

TOWN OF UXBRIDGE, MASSACHUSETTS

ROUTE 122 WATER MAIN

CONTRACT NO. 11

DWSRF NO. 3879

BOARD OF SELECTMEN

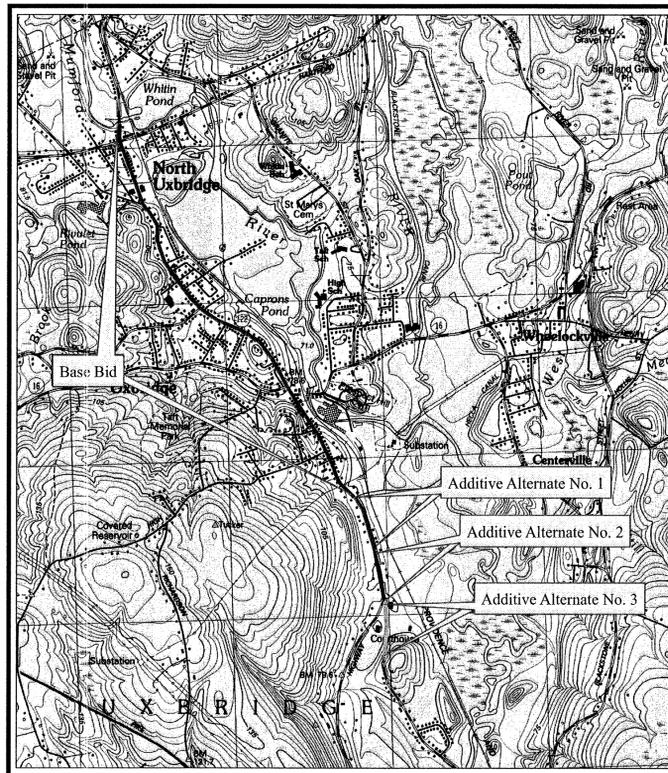
LANCE ANDERSON
 PETER BAGHDASARIAN
 JENNIFER MODICA
 TIMOTHY RICE
 JEFFREY SHAW

TOWN MANAGER

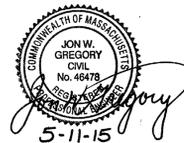
DAVID GENEREUX

DEPARTMENT OF PUBLIC WORKS

BENN S. SHERMAN, P.E.
 JIM BOLIVER
 PAUL MORANTE



LOCUS MAP



TATA & HOWARD

MAY 2015

INDEX TO DRAWINGS

- C-1 - GENERAL NOTES & LEGEND
- C-2 - SOUTH MAIN STREET STA. 0+00 TO STA. 24+02
- C-3 - NORTH MAIN STREET STA. 24+02 TO STA. 48+36
- C-4 - NORTH MAIN STREET STA. 48+36 TO STA. 72+74
- C-5 - NORTH MAIN STREET STA. 72+74 TO STA. 95+19
- C-6 - ADDITIVE ALTERNATE NO. 1
SOUTH MAIN STREET STA. 0+00 TO STA. 11+42
- C-7 - ADDITIVE ALTERNATE NO. 2
SOUTH MAIN STREET STA. 0+00 TO STA. 12+89
- C-8 - ADDITIVE ALTERNATE NO. 3
NORTH MAIN STREET STA. 0+00 TO STA. 10+16
- C-9 - DETAIL SHEET 1
- C-10 - DETAIL SHEET 2
- S-1 - STRUCTURAL GENERAL NOTES
- S-2 - BR. NO. U-02-022 UTILITY LAYOUT PLAN &
DETAIL SHEET
- TR-1 - TRAFFIC MANAGEMENT PLAN SHEET 1
- TR-2 - TRAFFIC MANAGEMENT PLAN SHEET 2

Consulting Engineers

Marlborough, MA

GENERAL NOTES

- ALL WATER SERVICES TO BE 1" UNLESS OTHERWISE NOTED. EACH SERVICE SHALL CONSIST OF A CORPORATION, POLYETHYLENE TUBING, CURB STOP AND BOX. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE SIZE OF EXISTING WATER SERVICES AND INSTALL NECESSARY TRANSITION FITTINGS. LOCATION OF WATER SERVICES SHALL BE COORDINATED WITH THE UXBRIDGE DEPARTMENT OF PUBLIC WORKS (DPW).
- THE CONNECTIONS TO EXISTING WATER MAINS AND SERVICES SHALL BE COMPLETED AFTER THE NEW WATER MAIN HAS BEEN PRESSURE TESTED, CHLORINATED AND APPROVED.
- THE LOCATION OF THE EXISTING UTILITIES AS SHOWN ON THE PLANS ARE APPROXIMATE AND ARE INTENDED ONLY TO ADVISE THE CONTRACTOR OF THEIR PRESENCE. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING THE ACTUAL LOCATIONS OF ALL THE EXISTING UTILITIES, INCLUDING SERVICES. CALL "DIG SAFE" (1-800-344-7233) FOR FIELD LOCATIONS OF ALL EXISTING UTILITIES. IN ADDITION, THE CONTRACTOR SHALL INFORM THE APPLICABLE TOWN OF UXBRIDGE MUNICIPAL DEPARTMENTS REGARDING WATER, SEWER AND DRAINS.
- ALL GATE VALVES SHALL BE RESTRAINED. SEE DETAILS ON DRAWING NO. C-9. ALL MECHANICAL JOINT TEES SHALL BE VALVE ANCHORING.
- ALL BENDS, TEES, CAPS AND MISCELLANEOUS FITTINGS SHALL BE RESTRAINED AS SPECIFIED.
- EXISTING HYDRANTS SHALL BE REMOVED AND STACKED AT THE TOWN OF UXBRIDGE WATER DIVISION, 105 BLACKSTONE STREET, UXBRIDGE, MA 01569. LOCATION OF PROPOSED HYDRANTS SHALL BE COORDINATED WITH THE UXBRIDGE DPW.
- EXISTING WATER MAIN SHALL BE CUT, CAPPED, AND VALVE BOXES PULLED AT ALL CONNECTIONS.
- SURVEY FROM THE BLACK STONE RIVER TO THE INTERSECTION OF NORTH MAIN STREET AND HARTFORD AVENUE WAS PROVIDED BY BETA GROUP, INC. 315 NORWOOD PARK SOUTH, NORWOOD, MA 02062. SURVEY FROM THE INTERSECTION OF NORTH MAIN STREET AND HARTFORD AVENUE TO THE NORTH END OF THE PROJECT WAS PROVIDED BY HERITAGE DESIGN GROUP, LLC. 1 MAIN STREET, WHITINSVILLE, MA 01588. EXISTING HOUSE SERVICE CONNECTIONS BASED UPON THE CARDS PROVIDED BY THE UXBRIDGE DPW.
- SEE APPENDIX B OF THE SPECIFICATIONS FOR SUBSURFACE SOIL INFORMATION.
- CONTRACTOR SHALL VERIFY INVERTS OF ALL DRAINAGE AND SEWER STRUCTURES PRIOR TO CONSTRUCTION.
- SILT SACKS ARE TO BE USED ON ALL CATCH BASINS WITHIN PROJECT LIMITS TO MINIMIZE SILT DEPOSITS INTO DRAINAGE SYSTEM.
- THE EXISTING 12-INCH DIAMETER WATER MAIN SHALL BE REMOVED AND PROPERLY DISPOSED OF AND THE NEW WATER MAIN SHALL BE INSTALLED WITHIN THE EXISTING WATER MAIN TRENCH. WHERE THE PROPOSED MAIN IS TO BE IN A NEW TRENCH, FROM HARTFORD AVENUE TO 340 NORTH MAIN STREET, THE WATER MAIN SHALL BE AT LEAST 10 FEET HORIZONTALLY FROM EXISTING SEWER AND IS AT LEAST 18 INCHES ABOVE TOP OF SEWER. WHEN CROSSING A SEWER, THE WATER MAIN SHALL CROSS ABOVE THE SEWER AND ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM SEWER AS POSSIBLE. IF THE ABOVE CRITERIA CAN NOT BE MET, THE SEWER MAIN SHALL BE ENCASED IN CONCRETE OR SLEEVED AT LEAST 10 FEET ALONG ITS LENGTH IN BOTH DIRECTIONS FROM THE POINT OF INTERSECTION WITH NEW WATER MAIN.
- CONCRETE ROAD BASE, WITH REBAR, IS PRESENT FROM MASSDOT STATION 154 TO 192 ALONG ROUTE 122.
- THE REGION ALONG ROUTE 122 BETWEEN MASSDOT STATIONS 192 AND 64 IS TOWN OWNED AND SHALL BE CONSTRUCTED ACCORDING TO THE TOWN OF UXBRIDGE CONSTRUCTION STANDARDS.
- ALL WATER PIPES ARE TO BE LAID WITH A MINIMUM OF 5'-0" COVER, EXCEPT AS INDICATED OTHERWISE IN THE CONTRACT DRAWINGS.
- ALL COUPLINGS SHALL BE TRANSITION COUPLINGS UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL MAKE EVERY EFFORT NOT TO DISTURB THE EXISTING WATER SYSTEM. NO ADDITIONAL PAYMENT SHALL BE MADE FOR DAMAGE CREATED FOR THE CONVENIENCE OF THE CONTRACTOR.
- UNLESS OTHERWISE NOTED OR APPROVED BY THE ENGINEER, THE NEW WATER MAIN SHALL PASS UNDER THE EXISTING UTILITIES AND DRAIN LINES, EXISTING WATER MAINS AND HYDRANTS WITHOUT DISTURBANCE. ANY DRAINAGE SYSTEM DISTURBANCES TO STATE OWNED ROAD SHALL BE REPORTED TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION (MASSDOT) DISTRICT 3 OFFICE PRIOR TO PROCEEDING. ANY DRAINAGE SYSTEM DISTURBANCES TO TOWN OWNED ROAD SHALL BE REPORTED TO THE TOWN OF UXBRIDGE HIGHWAY DEPARTMENT PRIOR TO PROCEEDING.
- THE CONTRACTOR AT HIS EXPENSE SHALL PROVIDE ADDITIONAL TAPS IF REQUIRED FOR THE CHLORINATING AND HYDROSTATIC TESTING. TAPS SHALL BE REMOVED AND CAPPED AFTER TESTING IS COMPLETE.
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE TOWN OF UXBRIDGE. ALL EXCAVATION AND RESTORATION SHALL MEET TOWN SPECIFICATIONS. ALL WORK PERFORMED WITHIN THE MASSDOT LAYOUT SHALL BE IN ACCORDANCE WITH THE MASSDOT PERMITS. THE MASSDOT PERMITS ARE APPENDED TO THE CONTRACT DOCUMENTS IN APPENDIX C. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COMPLIANCE WITH 520 CMR 14.00: EXCAVATION AND TRENCH SAFETY (a.k.a. JACKIE'S LAW), INCLUDING ACQUIRING ANY ASSOCIATED PERMITS FROM THE TOWN OF UXBRIDGE. A MASSDOT TRENCH RIDER PERMIT WILL BE REQUIRED PRIOR TO EXCAVATION ON ROUTE 122.

- THE CONTRACTOR AT HIS EXPENSE SHALL BRACE UTILITY POLES IF REQUIRED, AND REPAIR ANY DAMAGE TO EXISTING SIDEWALKS, CURBS, PAVING, SHRUBS, TREES, STONE WALLS, LAWNS, ETC. ALL EXCAVATED AREAS SHALL BE RETURNED TO EQUAL OR BETTER THAN PRIOR CONDITION BY THE CONTRACTOR.
- ALL STATIONING ALONG THE LENGTH OF THE PROPOSED WATER MAIN IS INTENDED FOR GENERAL REFERENCE. WHERE PRECISE GROUND LOCATION IS REQUIRED, REFER TO PLANS FOR ACTUAL DISTANCES FROM EXISTING GROUND FEATURES.
- ALL EXISTING WATER SERVICES ARE TO BE ABANDONED UNLESS OTHERWISE DIRECTED BY THE ENGINEER. NEW SERVICES ARE TO BE INSTALLED AS SPECIFIED AND IN ACCORDANCE WITH THE CONTRACT DRAWINGS.
- ALL VALVES ON ABANDONED WATER MAINS SHALL BE CLOSED. THE TOP SECTION OF THE GATE BOX SHALL BE REMOVED, AND THE GATE BOX FILLED WITH SAND AND TOPPED AS SPECIFIED.
- UNLESS OTHERWISE APPROVED BY THE ENGINEER, ALL ABANDONED SERVICES ARE TO BE SHUT OFF AT CORPORATION AT THE TIME OF THE NEW TIE OVER.
- CONTRACTOR SHALL USE A WATER TIGHT PLUG DURING THE WATER MAIN INSTALLATION TO PREVENT GROUNDWATER, TRENCH MATERIAL AND BACKFILL FROM ENTERING THE PIPE. PLUG SHALL REMAIN IN PLACE AT ALL TIMES EXCEPT WHEN INSTALLING THE NEXT PIPE LENGTH.
- CONTRACTOR TO COORDINATE SHUTDOWN AND TIE-IN PROCEDURES WITH THE TOWN OF UXBRIDGE.
- ANY ERRORS, OMISSIONS AND CHANGES IN CONDITIONS AT THE SITE SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PERFORMING THE RELATED WORK.
- ALL OPEN EXCAVATIONS SHALL BE ADEQUATELY SAFEGUARDED BY PROVIDING TEMPORARY BARRICADES, CAUTION SIGNS, LIGHTS AND OTHER MEANS TO PREVENT ACCIDENTS TO PERSONS, AND DAMAGE TO PROPERTY. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROVIDE SUITABLE AND SAFE BRIDGES AND OTHER CROSSINGS FOR ACCOMMODATING TRAVEL BY PEDESTRIANS AND WORKMEN.
- DRAINAGE GENERATED AS A RESULT OF TRENCH DEWATERING SHALL BE DISCHARGED TO SEDIMENTATION BASINS WITH PROPER EROSION CONTROL MEASURES SUBJECT TO APPROVAL BY THE LOCAL CONSERVATION COMMISSION. DISCHARGE ONTO PAVEMENT OR PRIVATE PROPERTY SHALL NOT BE ALLOWED.
- THE CONTRACTOR SHALL MAKE EVERY EFFORT NOT TO DISTURB THE EXISTING DRAINAGE SYSTEM. IF NECESSARY, THE CONTRACTOR SHALL REMOVE AND RESET CATCH BASINS AS REQUIRED IN THE CONTACT DOCUMENTS. ANY DRAINAGE MODIFICATIONS TO STATE OWNED ROAD MUST BE REPORTED TO THE MASSACHUSETTS HIGHWAY DEPARTMENT DISTRICT 3 OFFICE PRIOR TO PROCEEDING. ANY DRAINAGE MODIFICATIONS IN TOWN OWNED ROAD MUST BE REPORTED TO THE TOWN OF UXBRIDGE HIGHWAY DEPARTMENT PRIOR TO PROCEEDING. NO ADDITIONAL PAYMENT SHALL BE MADE FOR DAMAGE CREATED FOR THE CONVENIENCE OF THE CONTRACTOR.
- THE CONTRACTOR SHALL INSTALL THE ENVIRONMENTAL PROTECTION DEVICES PRIOR TO THE START OF EXCAVATION. THE CONTRACTOR SHALL COMPLY WITH THE PROVISIONS OF THE ORDER OF CONDITIONS, ATTACHED TO THE CONTRACT DOCUMENTS IN APPENDIX D.
- THE CONTRACTOR SHALL MAINTAIN A MINIMUM CLEARANCE BETWEEN THE NEW WATER MAIN AND OTHER EXISTING UTILITIES OF AT LEAST 18-INCHES. ANY WATER MAIN OR SERVICE WITHIN 10 FEET HORIZONTALLY AND 18 INCHES VERTICALLY OF A SEWER LINE OR STRUCTURE SHALL BE ENCASED IN CONCRETE.
- PRIOR TO THE START OF CONSTRUCTION, A TEMPORARY BY-PASS PIPING SYSTEM SHALL BE INSTALLED, CHLORINATED, TESTED AND TEMPORARY WATER SERVICES INSTALLED BY CONTRACTOR ON ROUTE 122. UPON COMPLETION OF NEW 12-INCH DIAMETER WATER MAIN, THE TEMPORARY BY-PASS PIPING SHALL BE REMOVED BY CONTRACTOR. THE CONTRACTOR SHALL MAINTAIN BY-PASS SYSTEM AND PROTECT FROM DAMAGE THROUGHOUT THE DURATION OF THE PROJECT. THE TEMPORARY BY-PASS PIPING SHALL BE LIMITED TO 5,000 LINEAR FEET INSTALLED AT ANY ONE TIME.
- THE LOCATION AND METHOD OF PROVIDING SERVICE FOR THE TEMPORARY BY-PASS PIPING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT FOR THIS ITEM WILL BE BY THE LUMP SUM FOR ONE BY PASS LINE DELINEATED BY THE LIMIT OF WORK. NO ADDITIONAL PAYMENT SHALL BE MADE FOR CROSS TRENCHES OR ADDITIONAL PIPING. THE TEMPORARY BY-PASS PIPING AND VALVING SHALL BE PRESSURE RATED FOR 200 PSI.
- AT LOCATIONS WHERE TEMPORARY SERVICES CROSS THE ROAD, SERVICES SHALL BE ADEQUATELY PROTECTED IN A SOLID SLEEVE, PLACED IN A TRENCH OF ADEQUATE DEPTH AND COVERED WITH BITUMINOUS PAVEMENT TO PREVENT BREAKAGE DURING CONSTRUCTION OF THE NEW WATER MAIN. ALL TEMPORARY SERVICE CROSSINGS SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.
- PRIOR TO THE INSTALLATION OF THE TEMPORARY WATER BYPASS SYSTEM, INSERTION VALVES MUST BE INSTALLED ON HIGH STREET (12"), RIVULET STREET (8"), SOUTH GARDEN STREET (6"), AND HAZEL STREET (9"). FINAL LOCATIONS OF INSERTION VALVES SHALL BE COORDINATED WITH AND APPROVED BY THE TOWN OF UXBRIDGE.
- TEMPORARY HYDRANTS SHALL BE INSTALLED EVERY 500' WHEREVER TEMPORARY WATER SERVICE IS PROVIDED.
- WINTER SHUT DOWN SHALL BE NOVEMBER 1, 2015 THROUGH APRIL 1, 2016. ALL TEMPORARY WATER MAINS SHALL BE REMOVED. THE NEW WATER MAIN, SERVICES AND HYDRANTS SHALL BE TESTED AND BROUGHT ON LINE AND ALL TRENCHES SHALL BE COMPACTED AND COVERED WITH TEMPORARY PAVEMENT IN ACCORDANCE WITH THE TOWN OF UXBRIDGE AND/OR MASSDOT DESIGN STANDARDS.
- ALL DUCTILE IRON PIPE INSTALLED UNDER THIS CONTRACT SHALL BE INSTALLED WITH POLYETHYLENE WRAP IN ACCORDANCE WITH ANS/AWWA C105/A21.5, AMERICAN NATIONAL STANDARD FOR POLYETHYLENE ENCASEMENT OF DUCTILE IRON PIPE SYSTEMS.
- CONTRACTOR SHALL PROVIDE OWNER AND ENGINEER WITH A CONSTRUCTION SCHEDULE PRIOR TO THE START OF CONSTRUCTION FOR REVIEW AND APPROVAL.

LEGEND

EXISTING	DESCRIPTION	PROPOSED
	WATER MAIN	
	GATE VALVE	
	BUTTERFLY VALVE	
	REDUCER	
	TRANSITION COUPLING	
	CAP	
	FIRE HYDRANT	
	WATER SERVICE	
	SEWER MANHOLE	
	SEWER LINE	
	DRAIN MANHOLE	
	CATCH BASIN	
	DRAIN LINE	
	COMM. BOX	
	COMM. LINE	
	COMM. MANHOLE	
	ELEC. OH. WIRE	
	UTILITY POLE	
	LIGHT	
	MONITORING WELL	
	GAS LINE	
	ABANDONED GAS LINE	
	GAS VALVE	
	MISC. MANOLE	
	BOLLARD	
	TREE LINE	
	TREE	
	SHRUB	
	ROCK	
	WETLANDS	
	WETLAND FLAG	
	100' WETLAND BUFFER	
	25' WETLAND BUFFER	
	EDGE OF WATER	
	200' RIVER FRONT BUFFER	
	RIVER FLAG	
	SILTSACK	
	MULCH SOCK AND SILTATION FENCE	
	LIMIT OF WORK	
	BORING/PROBE	
	TEST PIT	
	EASEMENT	
	SURVEY MARKER	
	STATIONING	
	MASSDOT STATIONING	
	CHAIN LINK FENCE	
	FENCE (SPECIFIED)	
	STONE WALL	
	GUARD RAIL	
	BOLLARD	
	SIGN POST	
	MAILBOX	

ABBREVIATIONS

APPROX.	APPROXIMATE
B-#	BORING - NUMBER
BIT.	BITUMINOUS
C.B.	CATCH BASIN
C.I.	CAST IRON
C.F.	CHAIN LINK FENCE
CMP	CORRUGATED METAL PIPE
CONC.	CONCRETE
D.I.	DUCTILE IRON
DMH	DRAIN MANHOLE
EOP	EDGE OF PAVEMENT
GRAN.	GRANITE
GVL.	GRAVEL
HYD.	HYDRANT
INV.	INVERT
MH	MASS HIGHWAY
OH	OVERHEAD
RCP	REINFORCED CONCRETE PIPE
RET.	RETAINING
SQE	SLOPED GRANITE EDGING
SMH	SEWER MANHOLE
TEL.	TELEPHONE
TOW	TOP OF WATER
TYP.	TYPICAL
VC	VITRIFIED CLAY

TOWN OF UXBRIDGE,
MASSACHUSETTS

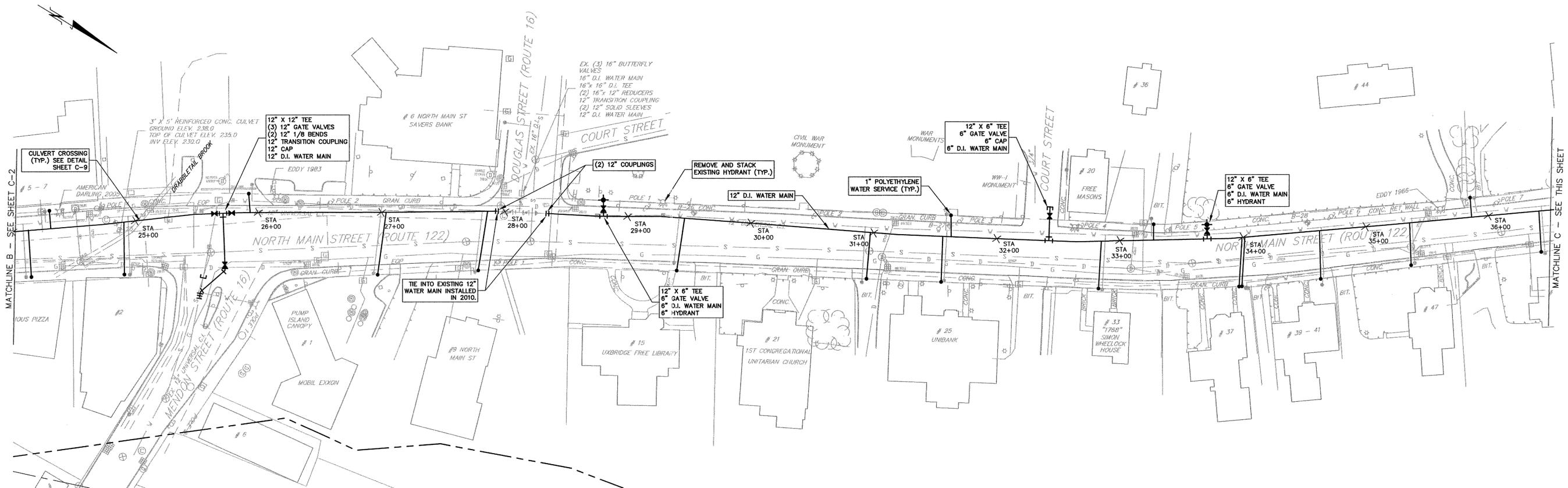
ROUTE 122 WATER MAIN

GENERAL NOTES
& LEGEND

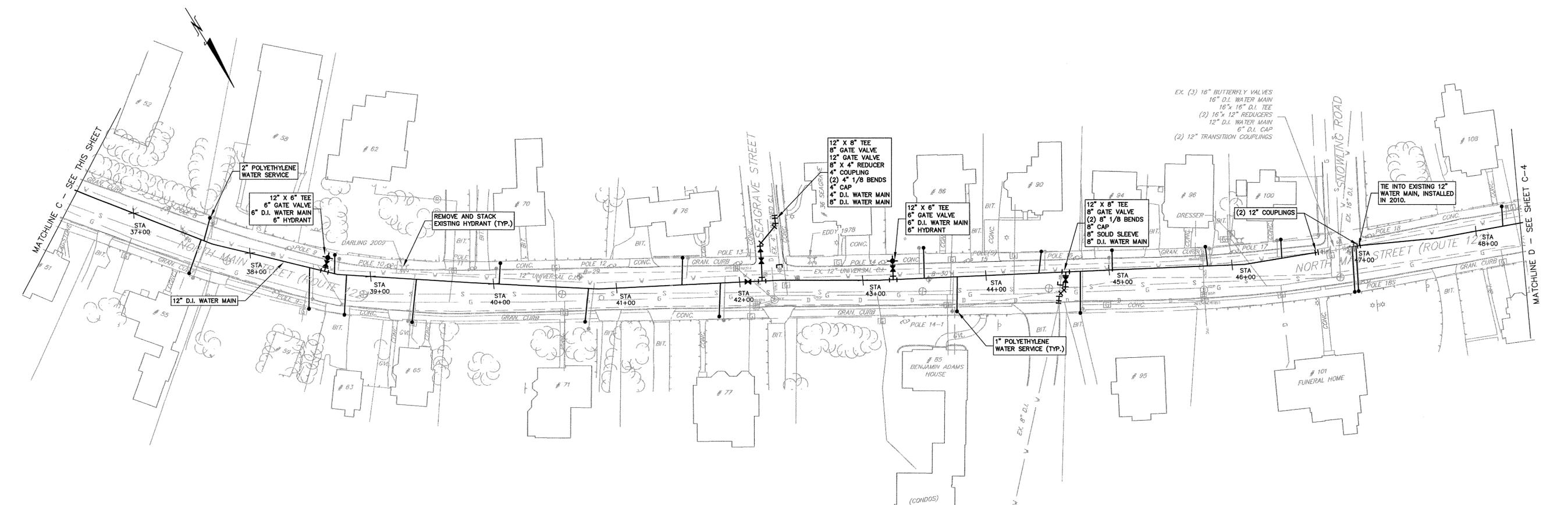
Date	Rev.	Description



T&H NO.: 2886
DATE: MAY 2015
SCALE: NONE
SHEET: 1 OF 14



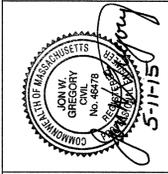
NORTH MAIN STREET (ROUTE 122)
STA. 24+02 TO STA. 36+51
 SCALE: 1" = 40'



NORTH MAIN STREET (ROUTE 122)
STA. 36+51 TO STA. 48+36
 SCALE: 1" = 40'

Rev.	Date	Description

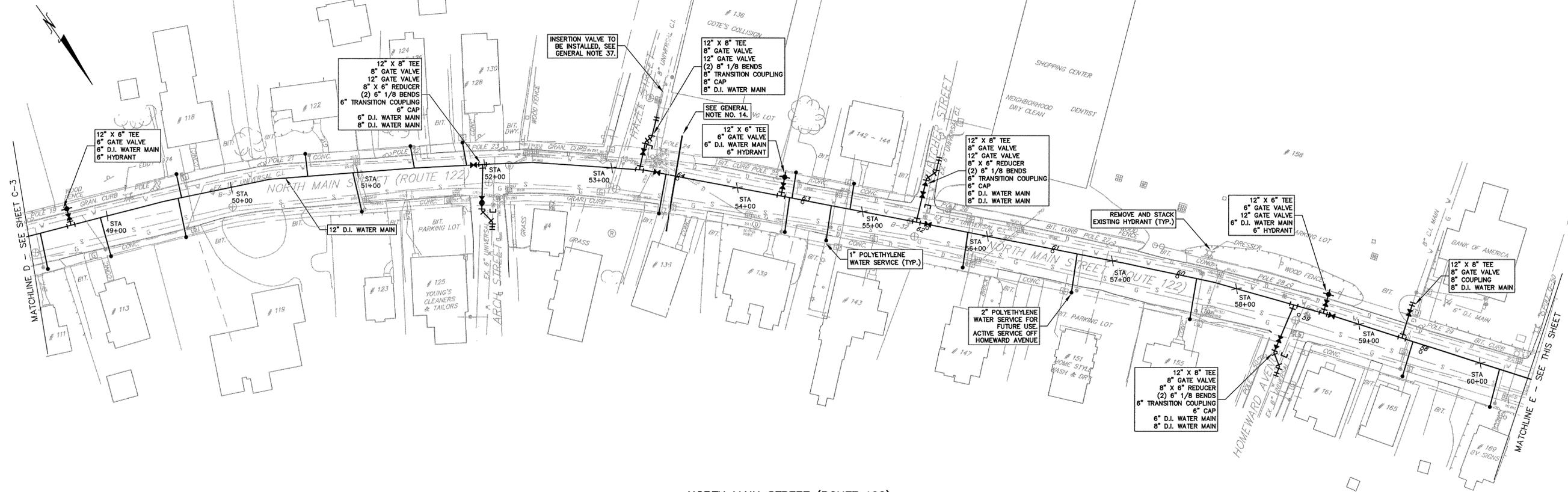
Rev.	Date	Description



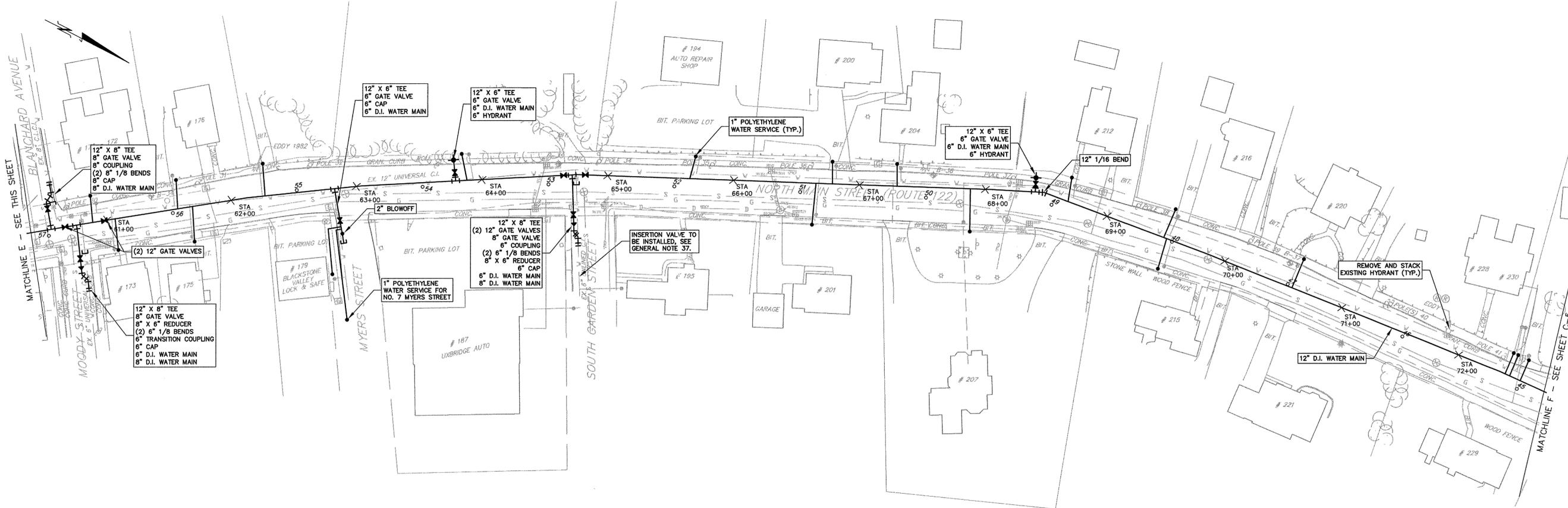
TATA & HOWARD

T&H NO.: 2886
 DATE: MAY 2015
 SCALE: 1 INCH = 40 FEET
 SHEET: 3 OF 14

C-3



NORTH MAIN STREET (ROUTE 122)
STA. 48+36 TO STA. 60+39
 SCALE: 1" = 40'

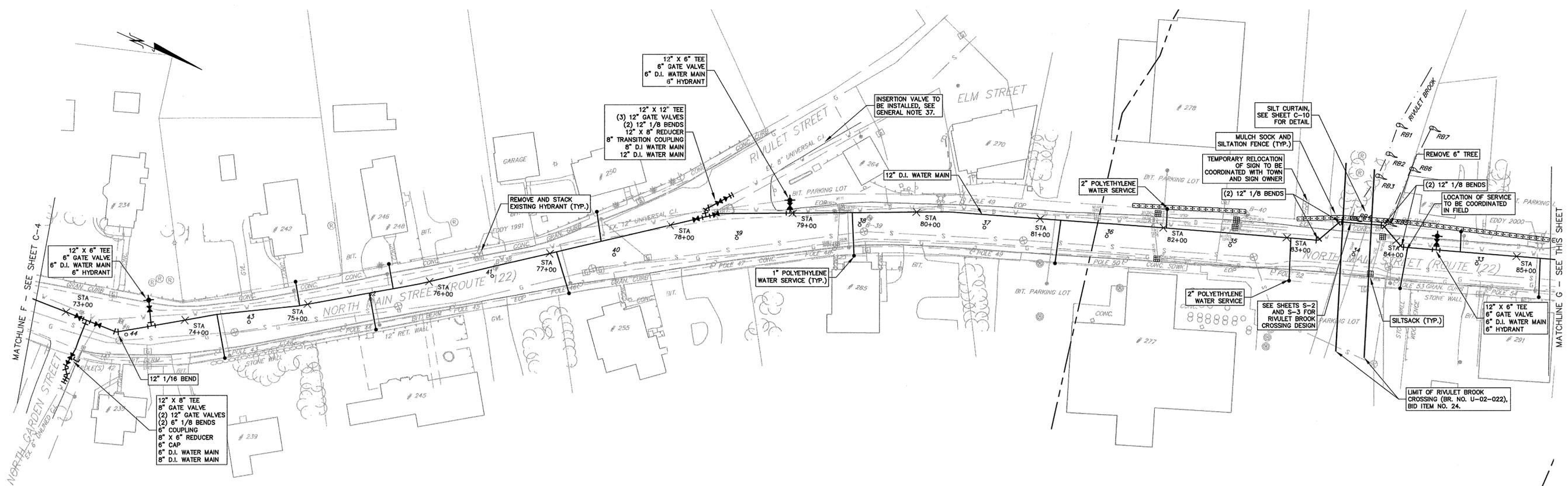


NORTH MAIN STREET (ROUTE 122)
STA. 60+39 TO STA. 72+74
 SCALE: 1" = 40'

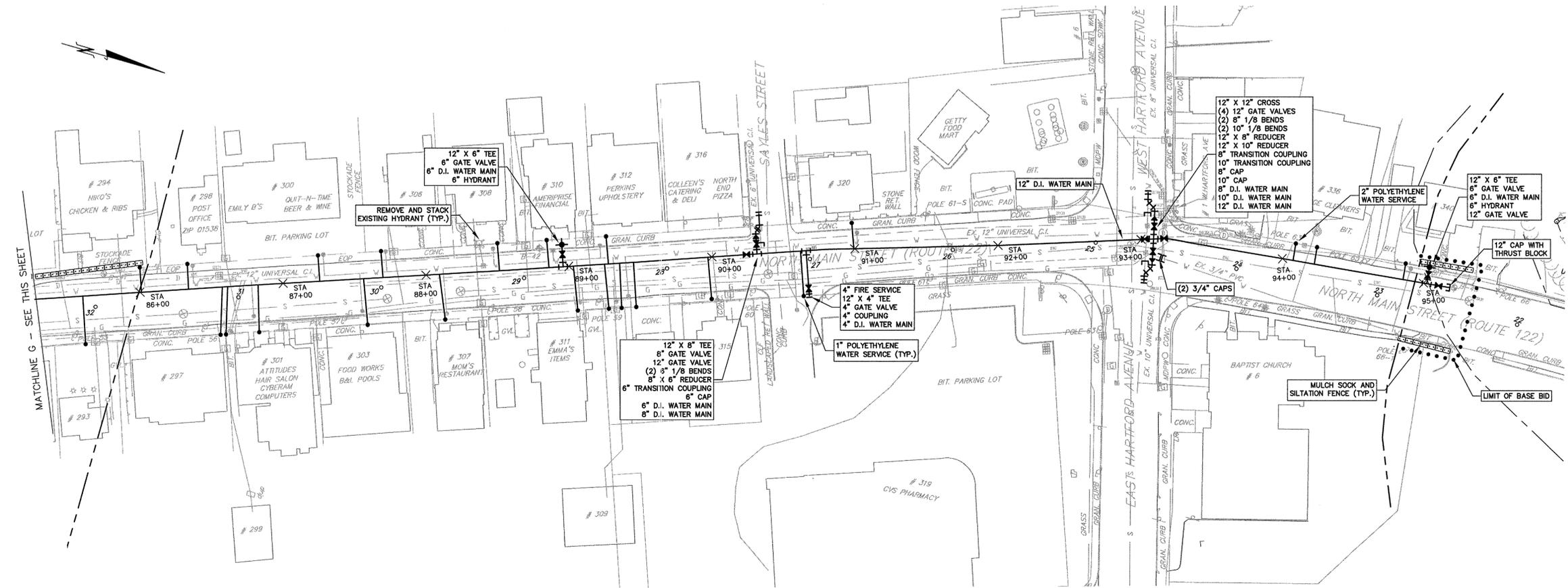
Rev.	Date	Description



Approved By: JWR
 Checked By: SHD/CAS
 Designed By: SHD/CAS
 Drawn By: CAS
 THIS DOCUMENT IS THE PROPERTY OF TATA & HOWARD, INC. AND ITS CLIENTS. REPRODUCTION OR DISTRIBUTION WITHOUT WRITTEN CONSENT IS PROHIBITED.



NORTH MAIN STREET (ROUTE 122)
STA. 72+74 TO STA. 85+27
 SCALE: 1" = 40'



NORTH MAIN STREET (ROUTE 122)
STA. 85+27 TO STA. 95+19
 SCALE: 1" = 40'

TOWN OF UXBRIDGE,
 MASSACHUSETTS

ROUTE 122 WATER MAIN

NORTH MAIN STREET
 STA. 72+74 TO STA. 95+19

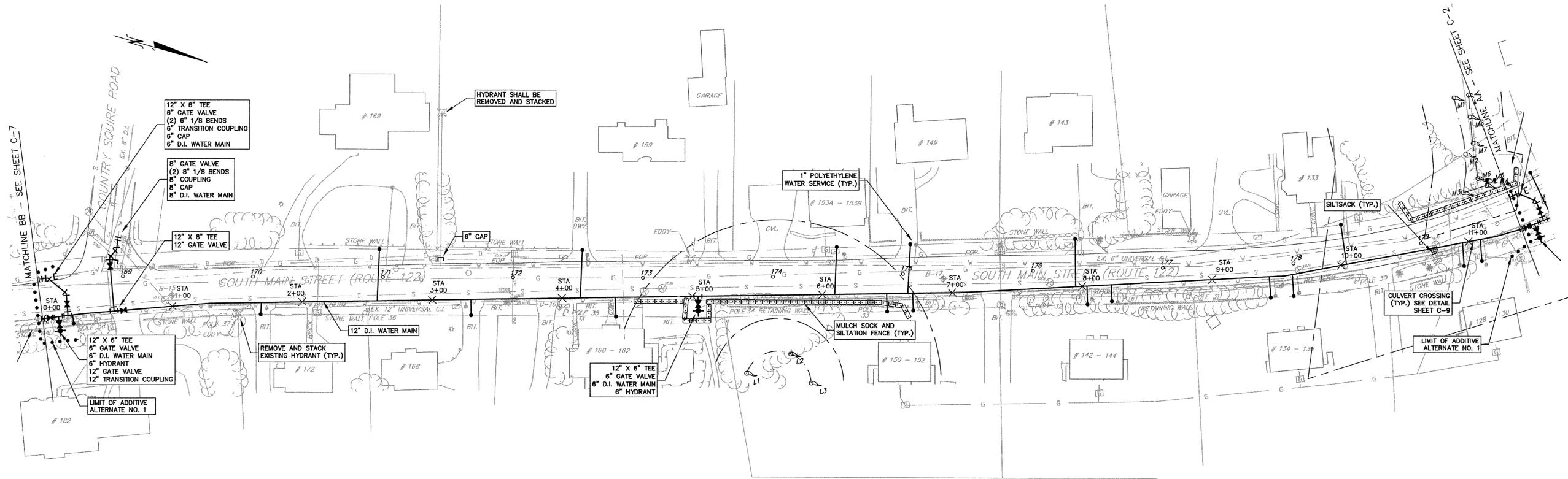
TATA & HOWARD

Checked By: JWR
 Designed By: SHD/CAS
 Drawn By: CAS

5-11-15

T&H NO.: 2886
 DATE: MAY 2015
 SCALE: 1 INCH = 40 FEET
 SHEET: 5 OF 14

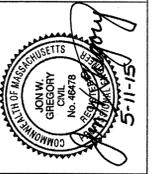
C-5

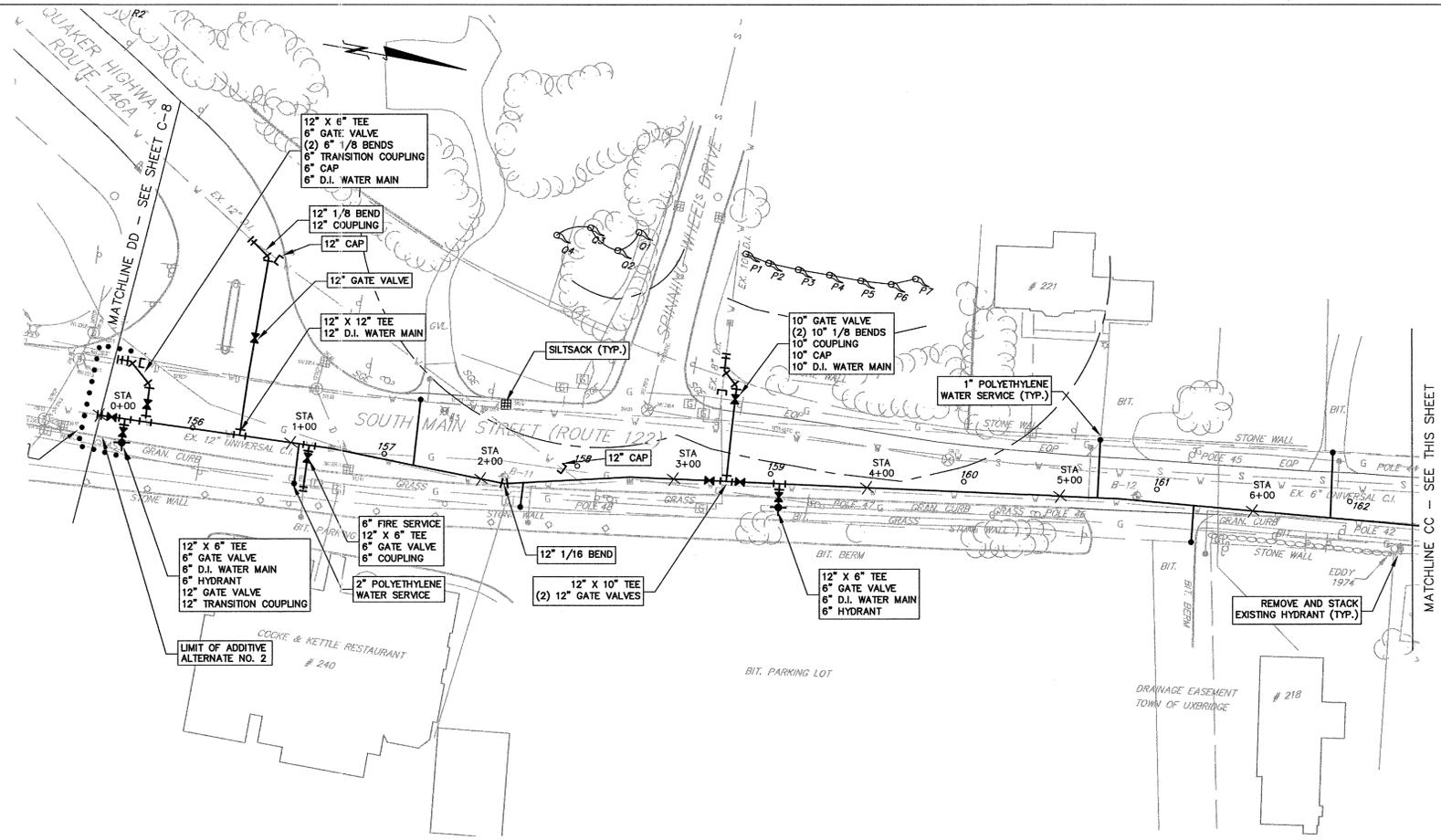


SOUTH MAIN STREET (ROUTE 122)
STA. 0+00 TO STA. 11+42
 SCALE: 1" = 40'

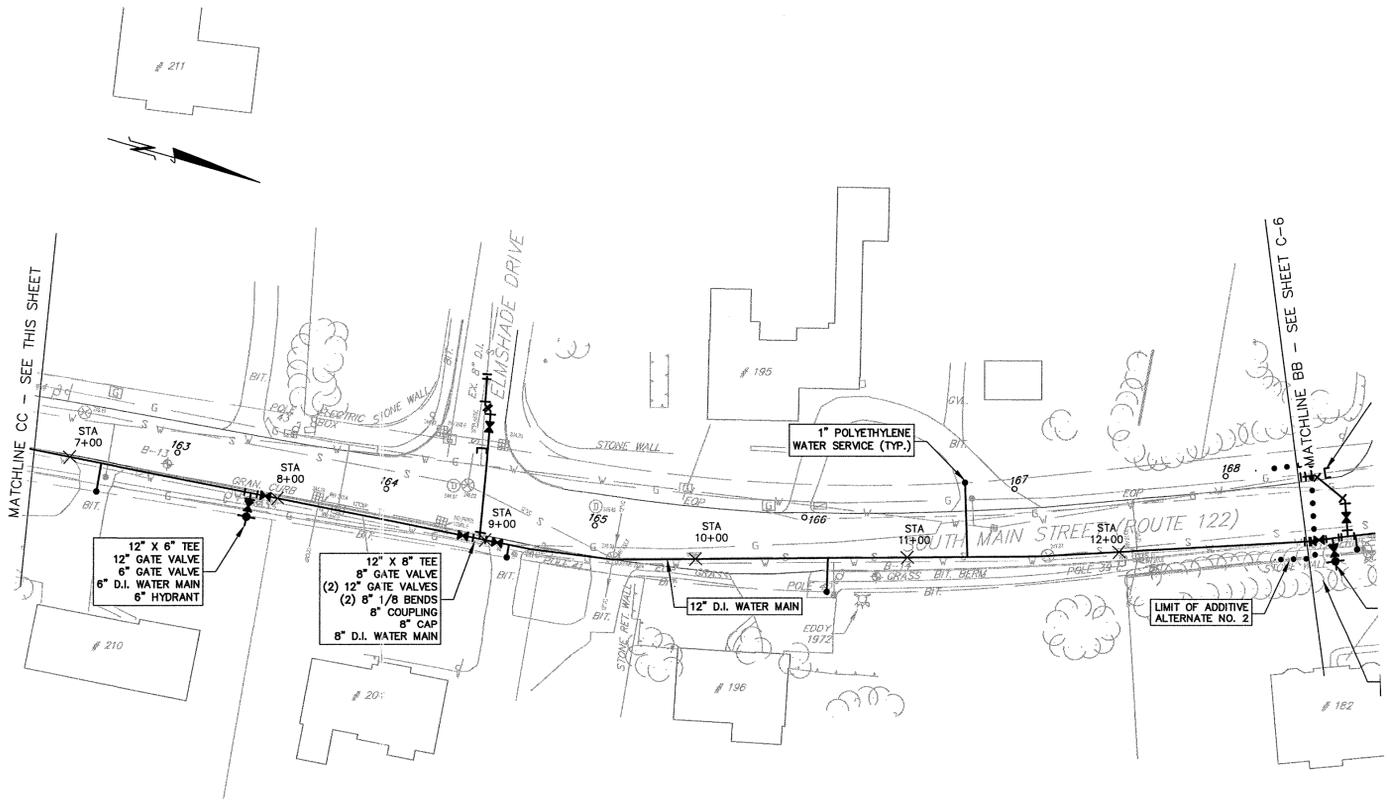
Rev.	Date	Description

Rev.	Date	Description





SOUTH MAIN STREET (ROUTE 122)
STA. 0+00 TO STA. 6+83
 SCALE: 1" = 40'



SOUTH MAIN STREET (ROUTE 122)
STA. 6+83 TO STA. 12+89
 SCALE: 1" = 40'

TOWN OF UXBRIDGE,
 MASSACHUSETTS
 ROUTE 122 WATER MAIN

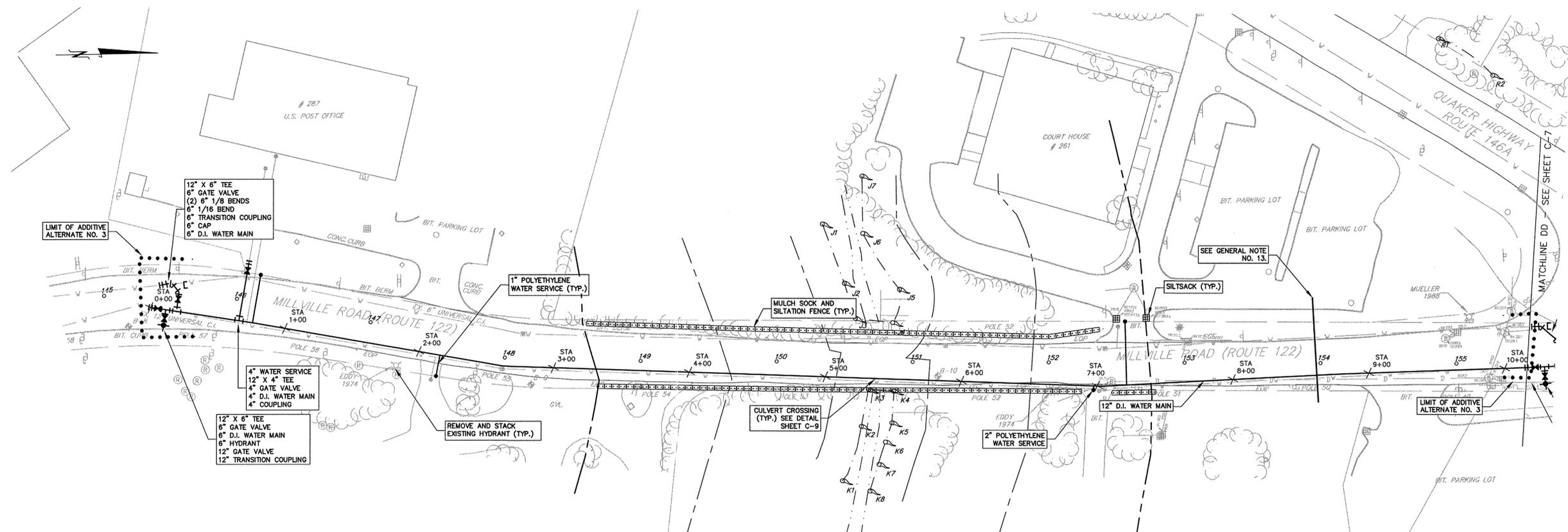
ADDITIVE ALTERNATE 2
 SOUTH MAIN STREET
 STA. 0+00 TO STA. 12+89

Date	Description

THIS DOCUMENT IS THE PROPERTY OF TATA & HOWARD, INC. AND ITS CLIENT.
 REPRODUCTION OR MODIFICATION WITHOUT WRITTEN CONSENT IS PROHIBITED.



T&H NO: 2886
 DATE: MAY 2015
 SCALE: 1 INCH = 40 FEET
 SHEET: 7 OF 14



MILLVILLE ROAD (ROUTE 122)
 STA. 0+00 TO STA. 10+16
 SCALE: 1" = 40'

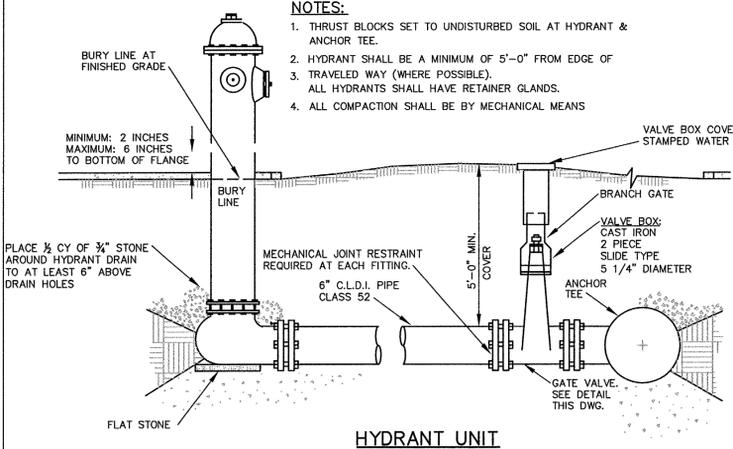
Rev.	Date	Description

Rev.	Date	Description

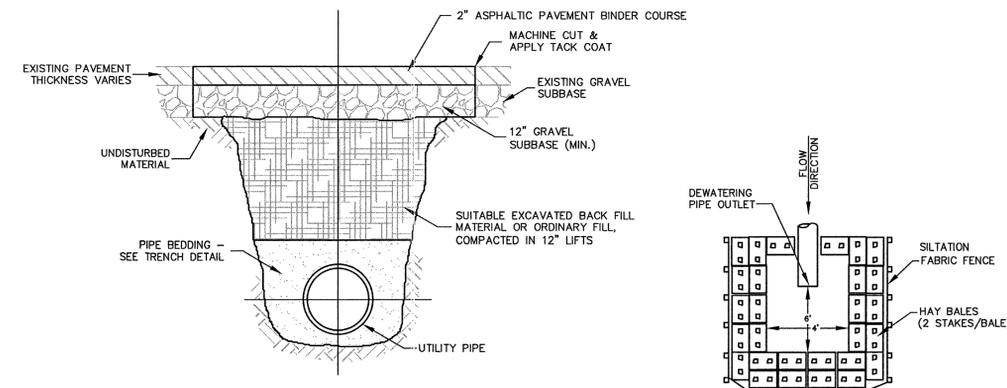


NOTES:

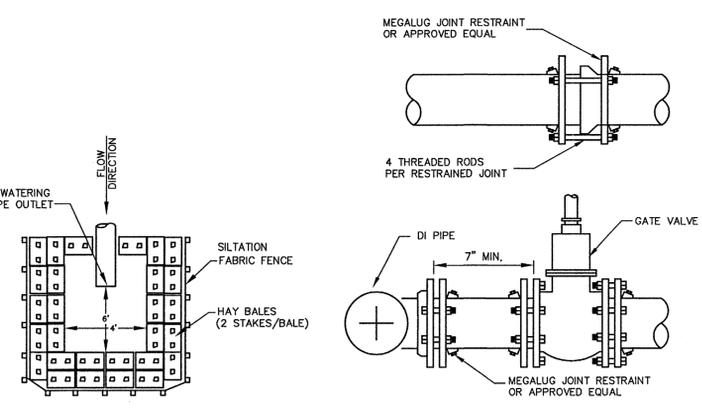
1. THRUST BLOCKS SET TO UNDISTURBED SOIL AT HYDRANT & ANCHOR TEE.
2. HYDRANT SHALL BE A MINIMUM OF 5'-0" FROM EDGE OF TRAVELED WAY (WHERE POSSIBLE).
3. ALL HYDRANTS SHALL HAVE RETAINER GLANDS.
4. ALL COMPACTION SHALL BE BY MECHANICAL MEANS.



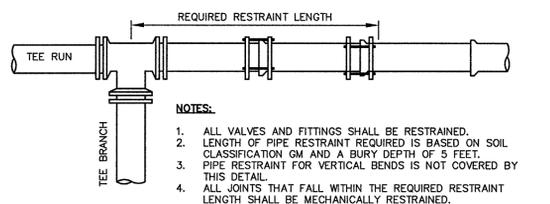
HYDRANT UNIT
SCALE: NONE



TEMPORARY TRENCH PAVEMENT
SCALE: NONE



SEDIMENTATION DISCHARGE CONTROL
SCALE: NONE



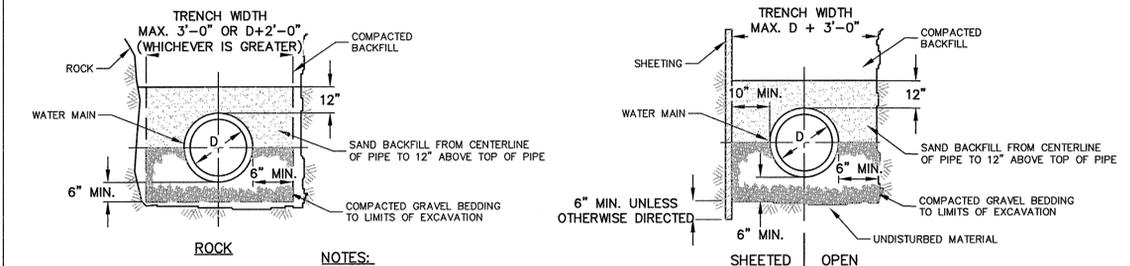
- NOTES:**
1. ALL VALVES AND FITTINGS SHALL BE RESTRAINED.
 2. LENGTH OF PIPE RESTRAINT REQUIRED IS BASED ON SOIL CLASSIFICATION CM AND A BURY DEPTH OF 5 FEET.
 3. PIPE RESTRAINT FOR VERTICAL BENDS IS NOT COVERED BY THIS DETAIL.
 4. ALL JOINTS THAT FALL WITHIN THE REQUIRED RESTRAINT LENGTH SHALL BE MECHANICALLY RESTRAINED.

PIPE SIZE (IN)	MINIMUM LENGTH OF PIPE TO BE RESTRAINED (IN FEET)				
	1/4 BEND (90°)	1/8 BEND (45°)	1/16 BEND (22°)	PLUG/CAP	TEE*
6"	12	5	3	21	18
8"	16	7	4	28	24
12"	22	10	5	40	37
16"	29	12	6	51	48
24"	40	17	8	73	71

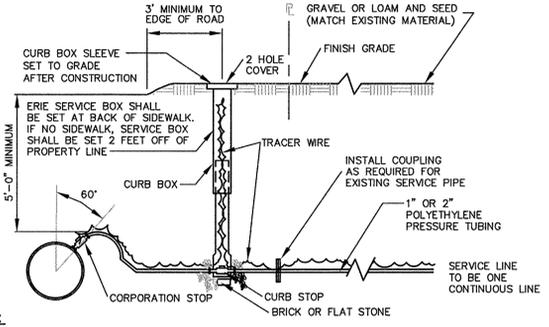
MECHANICAL JOINT RESTRAINT
SCALE: NONE

PIPE SIZE (IN)	MINIMUM BEARING FACE AREA (SQ. FT.)			
	1/4 BEND (90°)	1/8 BEND (45°)	1/16 BEND (22°)	PLUG/ TEE
6"	6.0	3.0	2.5	4.5
8"	9.0	5.0	2.5	6.5
12"	13.3	6.7	3.7	9.6
16"	24.0	11.8	3.7	17.0
24"	35.0	16.0	10.0	25.0

- NOTES:**
1. CONCRETE SHALL BE 3,000 PSI MINIMUM AT 28 DAYS.
 2. THRUST BLOCKS SHALL BE PLACED AGAINST UNDISTURBED MATERIAL WHENEVER POSSIBLE.
 3. ALL FITTINGS SHALL BE SUPPORTED IN CONCRETE.
 4. FOR FIRE HYDRANT THRUSTING SEE HYDRANT DETAIL.
 5. SEE VERTICAL BEND DETAIL FOR RESTRAINED PIPE REQUIREMENTS FOR VERTICAL BENDS.
 6. POURED CONCRETE NOT TO COME WITHIN 6" OF MECHANICAL JOINTS.
 7. BEARING FACE AREA CALCULATED ASSUMING 250 PSI AND 1.5 TON/S.F. ALLOWABLE SOIL BEARING CAPACITY.

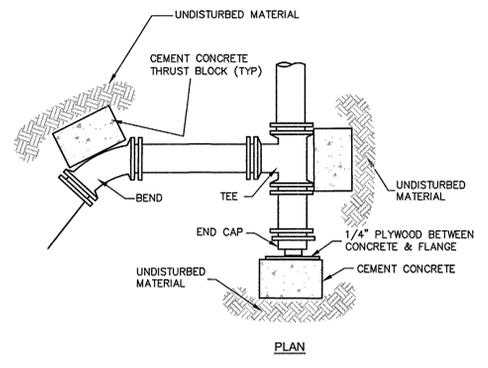


TYPICAL WATER MAIN TRENCH SECTIONS
SCALE: NONE

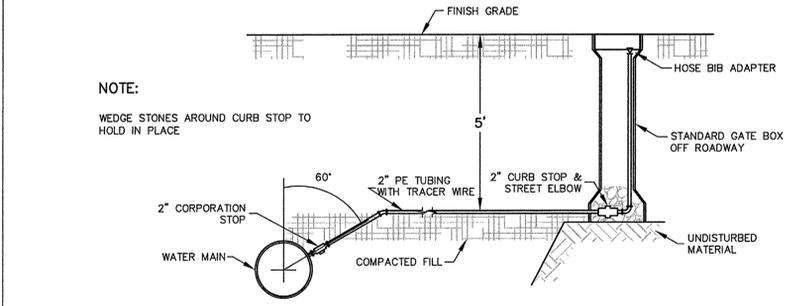


- NOTES:**
1. SADDLES REQUIRED FOR TAPS GREATER THAN 1-INCH IN 8-INCH MAINS OR LARGER.
 2. TRACER WIRE SHALL BE INSTALLED IN ACCORDANCE WITH SPECIFICATIONS SECTION 02860.

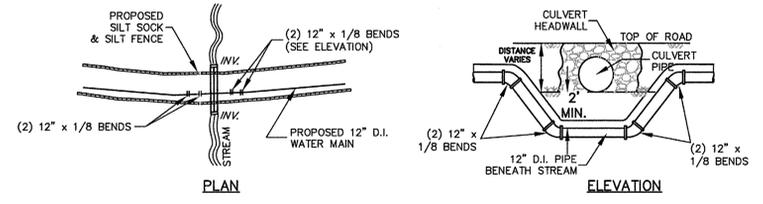
TYPICAL HOUSE SERVICE CONNECTION
SCALE: NONE



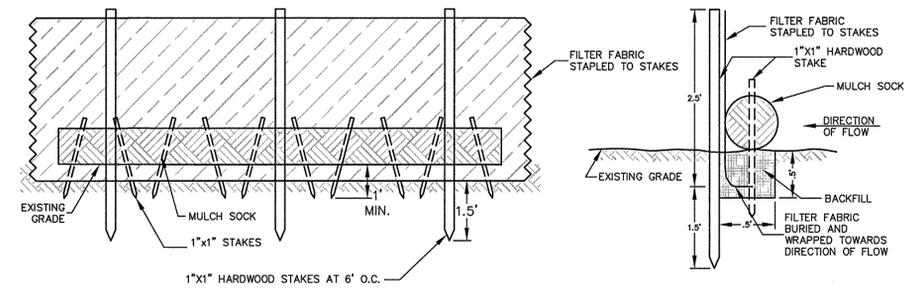
CONCRETE BACKING
SCALE: NONE



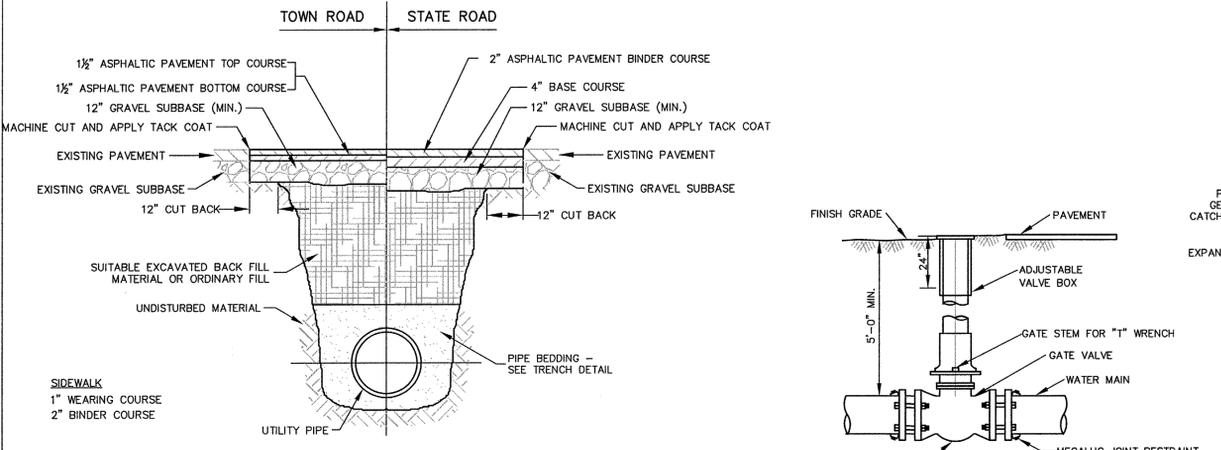
2" BLOW OFF
SCALE: NONE



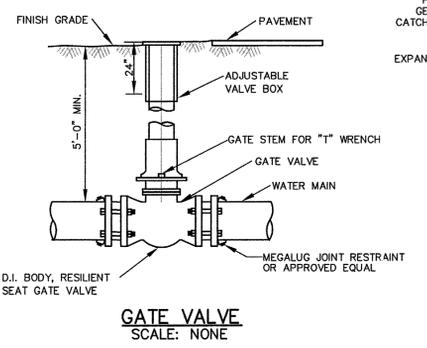
CULVERT CROSSING (TYP.)
SCALE: NONE



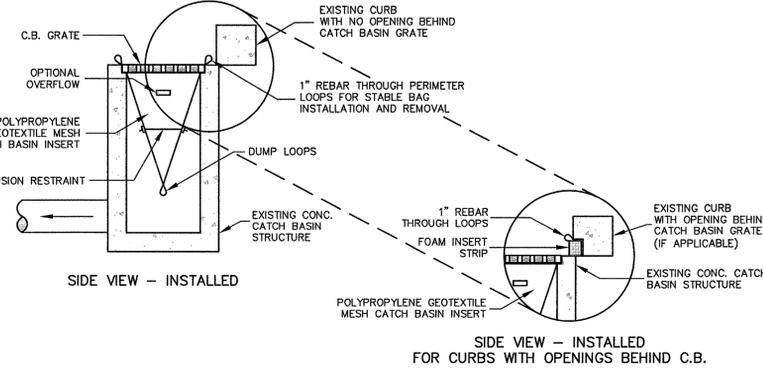
SILT FENCE/MULCH SOCK EROSION CONTROL
SCALE: NONE



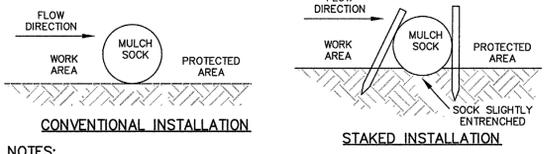
PERMANENT TRENCH PAVEMENT
SCALE: NONE



GATE VALVE
SCALE: NONE



CATCH BASIN SILTATION CONTROL INSERT
SCALE: NONE



- NOTES:**
1. MULCH SOCK INSTALLED IN VEGETATED AREAS AND IN AREAS WITH MINIMAL SLOPES AND A LOW RISK OF RUNOFF SHALL BE CONVENTIONAL INSTALLATION.
 2. SOCKS INSTALLED IN AREAS WITH A MODERATE RISK OF RUNOFF AND MODERATE SLOPES SHALL BE INSTALLED WITH A SLIGHT ENTRENCHMENT WITH NO STAKING.
 3. SOCKS INSTALLED IN AREAS WITH A HIGH RISK OF RUNOFF OR STEEP SLOPES SHALL BE INSTALLED WITH ENTRENCHMENT AND STAKING.
 4. FINAL INSTALLATION TECHNIQUES SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND AS DIRECTED BY THE ENGINEER.

MULCH SOCK
SCALE: NONE

GENERAL NOTES:

- DESIGN:** IN ACCORDANCE WITH THE LATEST AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS BRIDGE DESIGN SPECIFICATIONS WITH CURRENT INTERIM SPECIFICATIONS AND THE 2013 LRFD BRIDGE MANUAL.
- SCALES:** SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZE PRINTS. DIVIDE SCALES BY 2 FOR HALF-SIZE PRINTS (A3).
- FOR ADDITIONAL INFORMATION, REFER TO EXISTING BRIDGE PLANS DATED SEPTEMBER 1, 1914 FOR BRIDGE NO. U-02-022 LOCATED IN APPENDIX H OF THE SPECIFICATIONS.
- DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURE SHOWN ON THESE PLANS ARE TAKEN FROM THE ORIGINAL DESIGN DRAWINGS AND FIELD OBSERVATIONS AND ARE NOT GUARANTEED. THE CONTRACTOR IS REQUIRED TO EXAMINE THE DRAWINGS AND SPECIFICATIONS, AND TO VISIT THE SITE TO FULLY GET INFORMED ABOUT THE EXISTING CONDITIONS AND LIMITATIONS PRIOR TO AGREEING TO PERFORM THE WORK. FAILURE TO DO THIS WILL IN NO WAY RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY OF FURNISHING ANY MATERIALS OR PERFORMING ANY WORK IN ACCORDANCE WITH THESE DRAWINGS AND SPECIFICATIONS. ALL ELEVATIONS, DIMENSIONS AND CONDITIONS OF THE STRUCTURE SHOWN SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO FABRICATION OR CONSTRUCTION.

THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY DISCREPANCIES BETWEEN INFORMATION SHOWN ON THE PLANS AND ACTUAL FIELD CONDITIONS. THE CONTRACTOR MAY BE REQUIRED TO DOCUMENT EXISTING CONDITIONS IN SKETCHES OR OTHER METHODS AS DIRECTED BY THE ENGINEER
- ALL STRUCTURAL STEEL FOR UTILITY SUPPORTS SHALL CONFORM TO AASHTO M 270 GRADE 36. ALL STRUCTURAL STEEL AND FASTENERS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 111 AND M 232.
- ALL TREATED TIMBER FOR UTILITY SUPPORTS SHALL CONFORM TO AASHTO M133. THE PROPERTIES OF THE TIMBER SELECTED FOR PRESERVATIVE TREATMENT SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M168, STRUCTURAL TIMBER, LUMBER, AND PILING.
- ADHESIVE USED FOR ANCHOR BOLTS AT BR. NO. U-02-022 SHALL BE ANY OF THOSE LISTED ON MASSDOT'S QUALIFIED CONSTRUCTION MATERIALS LIST FOR ADHESIVE ANCHORS AS FOUND ON MASSDOT'S WEBSITE.
- THE CONTRACTOR SHALL TAKE THE PROPER PRECAUTIONS TO INSURE THE STABILITY AND SAFE PERFORMANCE OF ALL STRUCTURAL ELEMENTS DURING DEMOLITION AND CONSTRUCTION.
- DURING CONSTRUCTION, THE CONTRACTOR SHALL LOCATE AND PROTECT FROM DAMAGE ALL EXISTING UTILITIES THAT ARE TO REMAIN.

ESTIMATED BRIDGE QUANTITIES (NOT GUARANTEED)	
ITEM DESCRIPTION	BRIDGE NO. U-02-022
UNCLASSIFIED EXCAVATION	-
SELECTIVE DEMOLITION	-
TEMPORARY SHIELDING SYSTEM	1 LS
STRUCTURAL STEEL	500 LB
12" DUCTILE IRON WATER PIPE	36 FT
12" WATER PIPE INSULATION	36 FT
GRAVEL BORROW	-
CONCRETE REPAIRS	80 SF
STEEL REINFORCEMENT FOR STRUCTURES	100 LB
CONCRETE PENETRANT / SEALER	80 SF
DRILLED AND GROUTED 3/4" DOWELS	16 EA

CONCRETE MIX:
4,000 PSI, 3/8", 660 CEMENT CONCRETE.....DEEP PATCH REPAIR

CONCRETE REPAIR NOTES:

- CONTRACTOR SHALL ESTABLISH LIMITS OF REPAIRS AT THE DIRECTION OF THE ENGINEER. THE EXTENT, LOCATION, AND REPAIR TYPE ARE TO BE FIELD VERIFIED AND APPROVED BY THE ENGINEER AFTER THE CONTRACTOR HAS SOUNDED AND MARKED OUT THE REPAIR AREA. REPAIR CONFIGURATIONS SHOULD BE KEPT AS SIMPLE AS POSSIBLE, PREFERABLY WITH SQUARE CORNERS.
- SAW CUT ALONG NEAT LINES AROUND REPAIR AREA PRIOR TO CONCRETE EXCAVATION. USE SAW CUT DEPTH OF 1", OR AS REQUIRED TO AVOID CUTTING REINFORCING STEEL.
- CONCRETE REPAIR SHOULD INCLUDE THE REMOVAL OF ALL DETERIORATED, LOOSE, SPALLED, AND HOLLOW SOUNDING CONCRETE. THE DETERIORATED CONCRETE SHALL BE REMOVED FROM WITHIN THE REPAIR AREAS TO THE DEPTH OF SOUND CONCRETE. WHEN THE REINFORCING STEEL IS UNCOVERED, CARE SHALL BE TAKEN SO AS NOT TO DAMAGE THE STEEL OR ITS BOND TO THE SURROUNDING CONCRETE. MAXIMUM 25 LB. HAMMERS WITH CHISEL POINTS SHALL BE USED FOR CONCRETE REMOVAL. MAXIMUM 15 LB. HAMMERS SHALL BE USED ONCE REINFORCING STEEL IS EXPOSED.
- IF REINFORCING STEEL IS EXPOSED THEN CLEAN BY MECHANICAL CLEANING AND THEN HIGH PRESSURE WASHING WITH WATER THAT CONTAINS NO DETERGENTS OR BOND INHIBITING CHEMICALS. WHERE ACTIVE CORROSION HAS OCCURRED THAT WOULD INHIBIT BONDING, SANDBLAST STEEL TO WHITE METAL FINISH. PROVIDE SHIELDING AS NECESSARY TO PROTECT THE BROOK AT ALL TIMES FROM CONSTRUCTION ACTIVITIES. REFER TO ORDER OF CONDITIONS ISSUED BY THE UXBRIDGE CONSERVATION COMMISSION FOR REQUIREMENTS.
- AFTER CONCRETE REMOVAL AND EDGE PREPARATIONS ARE COMPLETE, REMOVE BOND INHIBITING MATERIALS (DIRT, GREASE, LOOSELY BONDED AGGREGATE) BY ABRASION BLASTING OF HIGH PRESSURE WATER BLASTING WITH WATER THAT CONTAINS NO DETERGENTS OR BOND INHIBITING CHEMICALS. CHECK THE CONCRETE SURFACES AFTER CLEANING TO INSURE THAT THE SURFACE IS FREE FROM ADDITIONAL LOOSE AGGREGATE OR THAT ADDITIONAL DELAMINATIONS ARE NOT PRESENT.
- EXISTING REINFORCING BARS WHICH ARE BROKEN OR HAVE LOST 25% OR MORE OF THEIR CROSS SECTIONAL AREA, OR AS ORDERED BY THE ENGINEER, SHALL BE REPAIRED BY SPLICING IN NEW REINFORCING BARS OF THE SAME DIAMETER. SEE EXISTING BRIDGE PLANS FOR BAR SIZES. SPLICE LAPS ARE TO BE AT LEAST 30 BAR DIAMETERS. MISSING OR DETERIORATED REINFORCING STEEL SHALL BE REPLACED AS DIRECTED BY THE ENGINEER.
- ALL SURFACES WHERE NEW CONCRETE WILL BE BONDED TO EXISTING CONCRETE SHALL BE PRE-WETTED WITH CLEAN WATER TO SATURATED SURFACE DRY (SSD) CONDITION IMMEDIATELY PRIOR TO THE CONCRETE PLACEMENT.
- IF INDICATED ON THE PLANS OR DIRECTED BY THE ENGINEER, APPLY EPOXY ADHESIVE SUITABLE FOR BONDING FRESH CONCRETE TO HARDENED CONCRETE FOR LOAD BEARING APPLICATIONS TO INTERFACE BETWEEN NEW AND EXISTING CONCRETE. THE EPOXY ADHESIVE SHALL CONFORM TO AASHTO M 235 TYPE V AND SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- IF EPOXY BONDING COMPOUND IS USED, THE FORMS SHALL BE INSTALLED AT LEAST ONCE PRIOR TO APPLICATION OF THE EPOXY BONDING COMPOUND TO INSURE FORMS CAN BE INSTALLED AND FILLED BEFORE THE EPOXY BONDING COMPOUND HARDENS.
- 4000 PSI-3/8"-660 CEMENT CONCRETE SHALL BE USED FOR ALL DEEP PATCH REPAIRS. ALL SHALLOW DEPTH REPAIRS SHALL BE PATCHED WITH CEMENTITIOUS MORTAR.
- ALL CONCRETE SURFACES ONCE CURED SHALL BE RUBBED TO PRODUCE A SMOOTH FINISH TO MATCH EXISTING SURFACES.
- EXPOSED SURFACES OF CONCRETE REPAIR SHALL RECEIVE A CONCRETE PENETRANT/SEALER OR COATING, 30 DAYS AFTER ALL REPAIRS HAVE BEEN MADE.
- SHALLOW DEPTH REPAIRS SHALL BE USED WHEN THE DEPTH OF SOUND CONCRETE IS REACHED LESS THAN 2" FROM THE FACE OF CONCRETE AND REINFORCING STEEL IS NOT ENCOUNTERED.
- DEEP PATCH REPAIRS SHALL BE USED WHEN THE DEPTH OF SOUND CONCRETE IS REACHED MORE THAN 2" FROM THE FACE OF CONCRETE OR REINFORCING STEEL IS ENCOUNTERED. DETERIORATED CONCRETE SHALL BE REMOVED TO A MINIMUM DEPTH OF 1" BEYOND THE LAYER OF REINFORCING.

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

MODIFICATION CONDITION	#4 BARS	#5 BARS
1. NONE	21"	26"
2. 12" OF CONCRETE BELOW BARS	29"	36"
3. COATED BARS, COVER<3db, OR CLEAR SPACING<6db	31"	39"
4. COATED BARS, ALL OTHER CASES	25"	31"
5. CONDITION 2. AND 3.	35"	44"
6. CONDITION 2. AND 4.	34"	43"

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

DRILLED AND GROUTED 3/4" DIAMETER DOWEL NOTES:

- THE EMBEDMENT LENGTH, THE METHOD AND EQUIPMENT USED TO DRILL THE DOWEL HOLES, AND THE DIAMETER OF THE DRILLED HOLE SHALL AT A MINIMUM CONFORM TO THE RECOMMENDATIONS OF THE MANUFACTURER AND BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
- ALL HOLES SHALL BE DRILLED BY MEANS OF A ROTARY IMPACT DRILL. IF REINFORCING STEEL IS ENCOUNTERED, THE ENGINEER SHALL BE CONTACTED IMMEDIATELY TO OBTAIN APPROVAL TO CUT THE REINFORCEMENT. UNLESS THE ENGINEER APPROVES CORING THROUGH THE REINFORCEMENT IN WRITING, THE DRILLED HOLE WILL BE REJECTED AND A NEW HOLE, IN WHICH REINFORCEMENT IS NOT ENCOUNTERED, SHALL BE DRILLED ADJACENT TO THE REJECTED HOLE TO THE EMBEDMENT LENGTH RECOMMENDED BY THE MANUFACTURER.
- THE REMAINDER OF THE DRILLING SHALL BE DONE WITH THE ROTARY IMPACT DRILL. DRILLING WITH A LUBRICANT WILL NOT BE PERMITTED. WATER IS NOT CONSIDERED A LUBRICANT.
- DRILLING METHODS SHALL NOT CAUSE SPALLING, OR OTHER DAMAGE TO CEMENT CONCRETE. CONCRETE SPALLED, OR OTHERWISE DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED IN A MANNER SATISFACTORY TO THE ENGINEER. SUCH REPAIR SHALL BE DONE AT THE EXPENSE OF THE CONTRACTOR.
- HOLES SHALL BE SURFACE DRY AND SHALL HAVE HAD ALL FOREIGN AND LOOSE MATERIAL REMOVED IMMEDIATELY PRIOR TO CHEMICAL ANCHORING MATERIAL PLACEMENT. CHEMICAL ANCHORING MATERIAL SHALL BE MIXED AND PLACED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS, UNLESS MODIFIED HERE, OR ELSEWHERE, IN THE CONTRACT DOCUMENTS.
- THE DOWELS SHALL BE INSERTED FULL DEPTH INTO THE HOLE AND SHALL BE MANIPULATED TO ENSURE COMPLETE COVERAGE BY THE CHEMICAL ANCHORING MATERIAL. IMMEDIATELY AFTER INSERTION OF THE DOWEL OR THREADED ROD INTO THE CHEMICAL ANCHORING MATERIAL, THE DOWELS SHALL BE SUPPORTED AS NECESSARY TO PREVENT MOVEMENT DURING CURING AND SHALL REMAIN UNDISTURBED UNTIL THE CHEMICAL ANCHORING MATERIAL HAS CURED A MINIMUM TIME AS SPECIFIED BY THE MANUFACTURER. ALL EXCESS CHEMICAL ANCHORING MATERIAL SHALL BE STRUCK-OFF FLUSH WITH THE CONCRETE FACE. SHOULD THE CHEMICAL ANCHORING MATERIAL FAIL TO FILL THE HOLE AFTER DOWEL OR THREADED ROD INSERTION, ADDITIONAL CHEMICAL ANCHORING MATERIAL SHALL BE ADDED TO THE HOLE TO ALLOW A FLUSH STRIKE-OFF. THESE PRECAUTIONS SHALL BE DONE IN A MANNER SATISFACTORY TO THE ENGINEER.
- DOWELS THAT ARE IMPROPERLY BONDED, AS DETERMINED BY THE ENGINEER, WILL BE REJECTED. ADJACENT NEW HOLES SHALL BE DRILLED AND NEW DOWELS SHALL BE PLACED AND SECURELY ANCHORED TO THE CONCRETE. ALL WORK NECESSARY TO CORRECT IMPROPERLY ANCHORED DOWELS SHALL BE PERFORMED AT THE CONTRACTOR'S EXPENSE.

TOWN OF UXBRIDGE, MASSACHUSETTS

ROUTE 122 WATER MAIN

STRUCTURAL GENERAL NOTES

TATA & HOWARD

T&H NO: 2886

DATE: MAY 2015

SCALE: AS NOTED

SHEET: 11 OF 16

S-1

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: DSH

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

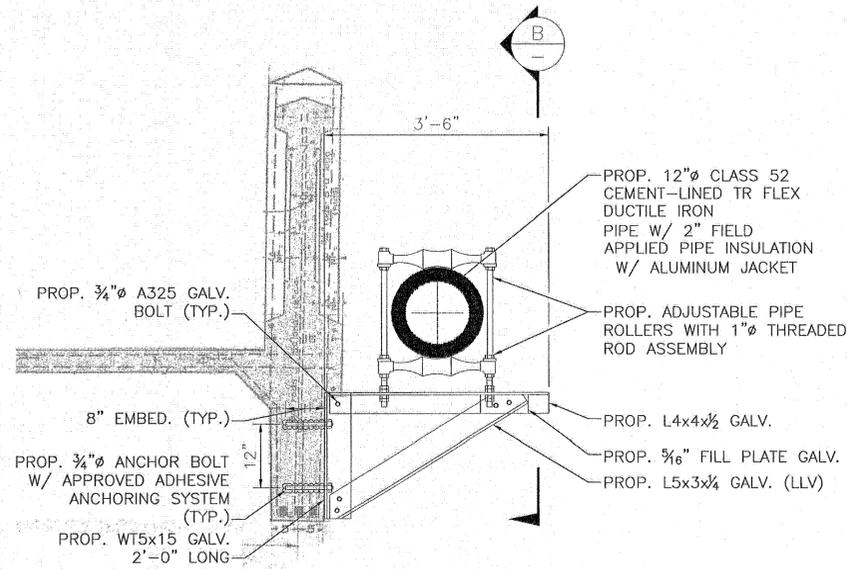
CHECKED BY: JPT

APPROVED BY: JPT

DESIGNED BY: JPT

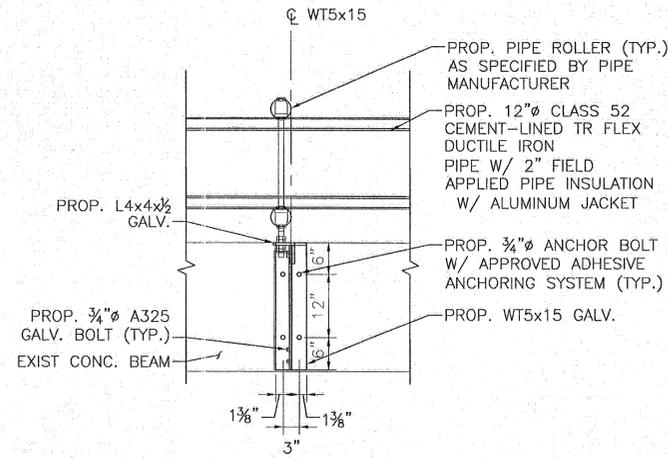
CHECKED BY: JPT

APPROVED BY: JPT

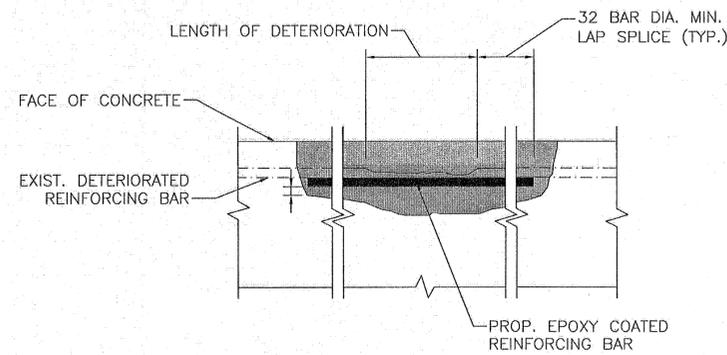


NOTE: BOLTS SHALL BE POSITIONED TO AVOID INTERFERENCE WITH EXISTING REBAR. CONTRACTOR SHALL BE RESPONSIBLE FOR POSITION OF WT BRACKETS CONFIRMING LOCATIONS BY EITHER PERFORMING PILOT HOLES OR NON-DESTRUCTIVE TESTING. REBAR LAYOUT AND SPACING ON EXISTING PLANS MAY BE USED FOR REFERENCE ONLY.

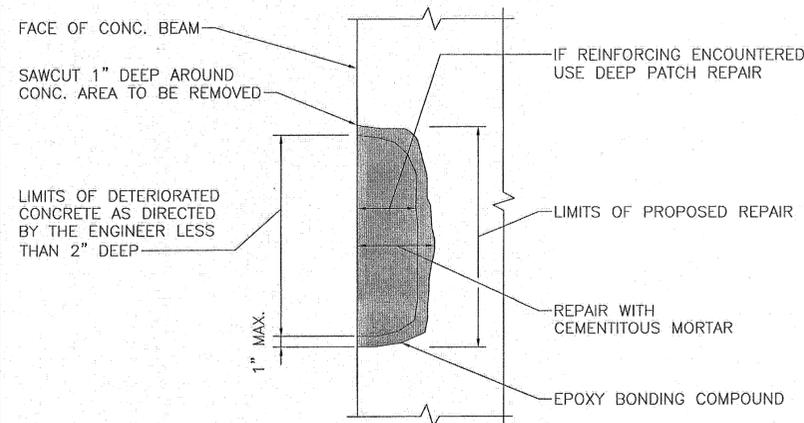
SECTION A
SCALE: 3/4" = 1'-0"



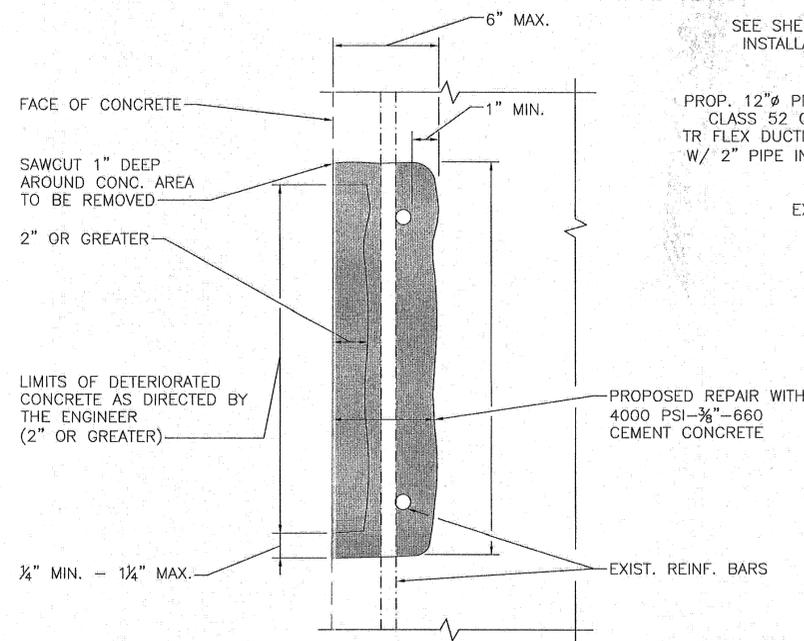
SECTION B
SCALE: 3/4" = 1'-0"



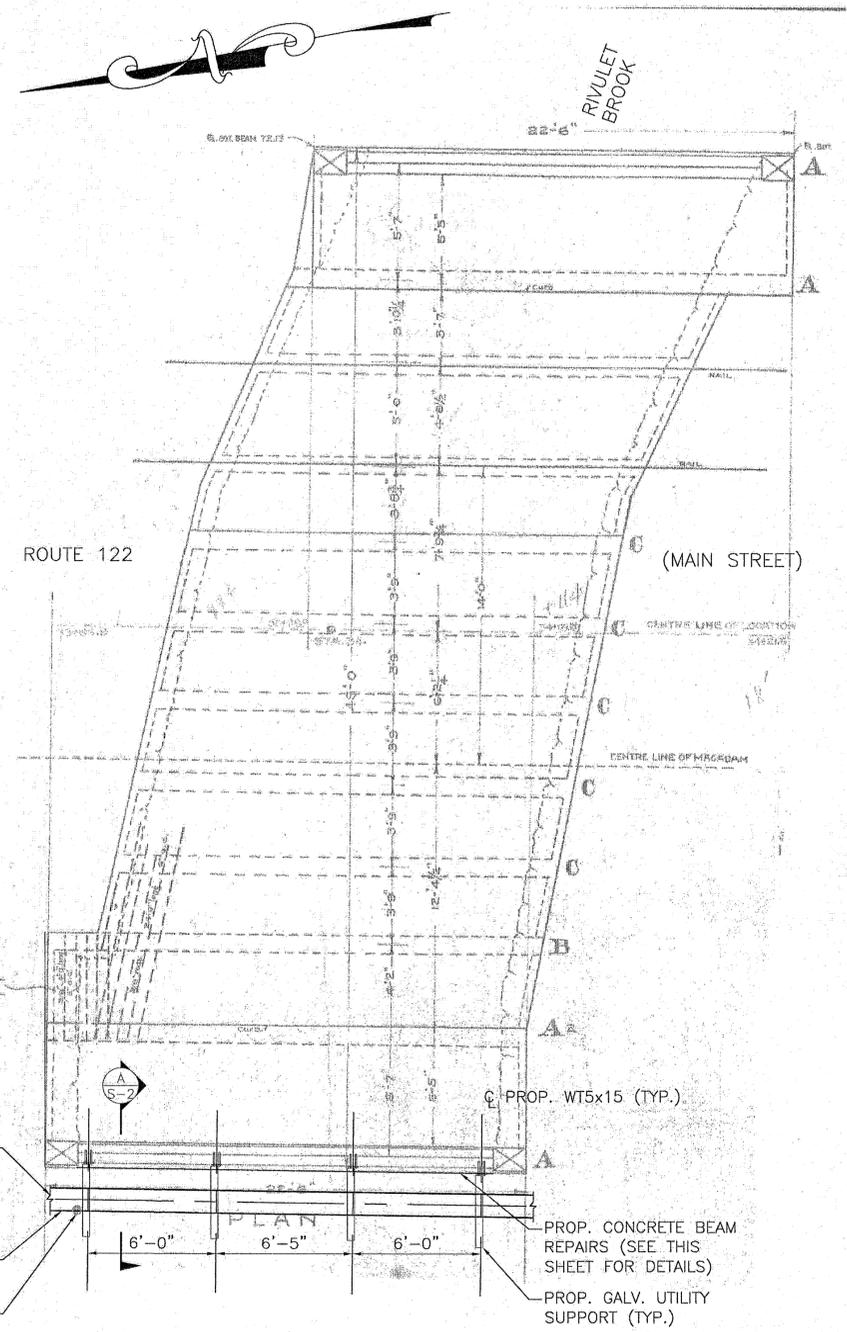
DETERIORATED REINFORCING BAR REPAIR
N.T.S.



SHALLOW DEPTH REPAIR
N.T.S.



DEEP PATCH REPAIR
N.T.S.



BR. NO. U-02-022
UTILITY LAYOUT PLAN

SCALE: 3/4" = 1'-0"

TOWN OF UXBRIDGE,
MASSACHUSETTS

ROUTE 122 WATER MAIN

BR. NO. U-02-022
UTILITY LAYOUT PLAN

65 Glenn Street
Lawrence, MA 01843
t: (978) 794-1792
TheEngineeringCorp.com

JODY TRAFFIO
STRUCTURAL
ENGINEER
REGISTERED PROFESSIONAL ENGINEER

T&H
TATA & HOWARD

T&H No.: 2896
DATE: MAY 2015
SCALE: AS NOTED
SHEET: 12 OF 16

S-2

SUGGESTED WORK ZONE WARNING SIGN SPACING

Road Type	Distance Between Signs**		
	A	B	C
LOCAL OR LOW VOLUME ROADWAYS*	350 (100)	350 (100)	350 (100)
MOST OTHER ROADWAYS*	500 (150)	500 (150)	500 (150)
FREEWAYS AND EXPRESSWAYS*	1,000 (300)	1,500 (450)	2,640 (800)

* SPEED CATEGORY TO BE DETERMINED BY HIGHWAY AGENCY

** DISTANCES ARE SHOWN IN FEET (METERS). THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TWP SETUPS. IT IS THE ONE WHICH MAY OFTEN HAVE THE "STANDARD RED OR RED-ORANGE FLAGS (18 in. X 18 in.)" MOUNTED ON IT. THESE ADVANCE WARNING SIGNS ARE LOCATED AT THE PROJECT LIMITS ON ALL APPROACHES (I.E. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT. ADDITIONAL SIGNS (I.E. "RIGHT LANE CLOSED 1 MILE" AND "LEFT LANE CLOSED 1 MILE") HAVE BEEN SHOWN IN SOME FIGURES AS EXAMPLES OF REINFORCEMENT SIGN PLACEMENT BUT ARE USED IN RARE OCCASIONS.

THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

R2-10a SIGNS SHALL BE PLACED BETWEEN THE SECOND AND THIRD SIGNS AS DESCRIBED ABOVE.

R2-10a AND W20-1 SERIES SIGNS ARE TO BE INCLUDED ON ALL DETAILS/TYPICAL SETUPS.

Based on: Table 6C-1 2003 MUTCD

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED* (km/h)	DISTANCE (m)	SPEED* (mph)	DISTANCE (ft)
30	35	20	115
40	50	25	155
50	65	30	200
60	85	35	250
70	105	40	305
80	130	45	360
90	160	50	425
100	185	55	495
110	220	60	570
120	250	65	645
		70	730
		75	820

*POSTED SPEED, OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

THESE VALUES MAY BE USED TO DETERMINE THE LENGTH OF LONGITUDINAL BUFFER SPACES.

THE DISTANCES IN THE ABOVE CHART REPRESENT THE MINIMAL VALUES FOR BUFFER SPACING.

Source: Table 6C-2 2003 MUTCD



Notes for Traffic Management

FIGURE Gen-2

NOTES ON WORK ZONE DISTANCES

CONVENTIONAL ROADWAY - A STREET OR HIGHWAY OTHER THAN A LOW-VOLUME ROAD, EXPRESSWAY, OR FREEWAY.

EXPRESSWAY - A DIVIDED HIGHWAY WITH PARTIAL CONTROL OF ACCESS.

FREEWAY - A DIVIDED HIGHWAY WITH FULL CONTROL OF ACCESS.

LOW-VOLUME ROAD - A FACILITY LYING OUTSIDE OF BUILT-UP AREAS OF CITIES, TOWNS, AND COMMUNITIES, AND IT SHALL HAVE A TRAFFIC VOLUME OF LESS THAN 400 ADT. IT SHALL NOT BE A FREEWAY, EXPRESSWAY, INTERCHANGE RAMP, FREEWAY SERVICE ROAD, OR A ROAD ON A DESIGNATED STATE HIGHWAY SYSTEM.

Source: 2003 MUTCD

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

Type of Taper	Taper Length (L)*
MERGING TAPER	AT LEAST L
SHIFTING TAPER	AT LEAST 0.5L
SHOULDER TAPER	AT LEAST 0.35L
ONE-LANE, TWO-WAY TRAFFIC TAPER	100 FT (30 m) MAXIMUM
DOWNSTREAM TAPER	100 FT (30 m) PER LANE

Source: Table 6C-3 2003 MUTCD

FORMULAS FOR DETERMINING TAPER LENGTHS

Speed Limit (S)	Taper Length (L) Feet	Speed Limit (S)	Taper Length (L) Meters
40 MPH OR LESS	$L = WS^2$	60 KM/H OR LESS	$L = WS^2$
45 MPH OR MORE	$L = WS$	70 KM/H OR MORE	$L = WS$

WHERE: L = TAPER LENGTH IN FEET (METERS)

W = WIDTH OF OFFSET IN FEET (METERS)

S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH (KM/H)

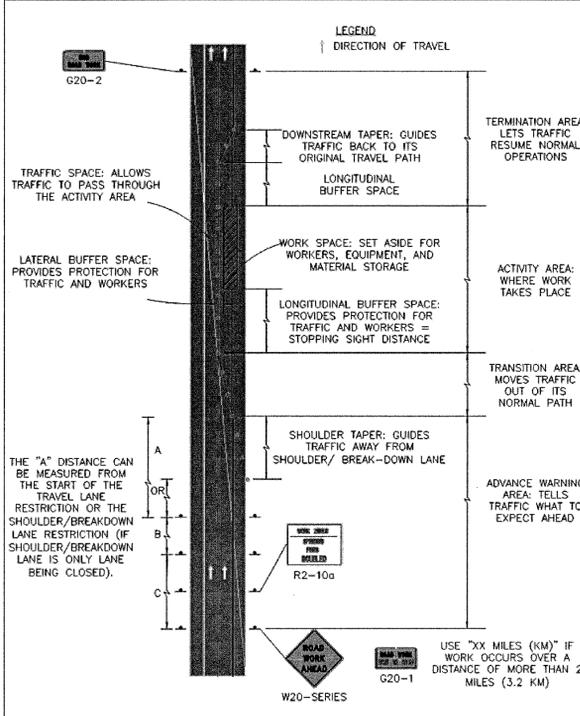
Source: Table 6C-4 2003 MUTCD



Notes for Traffic Management

FIGURE Gen-3

NOTES ON WORK ZONE DISTANCES



LEGEND

DIRECTION OF TRAVEL

TRAFFIC SPACE: ALLOWS TRAFFIC TO PASS THROUGH THE ACTIVITY AREA

LATERAL BUFFER SPACE: PROVIDES PROTECTION FOR TRAFFIC AND WORKERS

WORK SPACE: SET ASIDE FOR WORKERS, EQUIPMENT, AND MATERIAL STORAGE

LONGITUDINAL BUFFER SPACE: PROVIDES PROTECTION FOR TRAFFIC AND WORKERS = STOPPING SIGHT DISTANCE

SHOULDER TAPER: GUIDES TRAFFIC AWAY FROM SHOULDER/ BREAK-DOWN LANE

ADVANCE WARNING AREA: TELLS TRAFFIC WHAT TO EXPECT AHEAD

TERMINATION AREA: LETS TRAFFIC RESUME NORMAL OPERATIONS

ACTIVITY AREA: WHERE WORK TAKES PLACE

TRANSITION AREA: MOVES TRAFFIC OUT OF ITS NORMAL PATH

THE "A" DISTANCE CAN BE MEASURED FROM THE START OF THE TRAVEL LANE RESTRICTION OR THE SHOULDER/BREAKDOWN LANE RESTRICTION (IF SHOULDER/BREAKDOWN LANE IS ONLY LANE BEING CLOSED).

USE "X" MILES (KM) IF WORK OCCURS OVER A DISTANCE OF MORE THAN 2 MILES (3.2 KM)

W20-SERIES



Standard Details and Drawings for the Development of Traffic Management Plans

FIGURE Gen-4

COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL (TTC) ZONE

NOT TO SCALE

NOTES:

- ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
- ALL SIGN LEGENDS, BORDERS AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
- TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
- 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.
- SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES."
- CONTRACTORS SHALL NOTIFY EACH ADJUTANT 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.
- THE FIRST THREE PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.
- THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
- DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
- MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
- 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.
- ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.

LEGEND:

REFLECTORIZED PLASTIC DRUM	WORK ZONE	WORK VEHICLE
P/F POLICE/FLAGGER DETAIL	DIRECTION OF TRAFFIC	MOVABLE IMPACT ATTENUATOR
TYPE II BARRICADE	IMPACT ATTENUATOR	TRAFFIC OR PEDESTRIAN SIGNAL
CHANGEABLE MESSAGE SIGN	MEDIAN BARRIER	SIGN
FLASHING ARROW PANEL	MEDIAN BARRIER WITH WARNING LIGHTS	

THE REAL CAPACITY OF A MAJOR HIGHWAY IS GENERALLY CONSIDERED TO BE 1900 PASSENGER CARS PER HOUR PER LANE (PCPHPL). IN WORK ZONES ON A MULTI-LANE DIVIDED HIGHWAY, THE FOLLOWING VOLUME GUIDELINES HAVE BEEN SUGGESTED:

MEASURED AVERAGE WORK ZONE CAPACITIES

Number of Lanes	Number of Studies	Average Capacity	
		VPH	VPH/PL
3	1	1,170	1,170
2	8	1,340	1,340
5	8	2,740	1,370
4	4	2,960	1,480
3	9	2,980	1,490
4	4	4,560	1,520

Source: Prof. C. Nelson, et al., *Work Zone Capacity and Level of Service*, Texas Transportation Institute, Texas A&M University, College Station, Texas (1984)

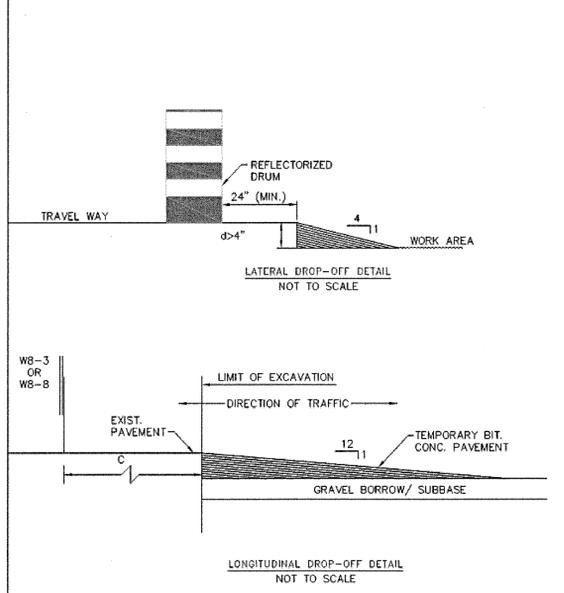
BY OBTAINING HOURLY TRAFFIC COUNTS FOR A PARTICULAR ROADWAY (WITH A MINIMUM OF A 48-HOUR AUTOMATIC TRAFFIC RECORDER (ATR) COUNT), THIS WILL HELP TO DETERMINE AT WHAT TIMES OF THE DAY OR NIGHT A CERTAIN NUMBER OF LANES MAY BE CLOSED.



Standard Details and Drawings for the Development of Traffic Management Plans

FIGURE Gen-1

GENERAL GUIDELINES





Standard Details and Drawings for the Development of Traffic Management Plans

FIGURE Gen-6

LATERAL AND LONGITUDINAL DROP-OFF DETAILS

NOT TO SCALE

TOWN OF UXBRIDGE,
MASSACHUSETTS

ROUTE 122 WATER MAIN

TRAFFIC MANAGEMENT
PLAN - SHEET 1

Approved By: RBH
Checked By: MRC
Designed By: SHD/CAS
Drawn By: CAS

THIS DOCUMENT IS THE PROPERTY OF TATA & HOWARD, INC. AND ITS CLIENT. REPRODUCTION OR MODIFICATION WITHOUT WRITTEN CONSENT IS PROHIBITED.

Description	Date	Rev.

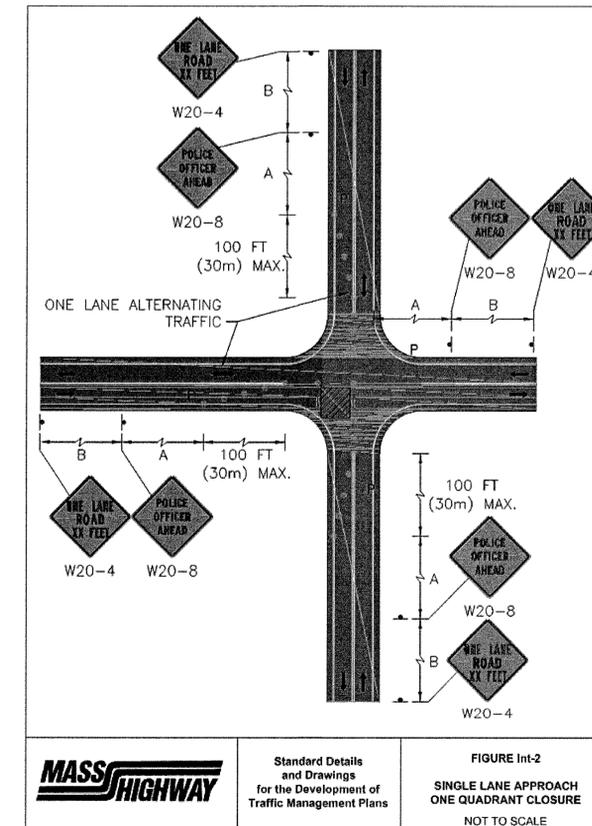
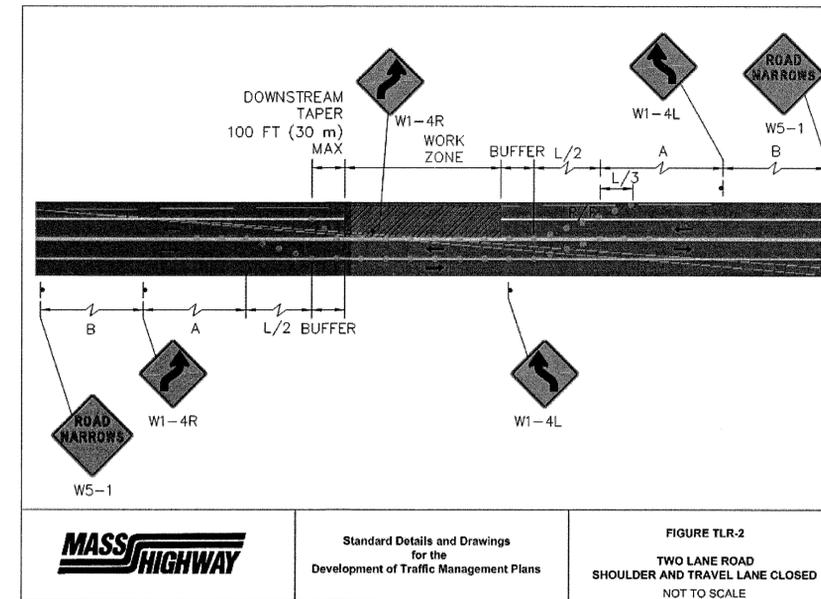
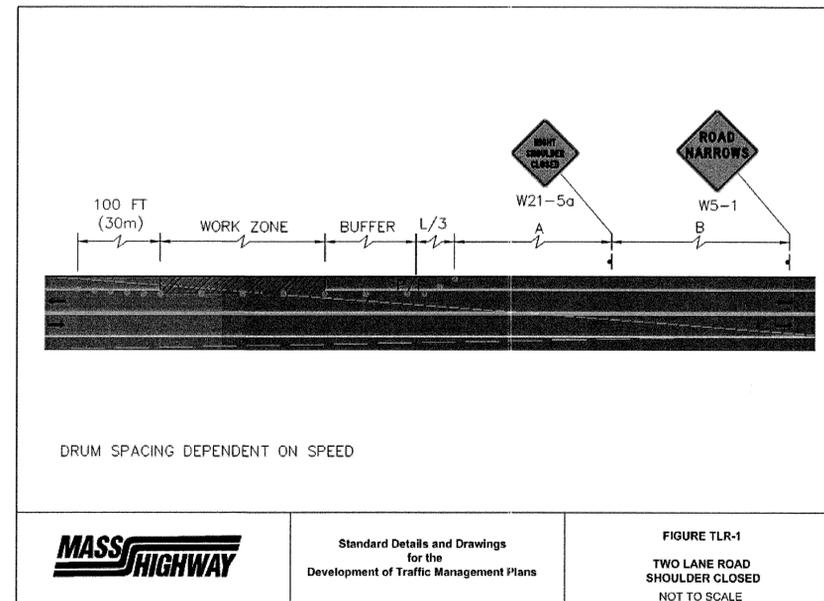
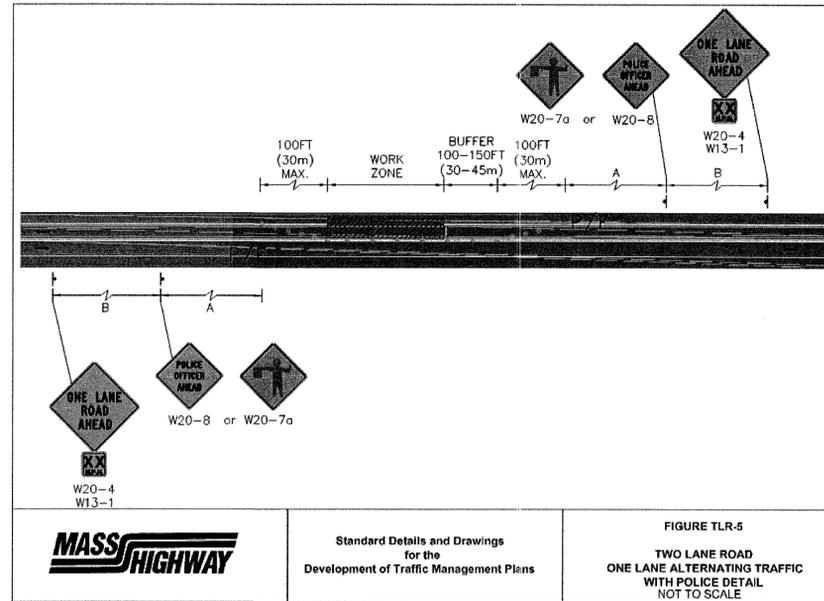


TATA & HOWARD

5-7-15

T&H NO.: 2886
DATE: MAY 2015
SCALE:
SHEET: 13 OF 14

TR-1



Rev.	Date	Description

