKAPOT RIVER
MONTEREY, MA**

ROADWAY SECTION AND DETAILS

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: TOWN OF MONTEREY		
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: KH	DRAWN BY: TF	SCALE: AS NOTED	C-103
DATE: July 2023	PROJECT NO. 01.0174558.10	REVISION NO.	



INLET END ELEVATION



OUTLET END ELEVATION



NOT FOR
CONSTRUCTION

NO.	ISSUE/DESCRIPTION	BY	DATE

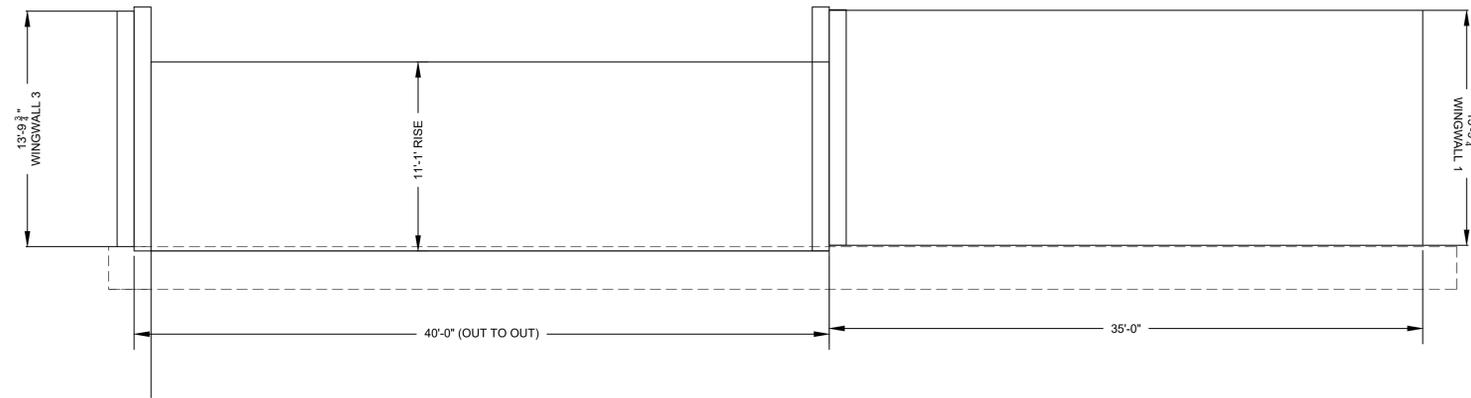
UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOTECHNICAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

ROAD CULVERT REPLACEMENT
MAIN ROAD / RT 23
MONTEREY, MA

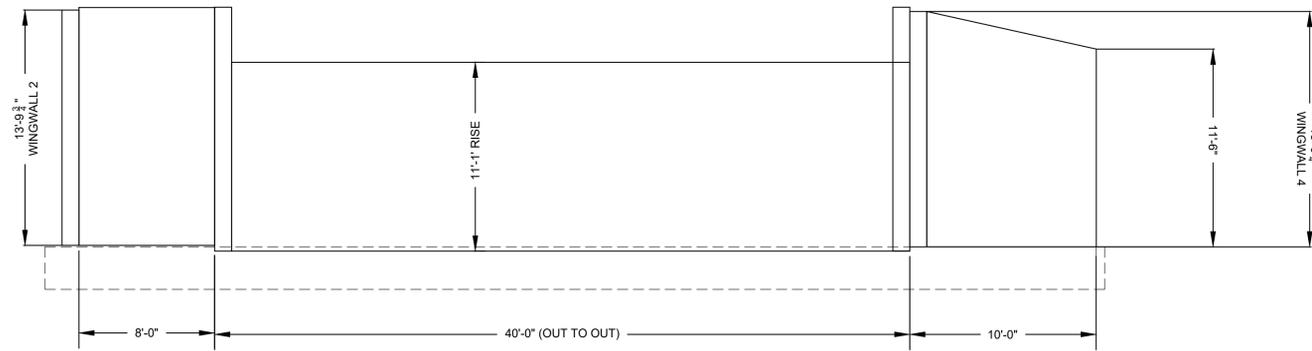
PRE-CAST CULVERT ELEVATIONS

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: TOWN OF MONTEREY
PROJ MGR: KH REVIEWED BY: KH CHECKED BY: CC DWG DESIGNED BY: KH DRAWN BY: TF SCALE: AS NOTED	DATE: July 2023 PROJECT NO. 01.0174558.10 REVISION NO.

C-104



PROFILE OF WEST BANK OF KONKAPOT RIVER



PROFILE OF EAST BANK OF KONKAPOT RIVER



NOT FOR CONSTRUCTION

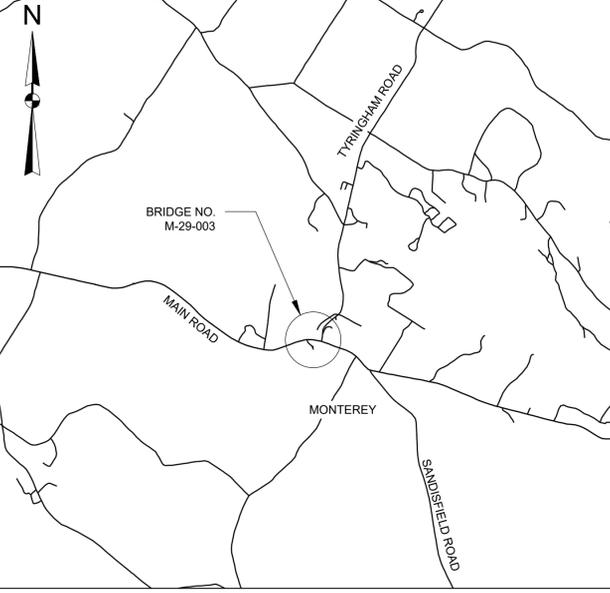
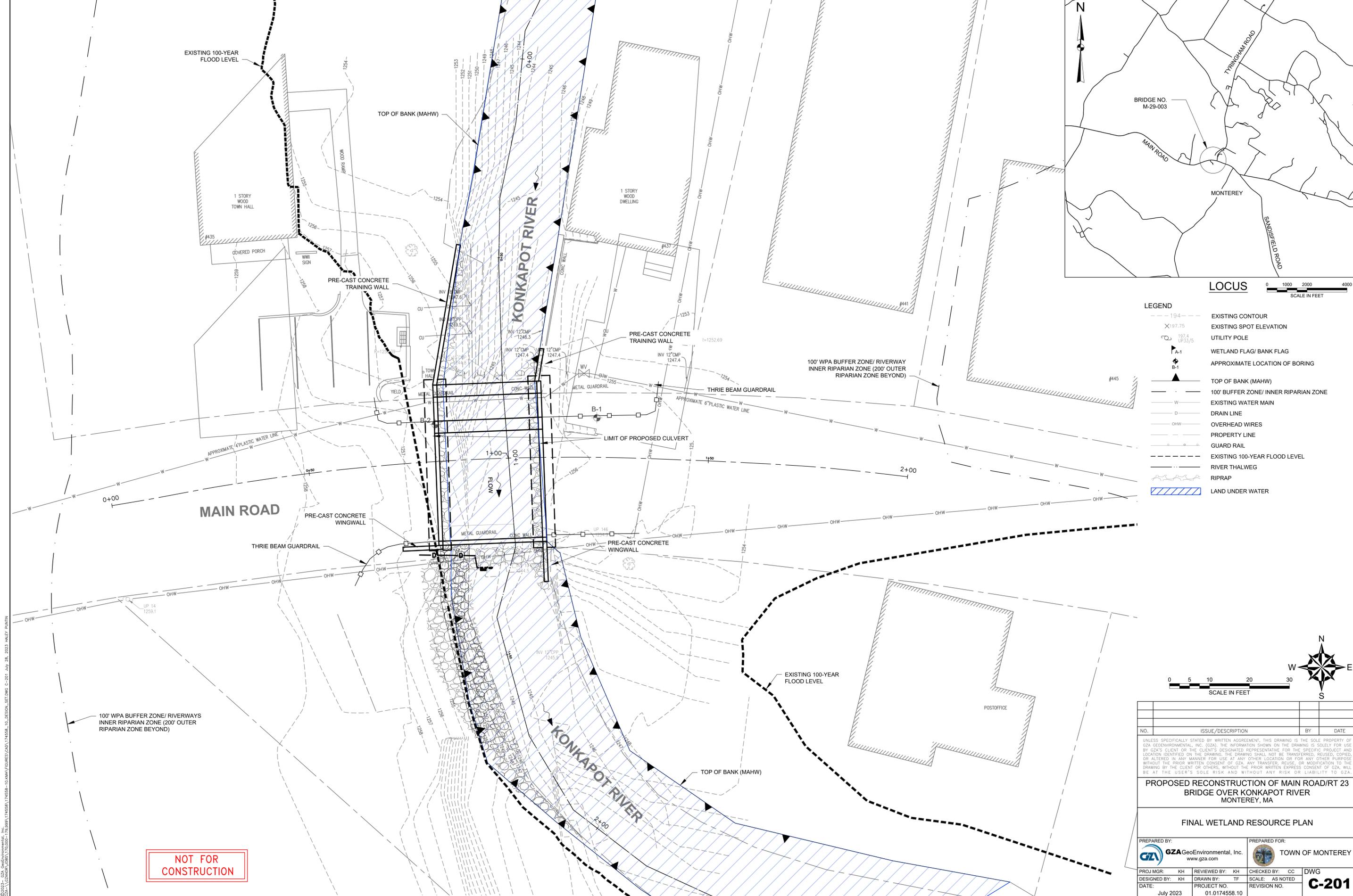
NO.	ISSUE/DESCRIPTION	BY	DATE

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOTECHNICAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

**ROAD CULVERT REPLACEMENT
MAIN ROAD / RT 23
MONTEREY, MA**

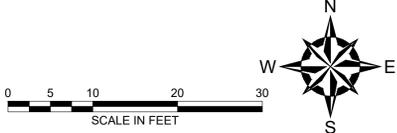
PRE-CAST HEADWALL/TRAINING WALL SECTIONS

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: TOWN OF MONTEREY		
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: KH	DRAWN BY: TF	SCALE: AS NOTED	C-105
DATE: July 2023	PROJECT NO. 01.0174558.10	REVISION NO.	



LOCUS 0 1000 2000 4000
SCALE IN FEET

- LEGEND**
- 194 --- EXISTING CONTOUR
 - × 197.75 EXISTING SPOT ELEVATION
 - 193.4 UP33/5 UTILITY POLE
 - ▲ A-1 WETLAND FLAG/ BANK FLAG
 - ◆ B-1 APPROXIMATE LOCATION OF BORING
 - ▲ TOP OF BANK (MAHW)
 - 100' BUFFER ZONE/ INNER RIPARIAN ZONE
 - W --- 100' WPA BUFFER ZONE/ RIVERWAY
 - D --- EXISTING WATER MAIN
 - OHW --- OVERHEAD WIRES
 - PROPERTY LINE
 - GUARD RAIL
 - EXISTING 100-YEAR FLOOD LEVEL
 - RIVER THALWEG
 - RIPRAP
 - LAND UNDER WATER



NO.	ISSUE/DESCRIPTION	BY	DATE

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**PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23
BRIDGE OVER KONKAPOT RIVER
MONTEREY, MA**

FINAL WETLAND RESOURCE PLAN

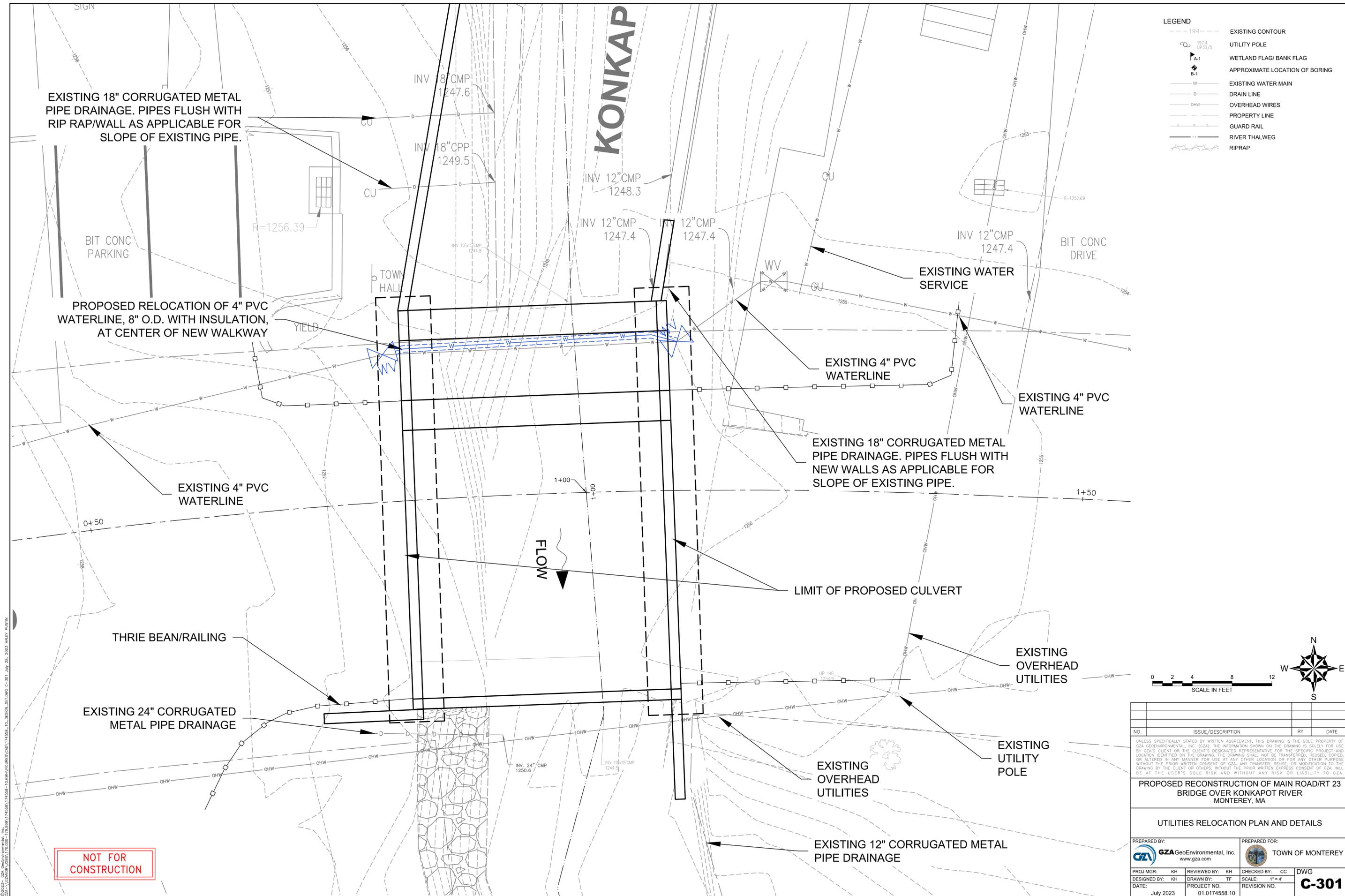
PREPARED BY: **GZA GeoEnvironmental, Inc.**
www.gza.com

PREPARED FOR: **TOWN OF MONTEREY**

PROJ MGR: KH REVIEWED BY: KH CHECKED BY: CC DWG
 DESIGNED BY: KH DRAWN BY: TF SCALE: AS NOTED
 DATE: July 2023 PROJECT NO. 01.0174558.10 REVISION NO. **C-201**

**NOT FOR
CONSTRUCTION**

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LEGEND

---	EXISTING CONTOUR
○	UTILITY POLE
▲	WETLAND FLAG/ BANK FLAG
◆	APPROXIMATE LOCATION OF BORING
—	EXISTING WATER MAIN
—	DRAIN LINE
—	OVERHEAD WIRES
—	PROPERTY LINE
—	GUARD RAIL
—	RIVER THALWEG
—	RIPRAP

EXISTING 18" CORRUGATED METAL PIPE DRAINAGE. PIPES FLUSH WITH RIP RAP/WALL AS APPLICABLE FOR SLOPE OF EXISTING PIPE.

PROPOSED RELOCATION OF 4" PVC WATERLINE, 8" O.D. WITH INSULATION, AT CENTER OF NEW WALKWAY

EXISTING 4" PVC WATERLINE

EXISTING 4" PVC WATERLINE

EXISTING 18" CORRUGATED METAL PIPE DRAINAGE. PIPES FLUSH WITH NEW WALLS AS APPLICABLE FOR SLOPE OF EXISTING PIPE.

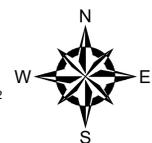
LIMIT OF PROPOSED CULVERT

EXISTING OVERHEAD UTILITIES

EXISTING UTILITY POLE

EXISTING OVERHEAD UTILITIES

EXISTING 12" CORRUGATED METAL PIPE DRAINAGE



NO.	ISSUE/DESCRIPTION	BY	DATE

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PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23 BRIDGE OVER KONKAPOT RIVER MONTEREY, MA

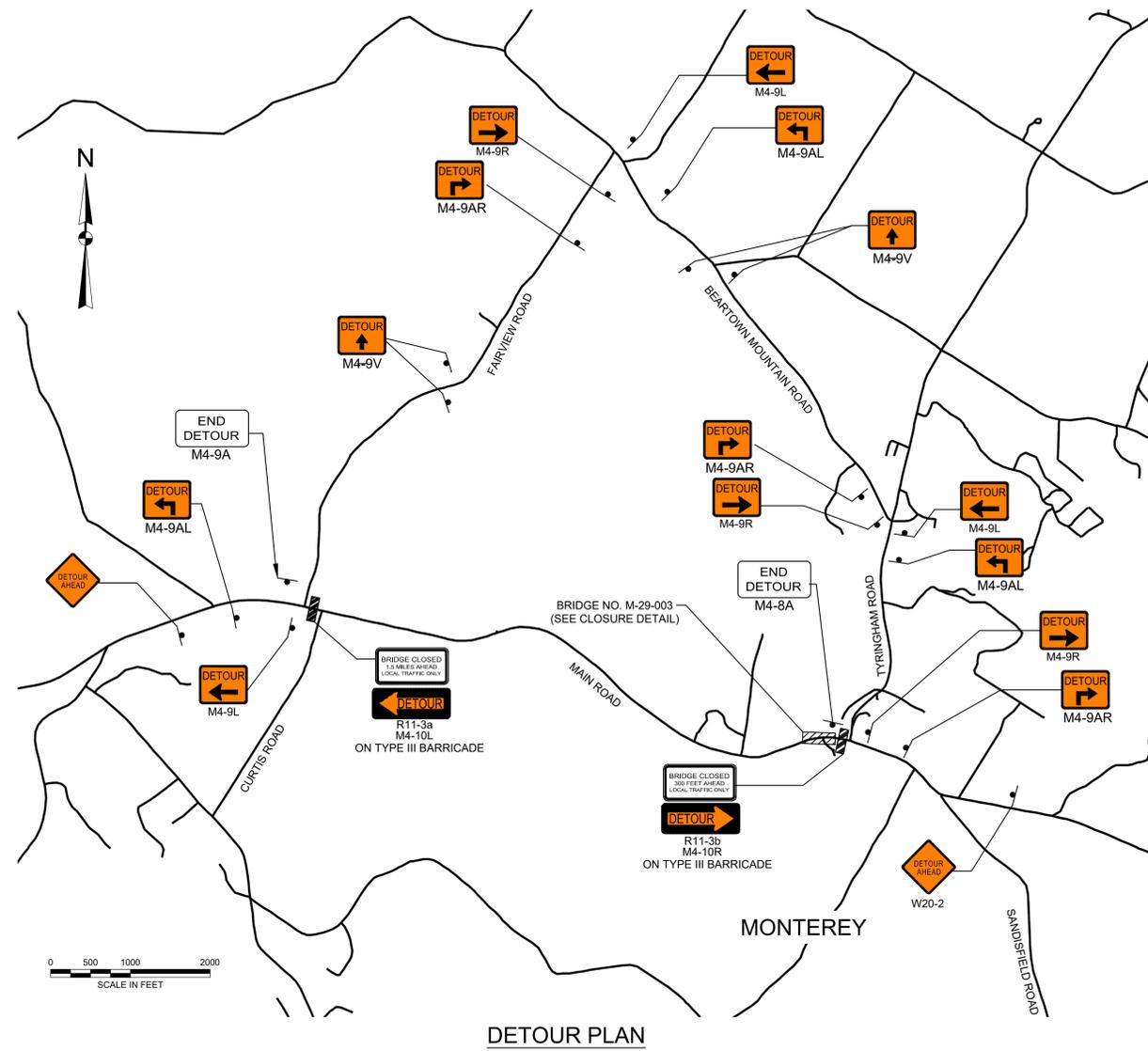
UTILITIES RELOCATION PLAN AND DETAILS

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: TOWN OF MONTEREY
---	-----------------------------------

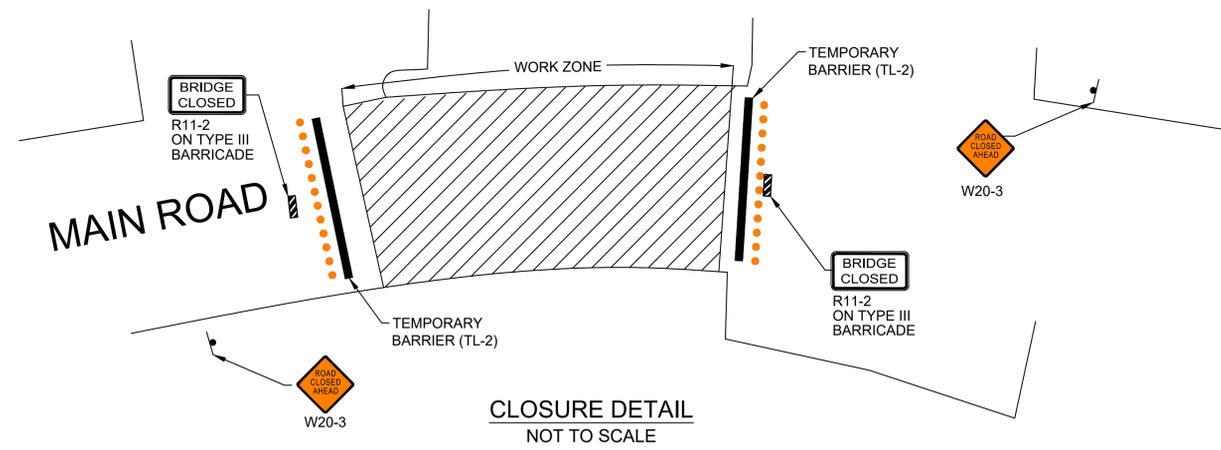
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: KH	DRAWN BY: TF	SCALE: 1" = 4'	C-301
DATE: July 2023	PROJECT NO. 01.0174558.10	REVISION NO.	

NOT FOR CONSTRUCTION

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DETOUR PLAN



CLOSURE DETAIL NOT TO SCALE

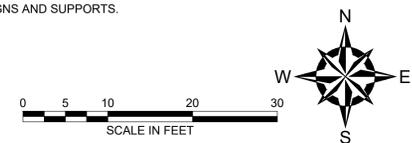
- LEGEND:**
- REFLECTORIZED PLASTIC DRUM
 - ▨ TYPE III BARRICADE
 - ▨ WORK ZONE
 - SIGN

NOT FOR CONSTRUCTION

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCH)			COLOR			POST TYPE & NUMBER PER SIGN	AREA PER SIGN (SF)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	RTE. MKR. ARROW	BACK-GROUND	LEGEND	BORDER		
MA-8A	24"	18"	END DETOUR	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			WHITE	BLACK	BLACK	P-5 (1)	3.00
M4-9L	30"	24"	DETOUR ←	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			FLUORESCENT ORANGE	BLACK	BLACK	P-5 (1)	5.00
M4-9R	30"	24"	DETOUR →	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			FLUORESCENT ORANGE	BLACK	BLACK	P-5 (1)	5.00
M4-9V	30"	24"	DETOUR ↑	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			FLUORESCENT ORANGE	BLACK	BLACK	P-5 (1)	5.00
M4-9AL	30"	24"	DETOUR ↙	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			FLUORESCENT ORANGE	BLACK	BLACK	P-5 (1)	5.00
M4-9AR	30"	24"	DETOUR ↘	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			FLUORESCENT ORANGE	BLACK	BLACK	P-5 (1)	5.00
R11-2	48"	30"	BRIDGE CLOSED	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			WHITE	BLACK	BLACK	MOUNT TO BARRICADE	10.00
W20-2	36"	36"	ROAD CLOSED AHEAD	SEE 2009 MUTCD			FLUORESCENT ORANGE	BLACK	BLACK	P-5 (1)	9.00
W20-3	36"	36"	ROAD CLOSED AHEAD	SEE 2009 MUTCD			FLUORESCENT ORANGE	BLACK	BLACK	P-5 (1)	9.00
M4-10R	48"	18"	DETOUR →	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			FLUORESCENT ORANGE	BLACK	BLACK	MOUNT TO BARRICADE	6.00
M4-10L	48"	18"	DETOUR ←	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			FLUORESCENT ORANGE	BLACK	BLACK	MOUNT TO BARRICADE	6.00
R11-3a/b	60"	30"	BRIDGE CLOSED OR MILES AHEAD LOCAL TRAFFIC ONLY	SEE FHWA STANDARD HIGHWAY SIGNS 2004 EDITION			WHITE	BLACK	BLACK	MOUNT TO BARRICADE	12.50

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS.
2. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH MUTCD
3. ALL CONSTRUCTION WARNING SIGNS SHALL BE FLOURESCENT ORANGE IN COLOR, UNLESS OTHERWISE NOTED
4. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
5. 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.
6. 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).
7. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT, AND SIMILAR OPERATIONS.
8. THE FIRST FIVE PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH TYPE A LIGHTS.
9. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
10. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
11. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
12. MINIMUM LANE WIDTH IS TO BE 11 FEET (3.3M) UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
13. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
14. BEFORE ANY DETOUR IS IMPLEMENTED, ALL NECESSARY SIGNS SHALL BE IN PLACE WHEN WORK IS SUSPENDED FOR SHORT PERIODS OF TIME. TEMPORARY TRAFFIC CONTROL DEVICES THAT ARE NO LONGER APPLICABLE SHALL BE REMOVED OR COVERED
15. AS THE CONSTRUCTION WORK PROGRESSES, TEMPORARY TRAFFIC CONTROLS AND/OR WORKING CONDITIONS SHOULD BE MODIFIED, IF APPROPRIATE, IN ORDER TO PROVIDE MOBILITY AND POSITIVE GUIDANCE TO THE ROAD USER AND TO ENSURE WORKER SAFETY, AS APPROVED BY THE ENGINEER
16. DETOUR SIGNAGE MAY BE MOUNTED ON PORTABLE SUPPORTS OR MOUNTED ON OR ABOVE BARRICADES, WHERE ALL SIGN MOUNTS ARE CRASHWORTHY, SIGNS MOUNTED ON TYPE 3 BARRICADES SHOULD NOT COVER MORE THAN 50% OF THE TOP OF THE TWO RAILS OR 33% OF THE TOTAL AREA OF THE THREE RAILS. THE BOTTOM OF A SIGN MOUNTED ON A BARRICADE OR OTHER PORTABLE SUPPORT, SHALL BE AT LEAST 1-FOOT ABOVE THE TRAVEL WAY. ALL SIGNAGE SHALL BE PLACED TO BE VISIBLE TO MOTORISTS
17. SIGN ASSEMBLES ON GROUND MOUNTED POSTS TOTALING MORE THAN 10 SQUARE FEET WILL REQUIRE TWO POSTS PER MASSDOT STANDARD DRAWINGS FOR SIGNS AND SUPPORTS.



NO.	ISSUE/DESCRIPTION	BY	DATE

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**PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23
BRIDGE OVER KONKAPOT RIVER
MONTEREY, MA**

TRAFFIC CONTROL AND DETOUR PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: TOWN OF MONTEREY		
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: KH	DRAWN BY: TF	SCALE: AS NOTED	C-401
DATE: July 2023	PROJECT NO. 01.0174558.10	REVISION NO.	

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REINFORCED CONCRETE NOTES

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

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

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

ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON CONSTRUCTION DRAWINGS.

PRE-CAST CONCRETE NOTES

1. DESCRIPTION

1.1 TYPE - THIS WORK SHALL CONSIST OF FURNISHING AND CONSTRUCTING A CON/SPAN® O-SERIES BRIDGE SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN REASONABLY CLOSE CONFORMITY WITH THE LINES, GRADES, DESIGN AND DIMENSIONS SHOWN ON THE PLANS OR AS ESTABLISHED BY THE ENGINEER. IN SITUATIONS WHERE TWO OR MORE SPECIFICATIONS APPLY TO THIS WORK, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN.

2. DESIGN

2.1 SPECIFICATIONS - THE PRECAST ELEMENTS ARE DESIGNED IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" 17TH EDITION, ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2002. A MINIMUM OF ONE FOOT OF COVER ABOVE THE CROWN OF THE BRIDGE UNITS IS REQUIRED IN THE INSTALLED CONDITION. (UNLESS NOTED OTHERWISE ON THE SHOP DRAWINGS AND DESIGNED ACCORDINGLY.)

3. MATERIALS

3.1 CONCRETE - THE CONCRETE FOR THE PRECAST ELEMENTS SHALL BE AIR-ENTRAINED WHEN INSTALLED IN AREAS SUBJECT TO FREEZE-THAW CONDITIONS, COMPOSED OF PORTLAND CEMENT, FINE AND COARSE AGGREGATES, ADMIXTURES AND WATER. AIR-ENTRAINED CONCRETE SHALL CONTAIN 6 ± 2 PERCENT AIR. THE AIR-ENTRAINING ADMIXTURE SHALL CONFORM TO AASHTO M154. THE MINIMUM CONCRETE COMPRESSIVE STRENGTH SHALL BE AS SHOWN ON THE SHOP DRAWINGS.

- 3.1.1. PORTLAND CEMENT - SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATIONS C150-TYPE I, TYPE II, OR TYPE III CEMENT.
3.1.2. COARSE AGGREGATE - SHALL CONSIST OF STONE HAVING A MAXIMUM SIZE OF 1 INCH. AGGREGATE SHALL MEET REQUIREMENTS FOR ASTM C33. WATER REDUCING ADMIXTURE - THE MANUFACTURER MAY SUBMIT, FOR APPROVAL BY THE ENGINEER, A WATER-REDUCING ADMIXTURE FOR THE PURPOSE OF INCREASING WORKABILITY AND REDUCING THE WATER REQUIREMENT FOR THE CONCRETE.
3.1.4. CALCIUM CHLORIDE - THE ADDITION TO THE MIX OF CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE WILL NOT BE PERMITTED.
3.1.5. MIXTURE - THE AGGREGATES, CEMENT AND WATER SHALL BE PROPORTIONED AND MIXED IN A BATCH MIXER TO PRODUCE A HOMOGENEOUS CONCRETE MEETING THE STRENGTH REQUIREMENTS OF THIS SPECIFICATION. THE PROPORTION OF PORTLAND CEMENT IN THE MIXTURE SHALL NOT BE LESS THAN 564 POUNDS (6 SACKS) PER CUBIC YARD OF CONCRETE.

3.2 STEEL REINFORCEMENT

- 4.2.1. THE MINIMUM STEEL YIELD STRENGTH SHALL BE 60,000 PSI, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS.
4.2.2 ALL REINFORCING STEEL FOR THE PRECAST ELEMENTS SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH THE DETAILED SHOP DRAWINGS SUBMITTED BY THE MANUFACTURER.
4.2.3. REINFORCEMENT SHALL CONSIST OF WELDED WIRE REINFORCING CONFORMING TO ASTM SPECIFICATION A 1064, OR DEFORMED BILLET STEEL BARS CONFORMING TO ASTM SPECIFICATION A 615, GRADE 60. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY CONSIST OF WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS.

3.3 STEEL HARDWARE

- 3.3.1. BOLTS AND THREADED RODS FOR WINGWALL CONNECTIONS SHALL CONFORM TO ASTM A 307. NUTS SHALL CONFORM TO AASHTO M292 (ASTM A194) GRADE 2H. ALL BOLTS, THREADED RODS AND NUTS USED IN WINGWALL CONNECTIONS SHALL BE MECHANICALLY ZINC COATED IN ACCORDANCE WITH ASTM B695 CLASS 50.
3.3.2. STRUCTURAL STEEL FOR WINGWALL CONNECTION PLATES AND PLATE WASHERS SHALL CONFORM TO AASHTO M 270 (ASTM A 709) GRADE 36 AND SHALL BE HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123).
3.3.3. INSERTS FOR WINGWALLS SHALL BE 1" DIAMETER TWO-BOLT PRESSET WINGWALL ANCHORS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700 AND SHALL BE MECHANICALLY ZINC COATED IN ACCORDANCE WITH ASTM B695 CLASS 50.
3.3.4. FERRULE LOOP INSERTS SHALL BE F-64 FERRULE LOOP INSERTS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700.
3.3.5. HOOK BOLTS USED IN ATTACHED HEADWALL CONNECTIONS SHALL BE ASTM A307.
3.3.6. INSERTS FOR DETACHED HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL, EXPANDED COIL INSERTS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700. COIL RODS AND NUTS USED IN HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL. WASHERS USED IN HEADWALL CONNECTIONS SHALL BE EITHER AISI TYPE 304 STAINLESS STEEL PLATE WASHERS OR AASHTO M270 (ASTM A709) GRADE 36 PLATE WASHERS HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123).
3.3.7. MECHANICAL SPLICES OF REINFORCING BARS SHALL BE MADE USING THE DOWEL BAR SPLICER SYSTEM AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700, AND SHALL CONSIST OF THE DOWEL BAR SPLICER (DB-SAE) AND DOWEL-IN (DI).

4. MANUFACTURE OF PRECAST ELEMENTS - SUBJECT TO THE PROVISIONS OF SECTION 5, BELOW, THE PRECAST ELEMENT DIMENSION AND REINFORCEMENT DETAILS SHALL BE AS PRESCRIBED IN THE PLAN AND SHOP DRAWINGS PROVIDED BY THE MANUFACTURER.

4.1 FORMS - THE FORMS USED IN MANUFACTURE SHALL BE SUFFICIENTLY RIGID AND ACCURATE TO MAINTAIN THE REQUIRED PRECAST ELEMENT DIMENSIONS WITHIN THE PERMISSIBLE VARIATIONS GIVEN IN SECTION 5 OF THESE SPECIFICATIONS. ALL CASTING SURFACES SHALL BE OF A SMOOTH MATERIAL.

4.2 PLACEMENT OF REINFORCEMENT

- 4.2.1. PLACEMENT OF REINFORCEMENT IN PRECAST BRIDGE UNITS - THE COVER OF CONCRETE OVER THE OUTSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 2" MINIMUM. THE COVER OF CONCRETE OVER THE INSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 1 1/2" MINIMUM, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS. THE CLEAR DISTANCE OF THE END CIRCUMFERENTIAL WIRES SHALL NOT BE LESS THAN 1" NOR MORE THAN 2" FROM THE ENDS OF EACH SECTION. REINFORCEMENT SHALL BE ASSEMBLED UTILIZING SINGLE OR MULTIPLE LAYERS OF WELDED WIRE FABRIC (NOT TO EXCEED 3 LAYERS), SUPPLEMENTED WITH A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS, WHEN NECESSARY. WELDED WIRE FABRIC SHALL BE COMPOSED OF CIRCUMFERENTIAL AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 5.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE BRIDGE UNIT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 5.3, BELOW. THE ENDS OF THE LONGITUDINAL DISTRIBUTION REINFORCEMENT SHALL BE NOT MORE THAN 3" AND NOT LESS THAN 1 1/2" FROM THE ENDS OF THE BRIDGE UNIT.
4.2.2. BENDING OF REINFORCEMENT FOR PRECAST BRIDGE UNITS - THE OUTSIDE AND INSIDE CIRCUMFERENTIAL REINFORCING STEEL FOR THE CORNERS OF THE BRIDGE SHALL BE BENT TO SUCH AN ANGLE THAT IS APPROXIMATELY EQUAL TO THE CONFIGURATION OF THE BRIDGE'S OUTSIDE CORNER.
4.2.3. PLACEMENT OF REINFORCEMENT FOR PRECAST WINGWALLS AND HEADWALLS - THE COVER OF CONCRETE OVER THE LONGITUDINAL AND TRANSVERSE REINFORCEMENT SHALL BE 2" MINIMUM. THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING STEEL SHALL NOT BE LESS THAN 1 1/2" NOR MORE THAN 3". REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE FABRIC, OR A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS. WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 5.3, BELOW.
4.2.4. PLACEMENT OF REINFORCEMENT FOR PRECAST FOUNDATION UNITS - THE COVER OF CONCRETE OVER THE BOTTOM REINFORCEMENT SHALL BE 3 INCHES MINIMUM. THE COVER OF CONCRETE FOR ALL OTHER REINFORCEMENT SHALL BE 2 INCHES MINIMUM. THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING

STEEL SHALL NOT BE LESS THAN 2 INCHES NOR MORE THAN 3 INCHES. REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE FABRIC OR A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS. WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 5.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 5.3, BELOW.

4.3 LAPS, WELDS, SPACING

- 4.3.1. LAPS, WELDS, AND SPACING FOR PRECAST BRIDGE UNITS - TENSION SPLICES IN THE CIRCUMFERENTIAL REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.2 AND 5.11.6.2. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.1 AND 5.11.6.1. THE OVERLAP OF WELDED WIRE FABRIC SHALL BE MEASURED BETWEEN THE OUTER-MOST LONGITUDINAL WIRES OF EACH FABRIC SHEET. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.1 FOR SPLICES OTHER THAN TENSION SPLICES, THE OVERLAP SHALL BE A MINIMUM OF 1'-0" FOR WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS. THE SPACING CENTER TO CENTER OF THE CIRCUMFERENTIAL WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 4". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 8". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL DISTRIBUTION STEEL FOR EITHER LINE OF REINFORCING IN THE TOP SLAB SHALL BE NOT MORE THAN 1'-4".
4.3.2. LAPS, WELDS, AND SPACING FOR PRECAST WINGWALLS, HEADWALLS AND FOUNDATIONS - SPLICES IN THE REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.2 AND 5.11.6.2. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.1 AND 5.11.6.1. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.1. THE SPACING CENTER-TO-CENTER OF THE WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 8".

4.4 CURING - THE PRECAST CONCRETE ELEMENTS SHALL BE CURED FOR A SUFFICIENT LENGTH OF TIME SO THAT THE CONCRETE WILL DEVELOP THE SPECIFIED COMPRESSIVE STRENGTH IN 28 DAYS OR LESS. ANY ONE OF THE FOLLOWING METHODS OF CURING OR COMBINATIONS THERE OF SHALL BE USED:

- 4.4.1. STEAM CURING - THE PRECAST ELEMENTS MAY BE LOW-PRESSURE STEAM CURED BY A SYSTEM THAT WILL MAINTAIN A MOIST ATMOSPHERE.
4.4.2. WATER CURING - THE PRECAST ELEMENTS MAY BE WATER CURED BY ANY METHOD THAT WILL KEEP THE SECTIONS MOIST.
4.4.3. MEMBRANE CURING - A SEALING MEMBRANE CONFORMING TO THE REQUIREMENTS OF ASTM SPECIFICATION C309 MAY BE APPLIED AND SHALL BE LEFT INTACT UNTIL THE REQUIRED CONCRETE COMPRESSIVE STRENGTH IS ATTAINED. THE CONCRETE TEMPERATURE AT THE TIME OF APPLICATION SHALL BE WITHIN +/- 10 DEGREES F OF THE ATMOSPHERIC TEMPERATURE. ALL SURFACES SHALL BE KEPT MOIST PRIOR TO THE APPLICATION OF THE COMPOUNDS AND SHALL BE DAMP WHEN THE COMPOUND IS APPLIED.

4.5 STORAGE, HANDLING & DELIVERY

- 4.5.1. STORAGE - PRECAST CONCRETE BRIDGE ELEMENTS SHALL BE LIFTED AND STORED IN "AS-CAST" POSITION. PRECAST CONCRETE HEADWALL AND WINGWALL UNITS ARE CAST, STORED AND SHIPPED IN A FLAT POSITION. THE PRECAST ELEMENTS SHALL BE STORED IN SUCH A MANNER TO PREVENT CRACKING OR DAMAGE. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE. THE UNITS SHALL NOT BE MOVED UNTIL THE CONCRETE COMPRESSIVE STRENGTH HAS REACHED A MINIMUM OF 2500 PSI, AND THEY SHALL NOT BE STORED IN AN UPRIGHT POSITION.
4.5.2. HANDLING - HANDLING DEVICES SHALL BE PERMITTED IN EACH PRECAST ELEMENT FOR THE PURPOSE OF HANDLING AND SETTING. SPREADER BEAMS MAY BE REQUIRED FOR THE LIFTING OF PRECAST CONCRETE BRIDGE ELEMENTS TO PRECLUDE DAMAGE FROM BENDING OR TORSION FORCES.
4.5.3. DELIVERY - PRECAST CONCRETE ELEMENTS MUST NOT BE SHIPPED UNTIL THE CONCRETE HAS ATTAINED THE SPECIFIED DESIGN COMPRESSIVE STRENGTH, OR AS DIRECTED BY THE DESIGN ENGINEER. PRECAST CONCRETE ELEMENTS MAY BE UNLOADED AND PLACED ON THE GROUND AT THE SITE UNTIL INSTALLED. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE.

4.6 QUALITY ASSURANCE - THE PRECASTER SHALL DEMONSTRATE ADHERENCE TO THE STANDARDS SET FORTH IN THE NPCA QUALITY CONTROL MANUAL. THE PRECASTER SHALL MEET EITHER SECTION 4.6.1 OR 4.6.2

- 4.6.1. CERTIFICATION - THE PRECASTER SHALL BE CERTIFIED BY THE PRECAST/PRESTRESSED CONCRETE INSTITUTE PLANT CERTIFICATION PROGRAM OR THE NATIONAL PRECAST CONCRETE ASSOCIATION'S PLANT CERTIFICATION PROGRAM PRIOR TO AND DURING PRODUCTION OF THE PRODUCTS COVERED BY THIS SPECIFICATION.
4.6.2. QUALIFICATIONS, TESTING AND INSPECTION
4.6.2.1. THE PRECASTER SHALL HAVE BEEN IN THE BUSINESS OF PRODUCING PRECAST CONCRETE PRODUCTS SIMILAR TO THOSE SPECIFIED FOR A MINIMUM OF THREE YEARS. HE SHALL MAINTAIN A PERMANENT QUALITY CONTROL DEPARTMENT OR RETAIN AN INDEPENDENT TESTING AGENCY ON A CONTINUING BASIS. THE AGENCY SHALL ISSUE A REPORT, CERTIFIED BY A LICENSED ENGINEER, DETAILING THE ABILITY OF THE PRECASTER TO PRODUCE QUALITY PRODUCTS CONSISTENT WITH INDUSTRY STANDARDS.
4.6.2.2. THE PRECASTER SHALL SHOW THAT THE FOLLOWING TESTS ARE PERFORMED IN ACCORDANCE WITH THE ASTM STANDARDS INDICATED. TESTS SHALL BE PERFORMED AS INDICATED IN SECTION 6 OF THESE SPECIFICATIONS.
4.6.2.2.1. AIR CONTENT: C231 OR C173
4.6.2.2.2. COMPRESSIVE STRENGTH: C31, C39, C497
4.6.2.3. THE PRECASTER SHALL PROVIDE DOCUMENTATION DEMONSTRATING COMPLIANCE WITH THIS SECTION TO CONTECH® ENGINEERED SOLUTIONS AT REGULAR INTERVALS OR UPON REQUEST.
5.6.2.4. THE OWNER MAY PLACE AN INSPECTOR IN THE PLANT WHEN THE PRODUCTS COVERED BY THIS SPECIFICATION ARE BEING MANUFACTURED.
4.6.3. DOCUMENTATION - THE PRECASTER SHALL SUBMIT PRECAST PRODUCTION REPORTS TO CONTECH® ENGINEERED SOLUTIONS AS REQUIRED.

5. PERMISSIBLE VARIATIONS

5.1. BRIDGE UNITS

- 5.1.1. INTERNAL DIMENSIONS - THE INTERNAL DIMENSION SHALL VARY NOT MORE THAN 1% FROM THE DESIGN DIMENSIONS NOR MORE THAN 1/2" WHICHEVER IS LESS.
5.1.2. SLAB AND WALL THICKNESS - THE SLAB AND WALL THICKNESS SHALL NOT BE LESS THAN THAT SHOWN IN THE DESIGN BY MORE THAN 1/4". A THICKNESS MORE THAN THAT REQUIRED IN THE DESIGN SHALL NOT BE CAUSE FOR REJECTION.
5.1.3. LENGTH OF OPPOSITE SURFACES - VARIATIONS IN LAYING LENGTHS OF TWO OPPOSITE SURFACES OF THE BRIDGE UNIT SHALL NOT BE MORE THAN 1/2" IN ANY SECTION, EXCEPT WHERE BEVELED ENDS FOR LAYING OF CURVES ARE SPECIFIED BY THE PURCHASER.
5.1.4. LENGTH OF SECTION - THE UNDERRUN IN LENGTH OF A SECTION SHALL NOT BE MORE THAN 12" IN ANY BRIDGE UNIT.
5.1.5. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN POSITION OF THE REINFORCEMENT SHALL BE ± 12". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1 1/2" FOR THE OUTSIDE CIRCUMFERENTIAL STEEL OR BE LESS THAN 1" FOR THE INSIDE CIRCUMFERENTIAL STEEL AS MEASURED TO THE EXTERNAL OR INTERNAL SURFACE OF THE BRIDGE. THESE TOLERANCES OR COVER REQUIREMENTS DO NOT APPLY TO MATING SURFACES OF THE JOINTS.
5.1.6. AREA OF REINFORCEMENT - THE AREAS OF STEEL REINFORCEMENT SHALL BE THE DESIGN STEEL AREAS AS SHOWN IN THE MANUFACTURER'S SHOP DRAWINGS. STEEL AREAS GREATER THAN THOSE REQUIRED SHALL NOT BE CAUSE FOR REJECTION. THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCEMENT SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCEMENT.

5.2. WINGWALLS & HEADWALLS

- 5.2.1. WALL THICKNESS - THE WALL THICKNESS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN 12".
5.2.2. LENGTH/HEIGHT OF WALL SECTIONS - THE LENGTH AND HEIGHT OF THE WALL SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN 1/2".
5.2.3. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN THE POSITION OF THE REINFORCEMENT SHALL BE ± 12". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1 1/2".
5.2.4. SIZE OF REINFORCEMENT - THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCING SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCING. STEEL AREA GREATER THAN THAT REQUIRED SHALL NOT BE CAUSE FOR REJECTION.
5.3. FOUNDATION UNITS
5.3.1. WALL THICKNESS - THE WALL THICKNESS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN 12".
5.3.2. LENGTH/HEIGHT/WIDTH OF FOUNDATION SECTIONS - THE LENGTH, HEIGHT AND WIDTH OF THE FOUNDATION UNITS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN 1/2".
5.3.3. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN THE POSITION OF THE REINFORCEMENT SHALL BE ± 12". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1 1/2".
5.3.4. SIZE OF REINFORCEMENT - THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCING SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCING. STEEL AREA GREATER THAN THAT REQUIRED SHALL NOT BE CAUSE FOR REJECTION.

6. TESTING/ INSPECTION

6.1. TESTING

6.1.1. TYPE OF TEST SPECIMEN - CONCRETE COMPRESSIVE STRENGTH SHALL BE DETERMINED FROM COMPRESSION TESTS MADE ON CYLINDERS OR CORES. FOR CYLINDER TESTING, A MINIMUM OF 4 CYLINDERS SHALL BE TAKEN FOR EACH BRIDGE ELEMENT. EACH ELEMENT SHALL BE CONSIDERED SEPARATELY FOR THE PURPOSE OF TESTING AND ACCEPTANCE.

6.1.2. COMPRESSION TESTING - CYLINDERS SHALL BE MADE AND TESTED AS PRESCRIBED BY THE ASTM C39 SPECIFICATION. CYLINDERS SHALL BE CURED IN THE SAME ENVIRONMENT AS THE BRIDGE ELEMENTS. CORES SHALL BE OBTAINED AND TESTED FOR COMPRESSIVE STRENGTH IN ACCORDANCE WITH THE PROVISIONS OF THE ASTM C42 SPECIFICATION.

6.1.3. ACCEPTABILITY OF CYLINDER TESTS - WHEN THE AVERAGE COMPRESSIVE STRENGTH OF ALL CYLINDERS TESTED IS EQUAL TO OR GREATER THAN THE DESIGN COMPRESSIVE STRENGTH, AND NOT MORE THAN 10% OF THE CYLINDERS TESTED HAVE A COMPRESSIVE STRENGTH LESS THAN THE DESIGN CONCRETE STRENGTH, AND NO CYLINDER TESTED HAS A COMPRESSIVE STRENGTH LESS THAN 80% OF THE DESIGN COMPRESSIVE STRENGTH, THEN THE ELEMENT SHALL BE ACCEPTED. WHEN THE COMPRESSIVE STRENGTH OF THE CYLINDERS TESTED DOES NOT CONFORM TO THESE ACCEPTANCE CRITERIA, THE ACCEPTABILITY OF THE ELEMENT MAY BE DETERMINED AS DESCRIBED IN SECTION 6.1.4, BELOW.

6.1.4. ACCEPTABILITY OF CORE TESTS - THE COMPRESSIVE STRENGTH OF THE CONCRETE IN A BRIDGE ELEMENT IS ACCEPTABLE WHEN THE AVERAGE CORE TEST STRENGTH IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH. WHEN THE COMPRESSIVE STRENGTH OF A CORE TESTED IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN MAY BE RE-CORED. WHEN THE COMPRESSIVE STRENGTH OF THE RE-CORE IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH, THE COMPRESSIVE STRENGTH OF THE CONCRETE IN THAT BRIDGE ELEMENT IS ACCEPTABLE.

- 6.1.4.1. WHEN THE COMPRESSIVE STRENGTH OF ANY RECORE IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN SHALL BE REJECTED.
6.1.4.2. PLUGGING CORE HOLES - THE CORE HOLES SHALL BE PLUGGED AND SEALED BY THE MANUFACTURER IN A MANNER SUCH THAT THE ELEMENTS WILL MEET ALL OF THE TEST REQUIREMENTS OF THIS SPECIFICATION. PRECAST ELEMENTS SO SEALED SHALL BE CONSIDERED SATISFACTORY FOR USE.
6.1.4.3. TEST EQUIPMENT - EVERY MANUFACTURER FURNISHING PRECAST ELEMENTS UNDER THIS SPECIFICATION SHALL FURNISH ALL FACILITIES AND PERSONNEL NECESSARY TO CARRY OUT THE TEST REQUIRED.
6.2. INSPECTION - THE QUALITY OF MATERIALS, THE PROCESS OF MANUFACTURE, AND THE FINISHED PRECAST ELEMENTS SHALL BE SUBJECT TO INSPECTION BY THE PURCHASER.

7. JOINTS

THE BRIDGE UNITS SHALL BE PRODUCED WITH FLAT BUTT ENDS. THE ENDS OF THE BRIDGE UNITS SHALL BE SUCH THAT WHEN THE SECTIONS ARE LAID TOGETHER THEY WILL MAKE A CONTINUOUS LINE WITH A SMOOTH INTERIOR FREE OF APPRECIABLE IRREGULARITIES. ALL COMPATIBLE WITH THE PERMISSIBLE VARIATIONS IN SECTION 5, ABOVE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED 3/4".

8. WORKMANSHIP/ FINISH

THE BRIDGE UNITS, WINGWALLS, HEADWALLS AND FOUNDATION UNITS SHALL BE SUBSTANTIALLY FREE OF FRACTURES. THE ENDS OF THE BRIDGE UNITS SHALL BE NORMAL TO THE WALLS AND CENTERLINE OF THE BRIDGE SECTION, WITHIN THE LIMITS OF THE VARIATIONS GIVEN IN SECTION 5, ABOVE, EXCEPT WHERE BEVELED ENDS ARE SPECIFIED. THE FACES OF THE WINGWALLS AND HEADWALLS SHALL BE PARALLEL TO EACH OTHER, WITHIN THE LIMITS OF VARIATIONS GIVEN IN SECTION 5, ABOVE. THE SURFACE OF THE PRECAST ELEMENTS SHALL BE A SMOOTH STEEL FORM OR TROWELED SURFACE. TRAPPED AIR POCKETS CAUSING SURFACE DEFECTS SHALL BE CONSIDERED AS PART OF A SMOOTH, STEEL FORM FINISH.

9. REPAIRS

PRECAST ELEMENTS MAY BE REPAIRED, IF NECESSARY, BECAUSE OF IMPERFECTIONS IN MANUFACTURE OR HANDLING DAMAGE AND WILL BE ACCEPTABLE IF, IN THE OPINION OF THE PURCHASER, THE REPAIRS ARE SOUND, PROPERLY FINISHED AND CURED, AND THE REPAIRED SECTION CONFORMS TO THE REQUIREMENTS OF THIS SPECIFICATION.

10. REJECTION

THE PRECAST ELEMENTS SHALL BE SUBJECT TO REJECTION ON ACCOUNT OF ANY OF THE SPECIFICATION REQUIREMENTS. INDIVIDUAL PRECAST ELEMENTS MAY BE REJECTED BECAUSE OF ANY OF THE FOLLOWING:
10.1. FRACTURES OR CRACKS PASSING THROUGH THE WALL, EXCEPT FOR A SINGLE END CRACK THAT DOES NOT EXCEED ONE HALF THE THICKNESS OF THE WALL.
10.2. DEFECTS THAT INDICATE PROPORTIONING, MIXING, AND MOLDING NOT IN COMPLIANCE WITH SECTION 4 OF THESE SPECIFICATIONS.
10.3. HONEYCOMBED OR OPEN TEXTURE.
10.4. DAMAGED ENDS, WHERE SUCH DAMAGE WOULD PREVENT MAKING A SATISFACTORY JOINT.

11. MARKING

EACH BRIDGE UNIT SHALL BE CLEARLY MARKED BY WATERPROOF THE FOLLOWING SHALL BE SHOWN ON THE INSIDE OF THE VERTICAL LEG OF THE BRIDGE SECTION:
BRIDGE SPAN x BRIDGE RISE
DATE OF MANUFACTURE
NAME OR TRADEMARK OF THE MANUFACTURER

Table with 4 columns: NO., ISSUE/DESCRIPTION, BY, DATE. Includes project information: PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23 BRIDGE OVER KONKAPOT RIVER MONTEREY, MA. Structural Notes. Prepared by: GZA GeoEnvironmental, Inc. www.gza.com. Prepared for: TOWN OF MONTEREY. Project Mgr: KH, Reviewed by: KH, Checked by: CC, DWG: S-001. Date: July 2023, Project No: 01.0174558.10, Revision No: [blank].



12. INSTALLATION PREPARATION

TO ENSURE CORRECT INSTALLATION OF THE PRECAST CONCRETE BRIDGE SYSTEM, CARE AND CAUTION MUST BE EXERCISED IN FORMING THE SUPPORT AREAS FOR BRIDGE UNITS, HEADWALL, AND WINGWALL ELEMENTS. EXERCISING SPECIAL CARE WILL FACILITATE THE RAPID INSTALLATION OF THE PRECAST COMPONENTS.

12.1 FOOTINGS

DO NOT OVER EXCAVATE FOUNDATIONS UNLESS DIRECTED BY SITE SOIL ENGINEER TO REMOVE UNSUITABLE SOIL.

THE SITE SOILS ENGINEER SHALL CERTIFY THAT THE BEARING CAPACITY MEETS OR EXCEEDS THE FOOTING DESIGN REQUIREMENTS, PRIOR TO THE CONTRACTOR POURING OF THE FOOTINGS.

THE BRIDGE UNITS AND WINGWALLS SHALL BE INSTALLED ON EITHER PRECAST OR CAST-IN-PLACE CONCRETE FOOTINGS. THE SIZE AND ELEVATION OF THE FOOTINGS SHALL BE AS DESIGNED BY THE ENGINEER. A KEYWAY SHALL BE FORMED IN THE TOP SURFACE OF THE BRIDGE FOOTING AS SPECIFIED ON THE PLANS. NO KEYWAY IS REQUIRED IN THE WINGWALL FOOTINGS, UNLESS OTHERWISE SPECIFIED ON THE PLANS.

THE FOOTINGS SHALL BE GIVEN A SMOOTH FLOAT FINISH AND SHALL REACH A COMPRESSIVE STRENGTH OF 2,000 PSI BEFORE PLACEMENT OF THE BRIDGE AND WINGWALL ELEMENTS. BACKFILLING SHALL NOT BEGIN UNTIL THE FOOTING HAS REACHED THE FULL DESIGN COMPRESSIVE STRENGTH.

THE FOOTING SURFACE SHALL BE CONSTRUCTED IN ACCORDANCE WITH GRADES SHOWN ON THE PLANS. WHEN TESTED WITH A 10'-0" STRAIGHT EDGE, THE SURFACE SHALL NOT VARY MORE THAN 1/4" IN 10'-0".

IF A PRECAST CONCRETE FOOTING IS USED, THE CONTRACTOR SHALL PREPARE A 4" THICK BASE LAYER OF COMPACTED GRANULAR MATERIAL THE FULL WIDTH OF THE FOOTING PRIOR TO PLACING THE PRECAST FOOTING.

THE FOUNDATIONS FOR PRECAST CONCRETE BRIDGE ELEMENTS AND WINGWALLS MUST BE CONNECTED BY REINFORCEMENT TO FORM ONE MONOLITHIC BODY. EXPANSION JOINTS SHALL NOT BE USED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONSTRUCTION OF THE FOUNDATIONS PER THE PLANS AND SPECIFICATIONS.

13. INSTALLATION

13.1 GENERAL - THE INSTALLATION OF THE PRECAST CONCRETE ELEMENTS SHALL BE AS EXPLAINED IN THE PUBLICATION CONSPAN BRIDGE SYSTEMS INSTALLATION HANDBOOK.

13.1.1 LIFTING - IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT A CRANE OF THE CORRECT LIFTING CAPACITY IS AVAILABLE TO HANDLE THE PRECAST CONCRETE UNITS. THIS CAN BE ACCOMPLISHED BY USING THE WEIGHTS GIVEN FOR THE PRECAST CONCRETE COMPONENTS AND BY DETERMINING THE LIFTING REACH FOR EACH CRANE UNIT. SITE CONDITIONS MUST BE CHECKED WELL IN ADVANCE OF SHIPPING TO ENSURE PROPER CRANE LOCATION AND TO AVOID ANY LIFTING RESTRICTIONS. THE LIFT ANCHORS OR HOLES PROVIDED IN EACH UNIT ARE THE ONLY MEANS TO BE USED TO LIFT THE ELEMENTS. THE PRECAST CONCRETE ELEMENTS MUST NOT BE SUPPORTED OR RAISED BY OTHER MEANS THAN THOSE GIVEN IN THE MANUALS AND DRAWINGS WITHOUT WRITTEN APPROVAL FROM CONTECH® ENGINEERED SOLUTIONS.

13.1.2 CONSTRUCTION EQUIPMENT WEIGHT RESTRICTIONS - IN NO CASE SHALL EQUIPMENT OPERATING IN EXCESS OF THE DESIGN LOAD (HS20 OR HS25) BE PERMITTED OVER THE BRIDGE UNITS UNLESS APPROVED BY CONTECH® ENGINEERED SOLUTIONS.

13.1.2.1. IN THE IMMEDIATE AREA OF THE BRIDGE UNITS, THE FOLLOWING RESTRICTIONS FOR THE USE OF HEAVY CONSTRUCTION MACHINERY DURING BACKFILLING OPERATIONS APPLY:

- NO CONSTRUCTION EQUIPMENT SHALL CROSS THE BARE PRECAST CONCRETE BRIDGE UNIT.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 4" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 10 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 1'-0" OVER THE CROWN OF THE BRIDGE CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 30 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED THE DESIGN COVER, OR 2'-0" MINIMUM, OVER THE CROWN OF THE PRECAST CONCRETE BRIDGE, CONSTRUCTION EQUIPMENT WITHIN THE DESIGN LOAD LIMITS FOR THE ROAD MAY CROSS THE PRECAST CONCRETE BRIDGE.

13.2 LEVELING PAD/SHIMS - THE BRIDGE UNITS AND WINGWALLS SHALL BE SET ON HARDBOARD SHIMS CONFORMING TO ASTM D1037 OR PLASTIC SHIMS (DAYTON SUPERIOR P-80, P-81 OR APPROVED MEASURING 5" x 5", MINIMUM, UNLESS SHOWN OTHERWISE ON THE PLANS. A MINIMUM GAP OF 12" SHALL BE PROVIDED BETWEEN THE FOOTING AND THE BOTTOM OF THE BRIDGE'S VERTICAL LEGS OR THE BOTTOM OF THE WINGWALL. ALSO, A SUPPLY OF 14", 12" AND 18" THICK HARDBOARD OR PLASTIC SHIMS FOR VARIOUS SHIMMING PURPOSES SHALL BE ON SITE.

13.3 PLACEMENT OF BRIDGE UNITS - THE BRIDGE UNITS SHALL BE PLACED AS SHOWN ON THE ENGINEER'S PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED 3/4".

13.3 IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE STRUCTURE SPAN DURING ALL PHASES OF INSTALLATION. DUE TO THE ARCH SHAPE, BRIDGE ELEMENTS WILL TEND TO SPREAD UNDER SELF-WEIGHT. IT IS IMPERATIVE THAT ANY LATERAL SPREADING OF THE BRIDGE ELEMENTS BE AVOIDED DURING AND AFTER THEIR PLACEMENT. GENERALLY, HORIZONTAL CABLE TIES OR TIE RODS ARE SHIPPED IN THE LARGER BRIDGE ELEMENTS TO ASSIST IN PREVENTING THIS SPREADING. CABLE TIES/TIE RODS SHALL NOT BE REMOVED UNTILL BRIDGE UNITS ARE GROUTED AND GROUT HAS CURED. IT IS RECOMMENDED THAT TEMPORARY HARDWOOD BLOCKS BE USED IN CONJUNCTION WITH THE CABLE TIES/TIE RODS TO MAINTAIN SPAN. IF, HOWEVER, DUE TO SITE RESTRICTIONS, THESE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO PLACEMENT OF THE BRIDGE ELEMENTS, THE CONTRACTOR MUST NOTIFY CONTECH (MANUFACTURER) AND REQUEST A SUGGESTED INSTALLATION PROCEDURE.

IN ADDITION, IF THE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO SETTING ARCH UNITS, THE FOLLOWING QUALITY CONTROL PROCEDURE MUST BE FOLLOWED:

- 1) FIND "MEASURED SPAN" UPON ARCH UNIT'S DELIVERY TO SITE, PRIOR TO LIFTING FROM TRUCK AND REMOVING CABLE TIES/TIE RODS. "MEASURED SPAN" SHALL BE THE AVERAGE OF (3) SPAN MEASUREMENTS ALONG THE LAY LENGTH OF THE ARCH UNIT.
- 2) AFTER SETTING OF BRIDGE UNIT ON THE FOUNDATION, VERIFY THE SPAN. THIS "INSTALLED SPAN MEASUREMENT" SHALL NOT EXCEED THE MAXIMUM OF:
 - A) THE NOMINAL SPAN +12" OR
 - B) THE "MEASURED SPAN"

IF THE "INSTALLED SPAN MEASUREMENT" EXCEEDS THIS AMOUNT, THE ARCH UNIT SHALL BE LIFTED AND RE-SET UNTIL THE "INSTALLED SPAN MEASUREMENT" MEETS THE LIMITS.

13.5 PLACEMENT OF WINGWALLS, HEADWALLS AND FOUNDATION UNITS - THE WINGWALLS, HEADWALLS AND FOUNDATIONS SHALL BE PLACED AS SHOWN ON THE PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE.

13.6 WATERPROOFING/JOINT PROTECTION AND SUBSURFACE DRAINAGE

13.6.1 EXTERNAL PROTECTION OF JOINTS - THE BUTT JOINT MADE BY TWO ADJOINING BRIDGE UNITS SHALL BE COVERED WITH A 78" x 138" PREFORMED BITUMINOUS JOINT SEALANT AND A MINIMUM OF A 9" WIDE JOINT WRAP. THE SURFACE SHALL BE FREE OF DIRT BEFORE APPLYING THE JOINT MATERIAL. A PRIMER COMPATIBLE WITH THE JOINT WRAP TO BE USED SHALL BE APPLIED FOR A MINIMUM WIDTH OF 9" ON EACH SIDE OF THE JOINT. THE EXTERNAL WRAP SHALL BE CS212 BY CONCRETE SEALANTS INC., EZ-WRAP RUBBER BY PRESS-SEAL GASKET CORPORATION, SEAL WRAP BY MAR MAC MANUFACTURING CO. INC. OR APPROVED EQUAL. THE JOINT SHALL BE COVERED CONTINUOUSLY FROM THE BOTTOM OF ONE BRIDGE SECTION LEG, ACROSS THE TOP OF THE BRIDGE AND TO THE OPPOSITE BRIDGE SECTION LEG. ANY LAPS THAT RESULT IN THE JOINT WRAP SHALL BE A MINIMUM OF 6" LONG WITH THE OVERLAP RUNNING DOWNHILL.

13.6.2. IN ADDITION TO THE JOINTS BETWEEN BRIDGE UNITS, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE HEADWALL SHALL ALSO BE SEALED AS DESCRIBED ABOVE. IF PRECAST WINGWALLS ARE USED, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE WINGWALL SHALL BE SEALED WITH A 2'-0" STRIP OF FILTER FABRIC. ALSO, IF LIFT HOLES ARE FORMED IN THE BRIDGE UNITS, THEY SHALL BE PRIMED AND COVERED WITH A 9" x 9" SQUARE OF JOINT WRAP.

13.6.3. DURING THE BACKFILLING OPERATION, CARE SHALL BE TAKEN TO KEEP THE JOINT WRAP IN ITS PROPER LOCATION OVER THE JOINT.

13.6.4. SUBSOIL DRAINAGE SHALL BE AS DIRECTED BY THE ENGINEER.

13.7 GROUTING

13.7.1. GROUTING SHALL NOT BE PERFORMED WHEN TEMPERATURES ARE EXPECTED TO GO BELOW 35° FOR A PERIOD OF 72 HOURS. FILL THE BRIDGE-FOUNDATION KEYWAY WITH CEMENT GROUT (PORTLAND CEMENT AND WATER OR CEMENT MORTAR COMPOSED OF PORTLAND CEMENT, SAND AND WATER) WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI. VIBRATE AS REQUIRED TO ENSURE THAT THE ENTIRE KEY AROUND THE BRIDGE ELEMENT IS

COMPLETELY FILLED. IF BRIDGE ELEMENTS HAVE BEEN SET WITH TEMPORARY TIES (CABLES, BARS, ETC.) GROUT MUST ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI BEFORE TIES MAY BE REMOVED.

13.7.2. ALL GROUT SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 3/4".

13.7.3. LIFTING AND ERECTION ANCHOR RECESSES SHALL BE FILLED WITH GROUT.

13.7.4. AFTER GROUT HAS REACHED ITS DESIGN STRENGTH THE TEMPORARY HARDWOOD WEDGES SHALL BE REMOVED AND THEIR HOLES FILLED WITH GROUT.

13.8 BACKFILL

13.8.1 DO NOT PERFORM BACKFILLING DURING WET OR FREEZING WEATHER.

13.8.2. NO BACKFILL SHALL BE PLACED AGAINST ANY STRUCTURAL ELEMENTS UNTIL THEY HAVE BEEN APPROVED BY THE ENGINEER.

13.8.3. BACKFILL SHALL BE CONSIDERED AS ALL REPLACED EXCAVATION AND NEW EMBANKMENT ADJACENT TO THE PRECAST CONCRETE ELEMENTS. THE PROJECT CONSTRUCTION AND MATERIAL SPECIFICATIONS, WHICH INCLUDE THE SPECIFICATIONS FOR EXCAVATION FOR STRUCTURES AND ROADWAY EXCAVATION AND EMBANKMENT CONSTRUCTION, SHALL APPLY EXCEPT AS MODIFIED IN THIS SECTION.

13.8.4. BACKFILL ZONES:

- IN-SITU SOIL
- ZONE A: CONSTRUCTED EMBANKMENT OR OVERFILL.
- ZONE B: FILL THAT IS DIRECTLY ASSOCIATED WITH PRECAST CONCRETE BRIDGE INSTALLATION.
- ZONE C: ROAD STRUCTURE.

13.8.5. REQUIRED BACKFILL PROPERTIES

13.8.5.1. IN-SITU SOIL - NATURAL GROUND IS TO BE SUFFICIENTLY STABLE TO ALLOW EFFECTIVE SUPPORT TO THE PRECAST CONCRETE BRIDGE UNITS. AS A GUIDE, THE EXISTING NATURAL GROUND SHOULD BE OF SIMILAR QUALITY AND DENSITY TO ZONE B MATERIAL FOR MINIMUM LATERAL DIMENSION OF ONE BRIDGE SPAN OUTSIDE OF THE BRIDGE FOOTING.

13.8.5.2. ZONE A - ZONE A REQUIRES FILL MATERIAL WITH SPECIFICATIONS AND COMPACTING PROCEDURES EQUAL TO THAT FOR NORMAL ROAD EMBANKMENTS.

13.8.5.3. ZONE B - GENERALLY, SOILS SHALL BE REASONABLY FREE OF ORGANIC MATTER, AND, NEAR CONCRETE SURFACES, FREE OF STONES LARGER THAN 3" IN DIAMETER SEE CHARTS FOR DETAILED DESCRIPTIONS OF ACCEPTABLE SOILS.

13.8.5.4. ZONE C - ZONE C IS THE ROAD SECTION OF GRAVEL, ASPHALT OR CONCRETE BUILT IN COMPLIANCE WITH LOCAL ENGINEERING PRACTICES.

13.8.5.5. GEOTECHNICAL ENGINEER SHALL REVIEW GRADATIONS OF ALL INTERFACING MATERIALS AND, IF NECESSARY, RECOMMEND GEOTEXTILE FILTER FABRIC (PROVIDED BY CONTRACTOR)

13.8.6. PLACING AND COMPACTING BACKFILL

DUMPING FOR BACKFILLING IS NOT ALLOWED ANY NEARER THAN 3'-0" FROM THE BRIDGE LEG.

THE FILL MUST BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE MAXIMUM DIFFERENCE IN THE SURFACE LEVELS OF THE FILL ON OPPOSITE SIDES OF THE BRIDGE MUST NOT EXCEED 2'-0".

THE FILL BEHIND WINGWALLS MUST BE PLACED AT THE SAME TIME AS THAT OF THE BRIDGE FILL. IT MUST BE PLACED IN PROGRESSIVELY PLACED HORIZONTAL LAYERS NOT EXCEEDING 8" PER LAYER.

THE BACKFILL OF ZONE B SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95% OF THE STANDARD PROCTOR, AS REQUIRED BY AASHTO T-99.

SOIL WITHIN 1'-0" OF CONCRETE SURFACES SHALL BE HAND-COMPACTED. ELSEWHERE, USE OF ROLLERS IS ACCEPTABLE. IF VIBRATING ROLLER-COMPACTORS ARE USED, THEY SHALL NOT BE STARTED OR STOPPED WITHIN ZONE B AND THE VIBRATION FREQUENCY SHOULD BE AT LEAST 30 REVOLUTIONS PER SECOND.

THE BACKFILL MATERIAL AND COMPACTING BEHIND WINGWALLS SHALL SATISFY THE CRITERIA FOR THE BRIDGE BACKFILL, ZONE B.

BACKFILL AGAINST A WATERPROOFED SURFACE SHALL BE PLACED CAREFULLY TO AVOID DAMAGE TO THE WATERPROOFING MATERIAL.

14.3.7. BRIDGE UNITS

FOR FILL HEIGHTS OVER 12 FEET (AS MEASURED FROM TOP CROWN OF BRIDGE TO FINISHED GRADE), NO BACKFILLING MAY BEGIN UNTIL A BACKFILL COMPACTION TESTING PLAN HAS BEEN COORDINATED WITH AND APPROVED BY CONTECH® ENGINEERED SOLUTIONS.

13.8.8. WINGWALLS

BACKFILL IN FRONT OF WINGWALLS SHALL BE CARRIED TO GROUND LINES SHOWN IN THE PLANS.

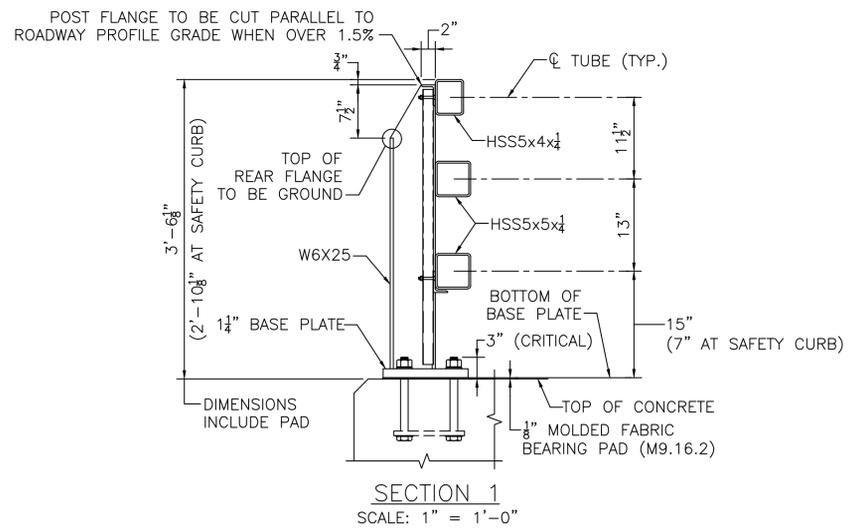
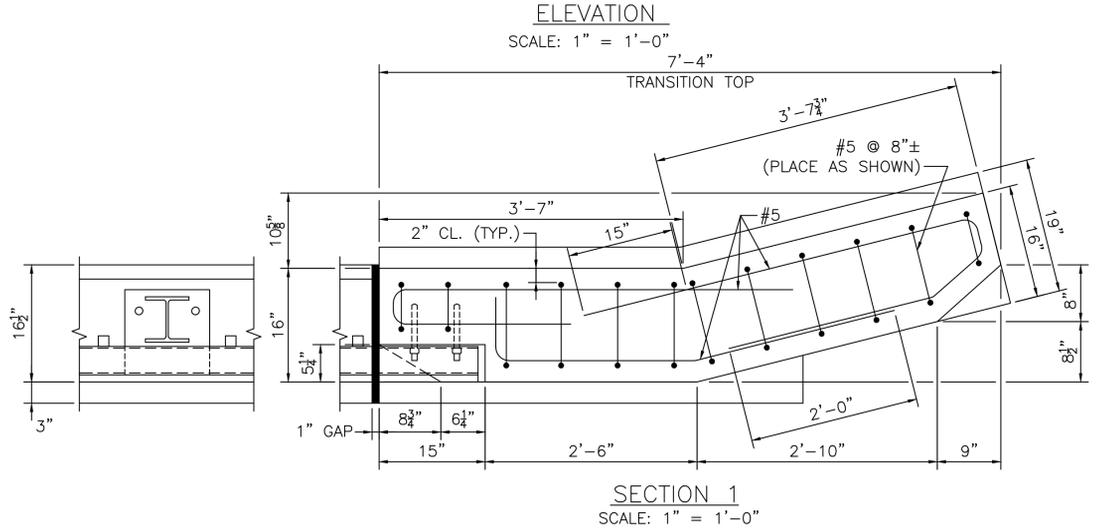
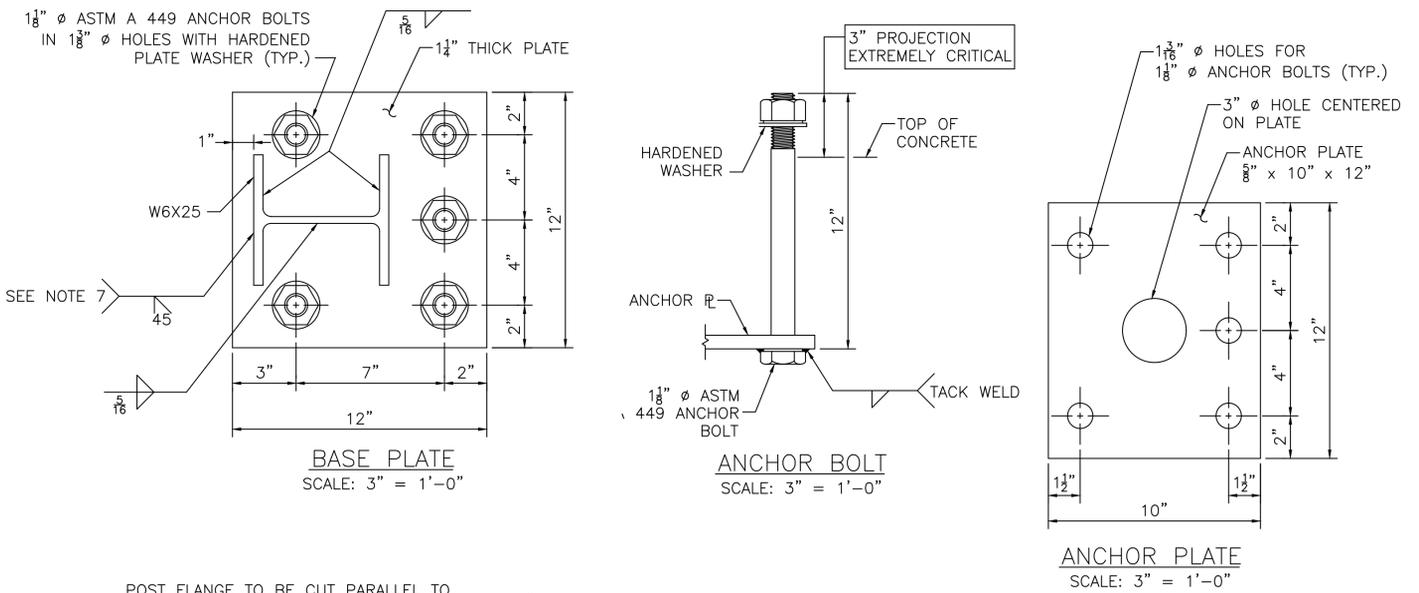
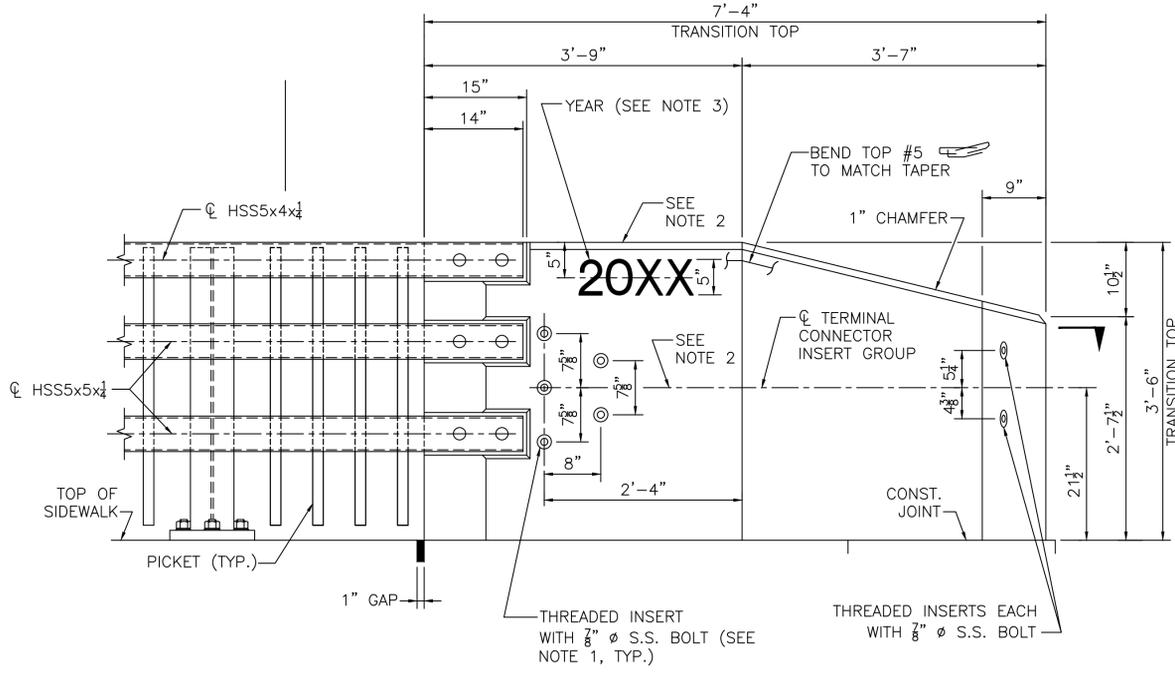
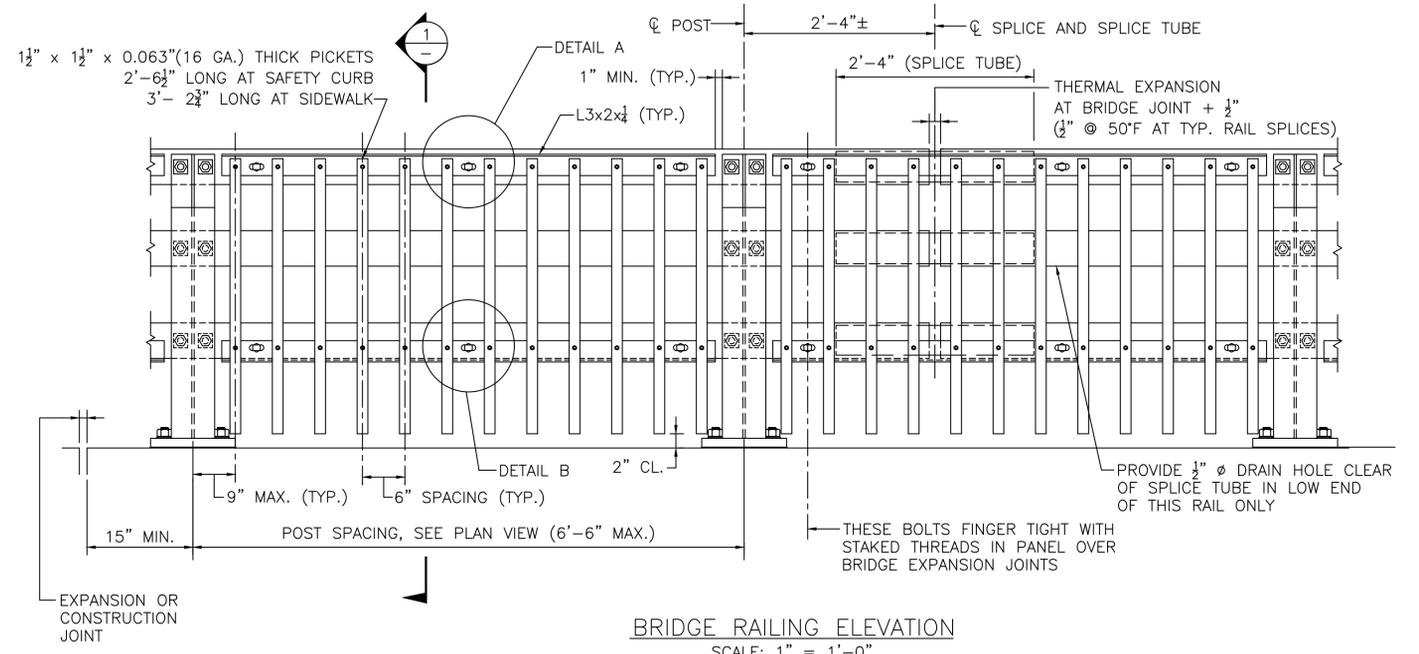
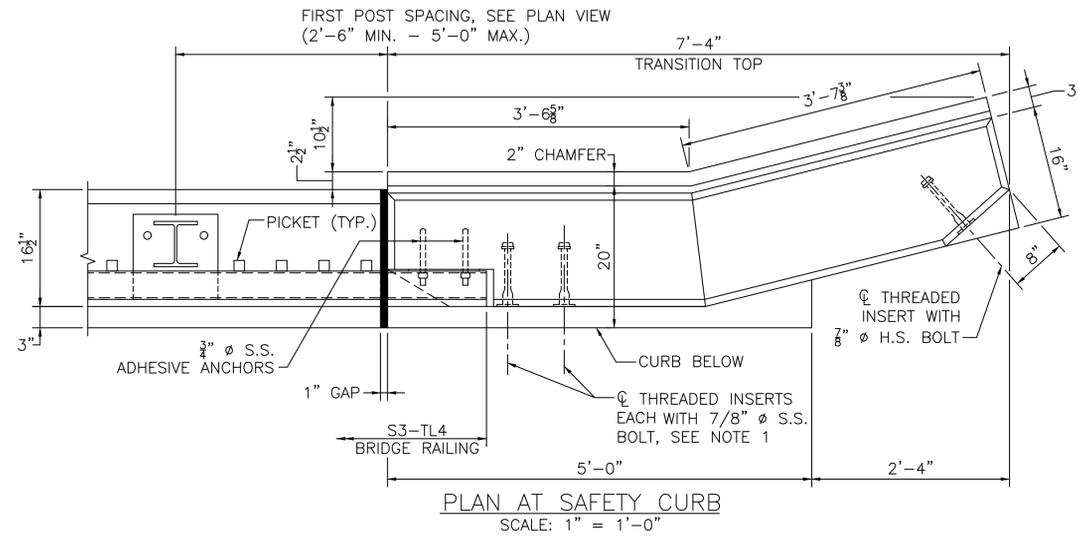
13.8.9. MONITORING

THE CONTRACTOR SHALL CHECK SETTLEMENTS AND HORIZONTAL DISPLACEMENT OF FOUNDATION TO ENSURE THAT THEY ARE WITHIN THE ALLOWABLE LIMIT PROVIDED BY THE ENGINEER. THESE MEASUREMENTS SHOULD GIVE AN INDICATION OF THE SETTLEMENTS AND DEFORMATIONS ALONG THE LENGTH OF THE FOUNDATIONS.

THE FIRST MEASUREMENT SHOULD TAKE PLACE AFTER THE ERECTION OF ALL PRECAST BRIDGE SYSTEM ELEMENTS, A SECOND AFTER COMPLETION OF BACKFILLING, AND A THIRD BEFORE OPENING OF THE BRIDGE TO TRAFFIC. FURTHER MEASUREMENTS MAY BE MADE ACCORDING TO LOCAL CONDITIONS.

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PROPOSED RECONSTRUCTION OF MAIN ROAD/RT 23 BRIDGE OVER KONKAPOT RIVER MONTEREY, MA			
STRUCTURAL NOTES CONTINUED			
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF MONTEREY	
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG S-002
DESIGNED BY: CC	DRAWN BY: TF	SCALE: AS NOTED	
DATE: July 2023	PROJECT NO: 01.0174558.10	REVISION NO.	



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**ROAD CULVERT REPLACEMENT
MAIN ROAD / RT 23
MONTEREY, MA**

BRIDGE AND RAILING DETAILS

PREPARED BY: GZA GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: TOWN OF MONTEREY		
PROJ MGR: KH	REVIEWED BY: KH	CHECKED BY: CC	DWG
DESIGNED BY: KH	DRAWN BY: TF	SCALE: AS NOTED	S-102
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