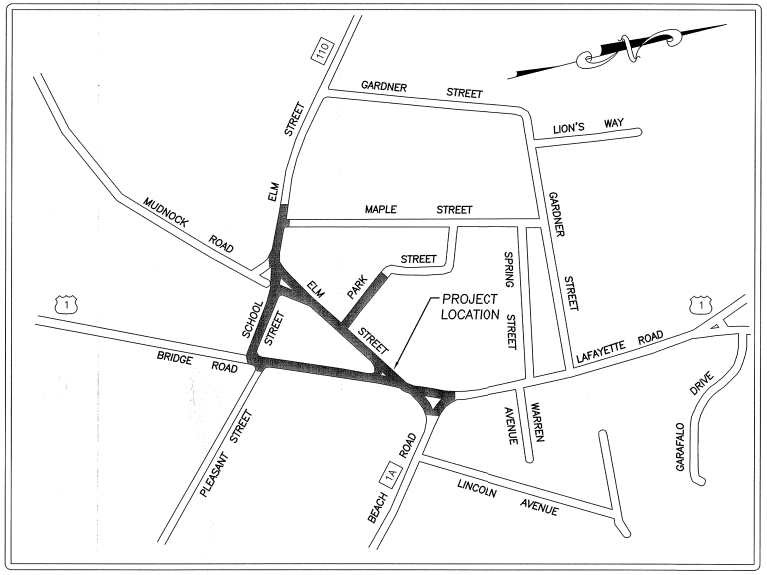
SALISBURY SQUARE
WATER SYSTEM IMPROVEMENTS PROJECT

SALISBURY SQUARE
SALISBURY, MA

SEPTEMBER 2012

INDEX

SHEET NO.	DESCRIPTION
1	COVER SHEET & INDEX
2	GENERAL NOTES & LEGEND
3–6	SITE PLANS
7–8	WATER DETAIL SHEETS
9	TRAFFIC MANAGEMENT PLAN



LOCUS
1 INCH = 300'

GRAPHIC SCALE
300 0 150 300 600 1200
(IN FEET)
1 INCH = 300'

COMMONWEALTH OF MASSACHUSETTS
ERIC W. BOTTERMAN
CIVIL
No. 31050
PROFESSIONAL ENGINEER

PREPARED FOR

TOWN OF SALISBURY
5 BEACH ROAD
SALISBURY, MA

NO.	DATE	DESCRIPTION	BY

MEI
MILLENNIUM ENGINEERING, INC.
ENGINEERING AND LAND SURVEYING
62 ELM ST. SALISBURY, MA 01952 (978) 463-8980
13 HAMPTON RD. EXETER, NH 03833 (603) 778-0528

SCALE: 1"=300'
DATE: SEPT. 4, 2012
PROJECT: M122410

WATER SYSTEM IMPROVEMENTS PROJECT
AT
SALISBURY SQUARE

COVER SHEET & INDEX

SHEET: 1 OF 9

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GENERAL SYMBOLS

EXISTING	PROPOSED	
□	■CB	CATCH BASIN (OR GUTTER INLET, OR LEACHING BASIN)
	■CBCI (OR GICI)	CATCH BASIN (OR GUTTER INLET) WITH CURB INLET
		CURB (OR BERM) – TYPE NOTED
		EDGE OF ROAD
Ⓔ	Ⓔ	ELECTRIC HANDHOLE (NUMBER AS NOTED)
Ⓔ	Ⓔ	ELECTRIC MANHOLE "
Ⓣ	Ⓣ	TELEPHONE MANHOLE "
Ⓢ	Ⓢ	SEWER MANHOLE "
Ⓓ	Ⓓ	DRAINAGE MANHOLE "
GV	GV	GAS GATE
WV	WV	WATER GATE
○ CS	● CS	CURB STOP
		HYDRANT
☼	☼	STREET LIGHT
		UTILITY POLE
GUY	GUY	GUY POLE
□ MB	■ MB	MAIL BOX
D	D	DRAIN PIPE
S	S	SEWER MAIN
E	E	ELECTRIC DUCT
G	G	GAS MAIN
W	W	WATER MAIN
T	T	TELEPHONE DUCT
		GUARDRAIL
X X	X X	FENCE
		CITY, TOWN, OR COUNTY LAYOUT
		EASEMENT LINE
PL	PL	PROPERTY LINE (APPROX.)
		LIMIT OF GRADING
△ 8 N00°00'00"E +12.34		BASE OR SURVEY LINE
	PC 8 N00°00'00"E +12.34	CONSTRUCTION BASELINE
		TREE (SIZE AND TYPE NOTED)
		COLD PLANING AREA
B-1		BORINGS, PAVEMENT CORES
TP-1		TEST PIT
	SF	SEDIMENTATION FENCE
		STAKED HAYBALES
		WETLAND
120		WETLAND DELINEATION FLAG

GENERAL NOTES

1. LOCATION OF ALL UTILITIES AND SUBSURFACE STRUCTURES ARE FROM SURVEY AND RECORDS OF THE TOWN OR PRIVATE UTILITY COMPANIES AND ARE CONSIDERED APPROXIMATE BOTH AS TO THE SIZE AND LOCATION, AND ARE INDICATED ON THESE DRAWINGS TO GIVE BIDDERS A GENERAL IDEA OF THE EXISTING CONDITIONS TO BE INVESTIGATED. IT IS UNDERSTOOD AND AGREED THAT EACH BIDDER WILL NOT RELY ON THESE DRAWINGS FOR SUCH INFORMATION, BUT THAT EACH BIDDER SHALL MAKE EXAMINATIONS IN THE FIELD BY VARIOUS AVAILABLE RECORDS, UTILITY CORPORATIONS AND INDIVIDUALS AS TO THE LOCATION OF ALL SUBSURFACE STRUCTURES.
2. IN THE EVENT CONSTRUCTION OPERATIONS BY THE CONTRACTOR RESULT IN DAMAGE TO EXISTING FACILITIES, ALL NECESSARY REPAIRS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. NO EXCAVATION SHALL BE LEFT OPEN, UNGUARDED, OR WATER FILLED DURING ANY PERIOD OF TIME WHEN WORK IS NOT IN PROGRESS. ALL TEMPORARY OPEN EXCAVATIONS SHALL BE ADEQUATELY SAFE-GUARDED.
4. ALL MATERIALS REMOVED FROM THE EXCAVATIONS SHALL BE LEGALLY DISPOSED OF BY THE CONTRACTOR.
5. PEDESTRIAN AND VEHICLE ACCESS TO ABUTTING PREMISES MUST BE MAINTAINED, IN A SAFE CONDITION, AT ALL TIMES.
6. AREAS OUTSIDE THE LIMITS OF WORK DISTURBED BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AT THE EXPENSE OF THE CONTRACTOR.
7. LIMITS OF WORK HAVE BEEN SET ON THE PLANS, HOWEVER THESE MAY BE EXTENDED OR REDUCED AT THE DISCRETION OF THE TOWN TO MEET FIELD CONDITIONS.
8. THE CONTRACTOR SHALL FIELD CHECK ALL DIMENSIONS AND ELEVATIONS BEFORE PROCEEDING WITH NEW WORK. THE CONTRACTOR SHALL EXCAVATE TO VERIFY PERTINENT DRAINAGE INVERTS AND POTENTIAL UTILITY CONFLICTS. ANY DISCREPANCIES SHALL BE REPORTED TO THE TOWN IMMEDIATELY.
9. THE CONTRACTOR SHALL COORDINATE AND BE RESPONSIBLE FOR ALL SAFETY SIGNING, BARRIERS AND TEMPORARY PAVEMENT MARKINGS NECESSARY TO PROVIDE A SMOOTH AND PROPER TRANSITION FOR TRAFFIC FLOW.
10. R.O.W. LINES PRESENTED ARE APPROXIMATE ONLY. ACCESS ONTO PRIVATE PROPERTY IS THE RESPONSIBILITY OF THE TOWN. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES OUTSIDE THE RIGHT OF WAY WITH THE TOWN.
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12. ALL EXISTING SURFACES, i.e. CEMENT CONCRETE, BITUMINOUS CONCRETE PAVEMENT, BRICK, ETC. SHALL BE COMPLETELY REMOVED FROM AREAS OF PROPOSED WORK INCLUDING PROPOSED PLANTING AREAS.
13. ALL CEMENT CONCRETE SUBBASE SURFACES SHALL BE TREATED WITH A BITUMEN TACK COAT PRIOR TO THE APPLICATION OF A BITUMINOUS CONCRETE MATERIAL.
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15. ALL TOWN AND STATE OWNED UTILITY STRUCTURES INCLUDING MANHOLES, CATCH BASINS, AND GATE BOXES SHALL BE ADJUSTED OR REMODELED TO FINISH GRADE BY THE CONTRACTOR, AS REQUIRED. ALL PRIVATELY OWNED STRUCTURES SHALL BE ADJUSTED OR REMODELED BY THE OWNER.
16. LOCATIONS OF PROPOSED SIGNS, MAILBOXES, ETC. ARE APPROXIMATE ONLY; THE EXACT LOCATION SHALL BE DETERMINED BY THE TOWN IN THE FIELD.
17. WATER MAINS SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING SEWER MAINS. WHENEVER WATER MAINS MUST CROSS SEWER MAINS THE WATER MAINS SHALL BE LAID SUCH THAT THE TOP ELEVATION OF THE SEWER AND BOTTOM ELEVATION OF THE WATER MAIN SHALL BE SEPARATED BY A MINIMUM OF 18 INCHES.

UTILITIES

F & G	FRAME AND GRATE
F & C	FRAME AND COVER
B & G	BOLTED AND GASKETED
RCP	REINFORCED CONCRETE PIPE
VCP	VITRIFIED CLAY PIPE
PVCP	POLYVINYL CHLORIDE PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
CIP	CAST IRON PIPE
DIP	DUCTILE IRON PIPE
CAP	CORRUGATED ALUMINUM PIPE
CB	CATCH BASIN
MH	MANHOLE
HYD	HYDRANT
INV	INVERT ELEVATION
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TSV & B	TAPPING SLEEVE, VALVE AND BOX
CIT	CHANGE IN TYPE
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GENERAL

PROP	PROPOSED
MIN	MINIMUM
MAX	MAXIMUM
RET	RETAIN
REM	REMOVE
REMOD	REMODEL
ABAN	ABANDON
ADJ	ADJUST
EXIST	EXISTING
R & R	REMOVE AND RESET
R & S	REMOVE AND STACK
ELEV	ELEVATION
ROW	RIGHT OF WAY
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
TYP	TYPICAL
APPROX.	APPROXIMATE
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SURVEY

⊡ C.B.	CONCRETE BOUND
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○ I.P.	IRON PIPE
● I ROD	IRON ROD
FND.	FOUND
N/FND.	NOT FOUND
(0/00)	ASSESSORS MAP AND PARCEL

MASSACHUSETTS COMMONWEALTH OF MASSACHUSETTS ERIC W. BOTTERMAN CIVIL No. 41099 REGISTERED PROFESSIONAL ENGINEER 9-5-12

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SALISBURY SQUARE

GENERAL NOTES & LEGEND

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SALISBURY SQUARE
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SALISBURY SQUARE
SALISBURY, MA

SEPTEMBER 2012

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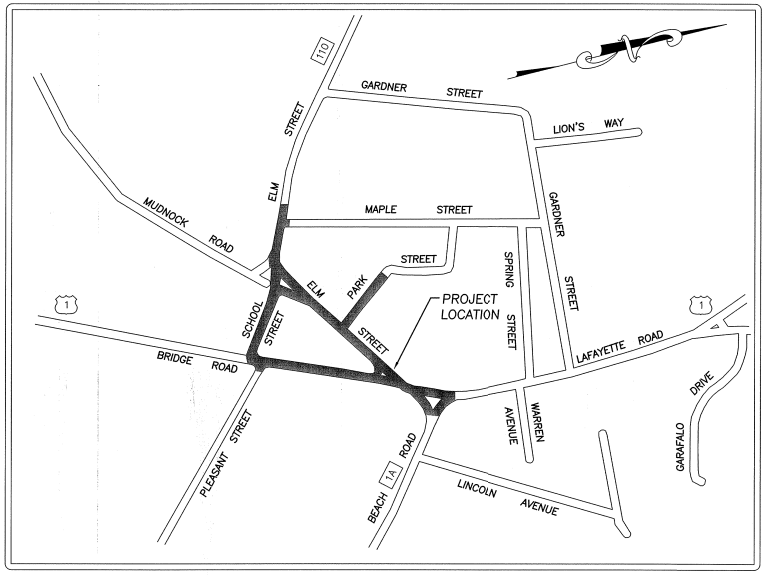

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GENERAL NOTES & LEGEND

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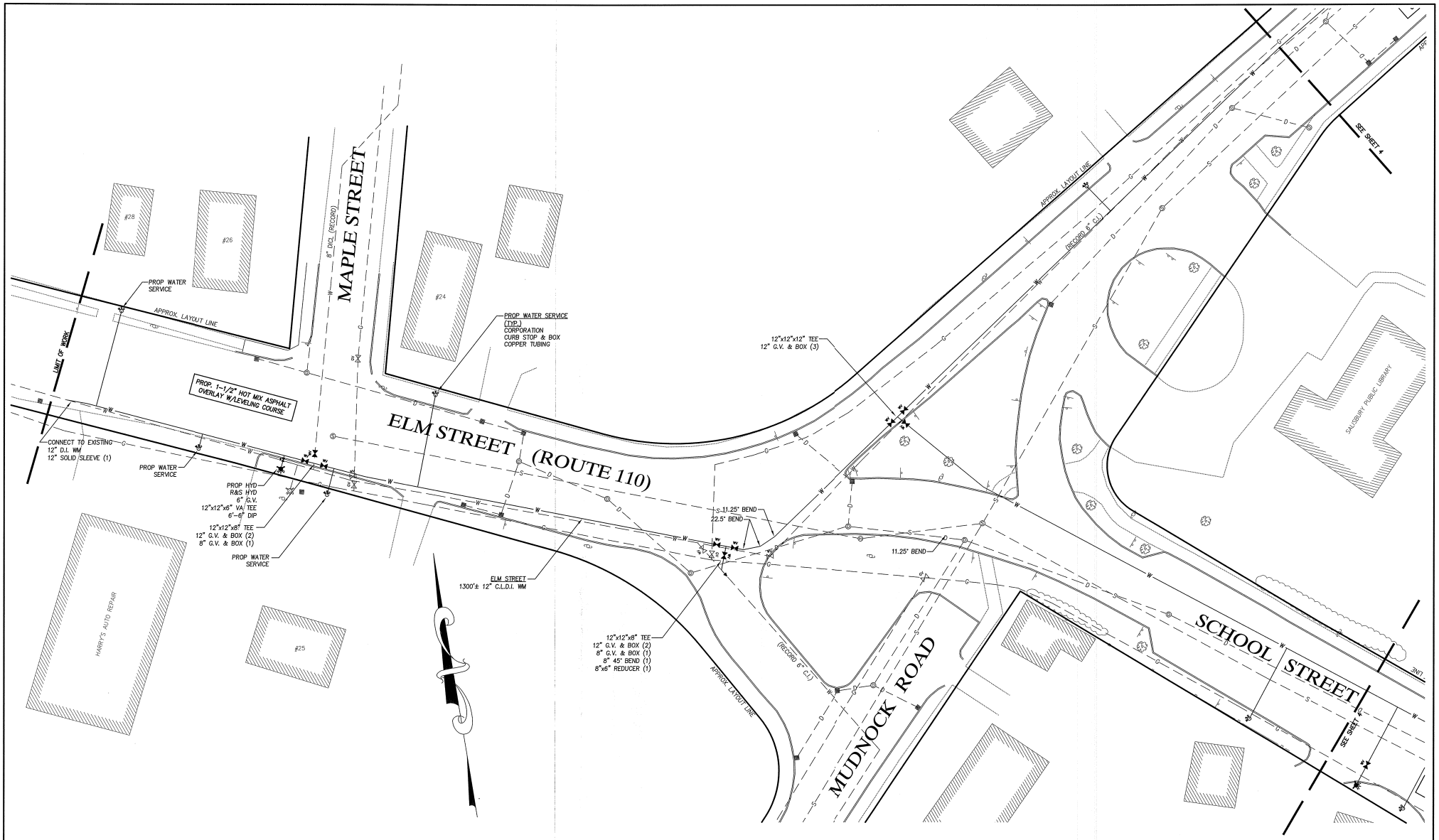

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20'

ERIC W. BOTTERMAN CIVIL No. 41029 REGISTERED PROFESSIONAL ENGINEER

9-4-12

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WATER SYSTEM IMPROVEMENTS PROJECT
AT
SALISBURY SQUARE

SITE PLAN

SHEET: 3 OF 9

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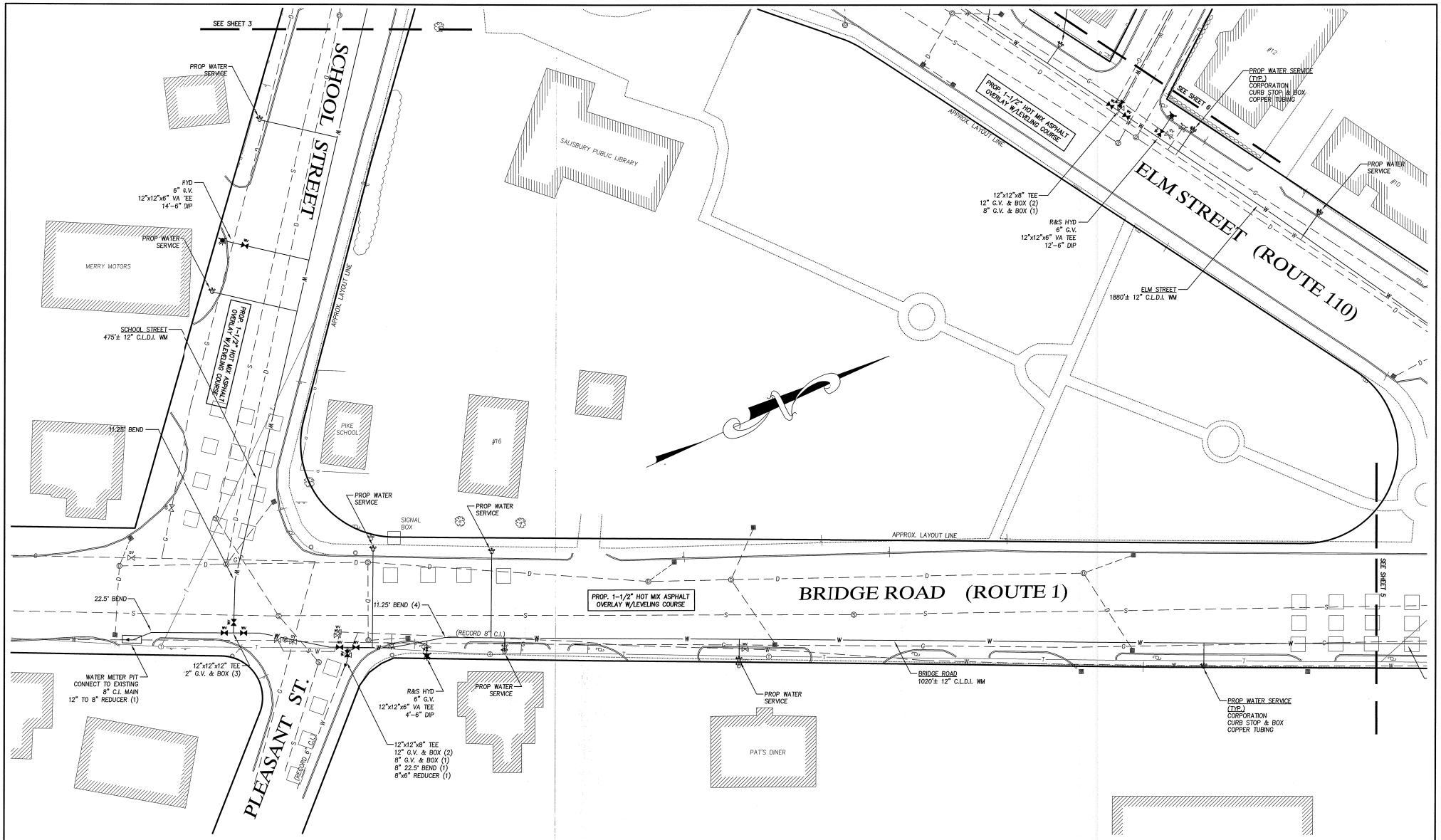

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(IN FEET)
1 inch = 20'

COMMONWEALTH OF MASSACHUSETTS
ERIC W. BOTTERMAN
CIVIL
No. 41082
REGISTERED PROFESSIONAL ENGINEER
9-4-12

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WATER SYSTEM IMPROVEMENTS PROJECT
AT
SALISBURY SQUARE

SITE PLAN

SHEET: 4 OF 9

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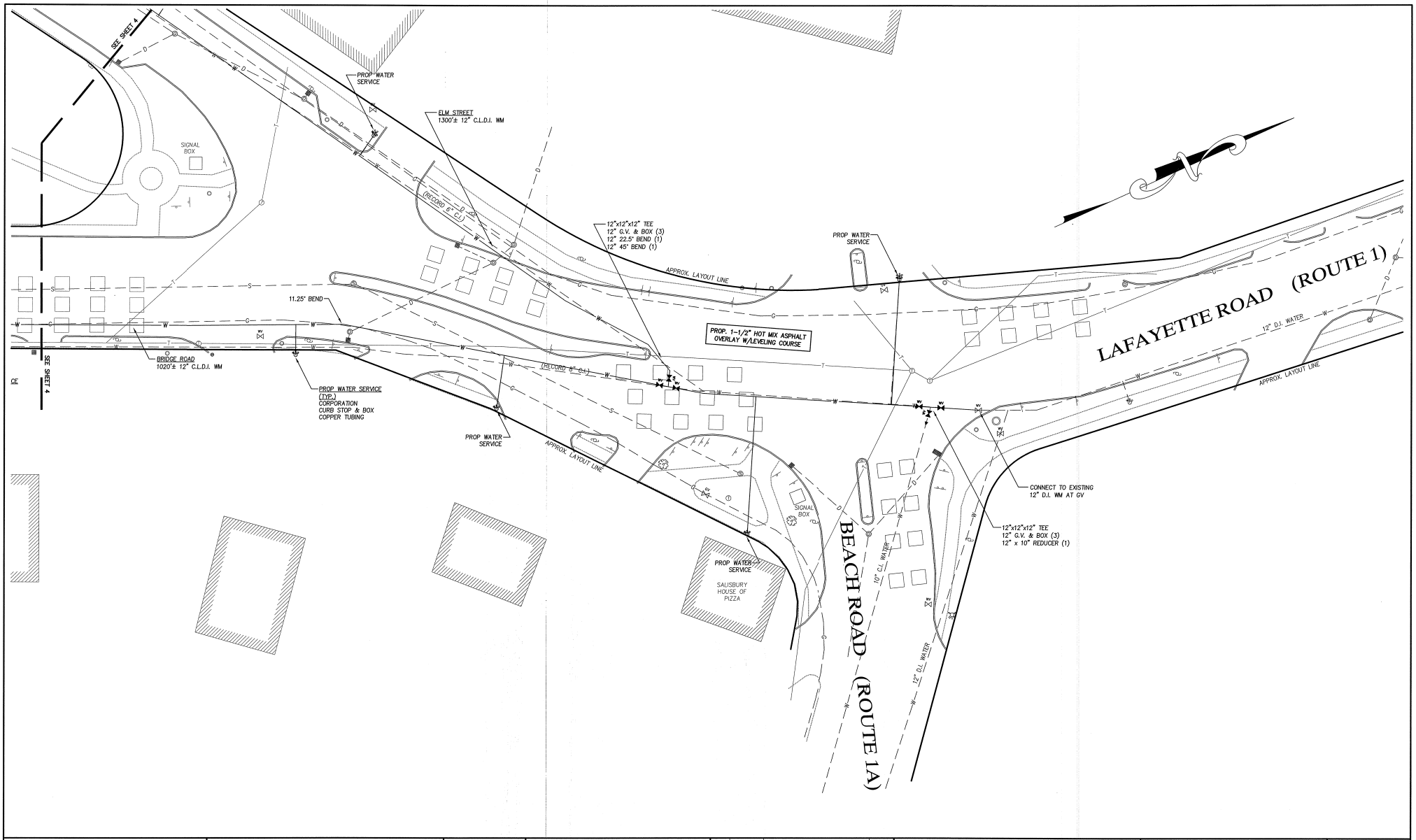

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COMMONWEALTH OF MASSACHUSETTS
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SHEET: 5 OF 9

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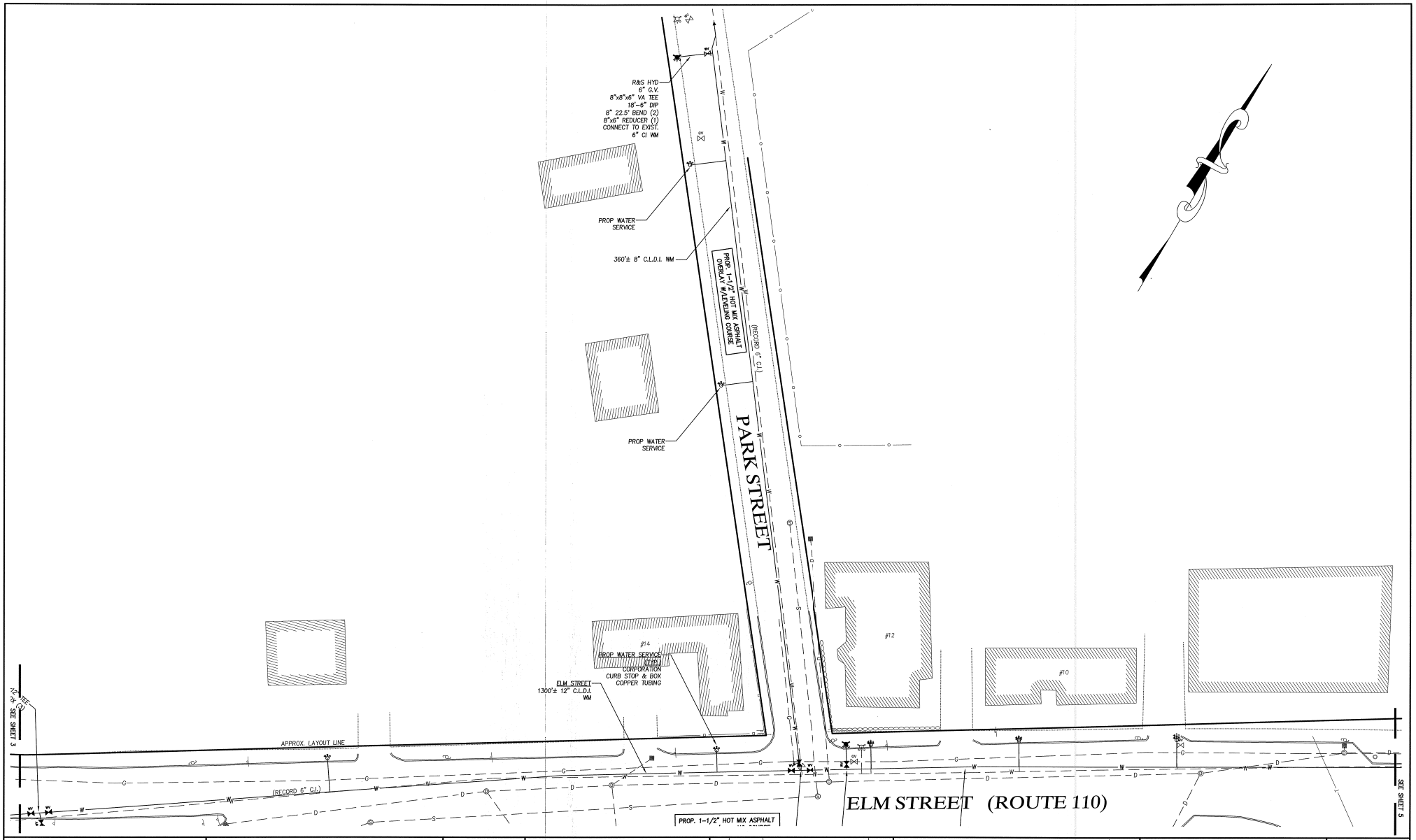

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ERIC W. BOTTERMAN
CIVIL
No. 41606
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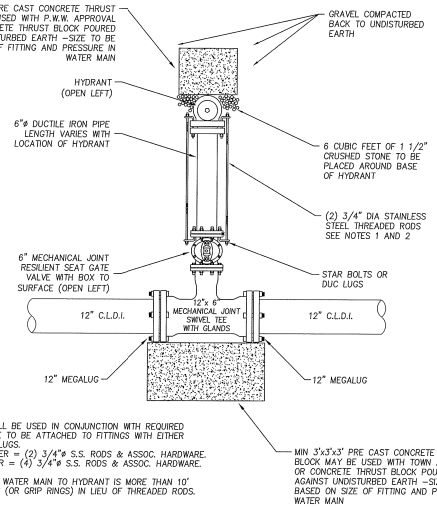
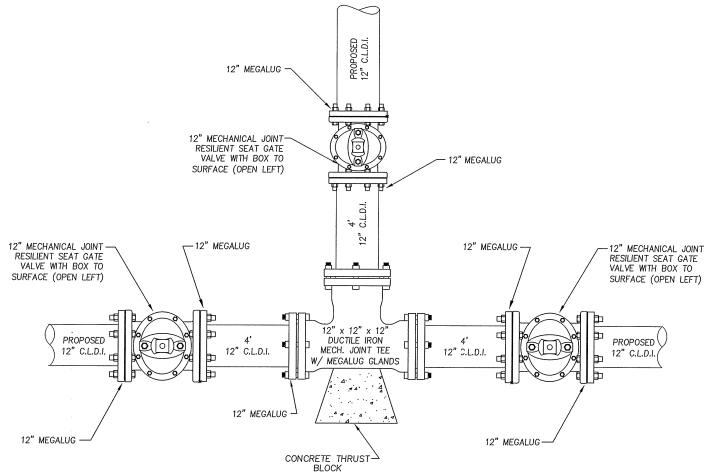


1. 3/4"ø S.S. RODS SHALL BE USED IN CONJUNCTION WITH REQUIRED S.S. NUTS. RODS ARE TO BE ATTACHED TO FITTINGS WITH EITHER STAR BOLTS OR DUC LUGS.
   10" FITTING OR SMALLER = (2) 3/4"ø S.S. RODS & ASSOC. HARDWARE.
   12" FITTING OR LARGER = (4) 3/4"ø S.S. RODS & ASSOC. HARDWARE.
2. WHEN DISTANCE FROM WATER MAIN TO HYDRANT IS MORE THAN 10' SUBSTITUTE MEGALUGS (OR GRIP RINGS) IN LIEU OF THREADED RODS.

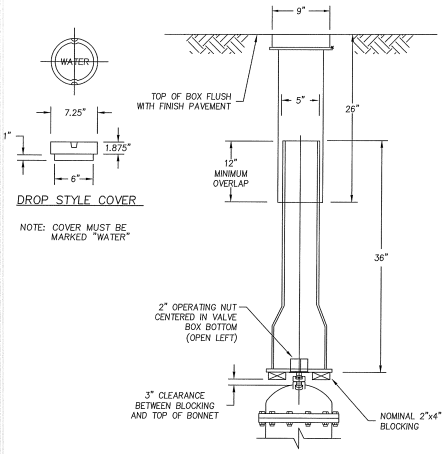
TYPICAL FIRE HYDRANT INSTALLATION

N.T.S.



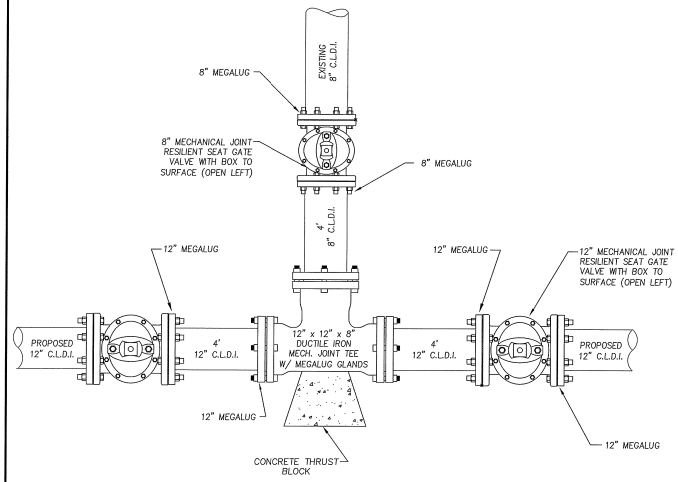
TYPICAL 12" WATER MAIN CONNECTION DETAIL

N.T.S.



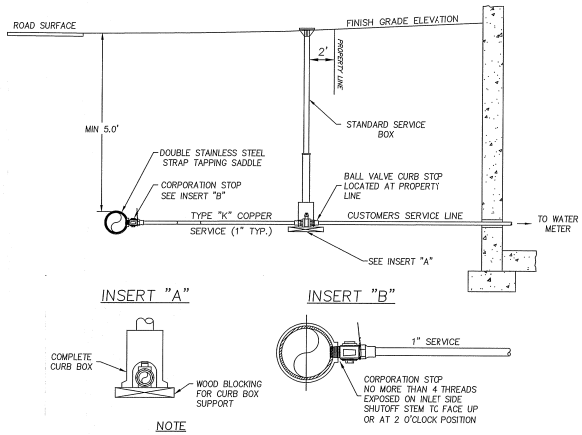
TYPICAL VALVE BOX DETAIL

N.T.S.



ELM ST/MAPLE ST CONNECTION DETAIL

N.T.S.



NOTE

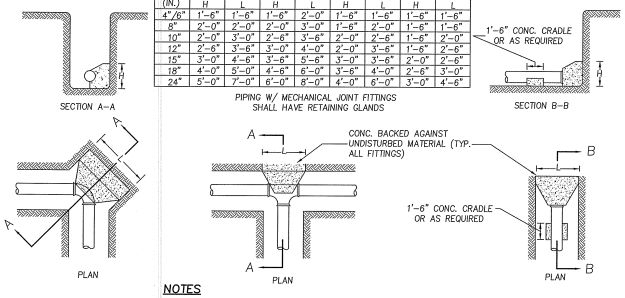
1. SERVICE CONNECTIONS FOR THE VARIOUS LOTS SHALL BE SIZED TO MEET THE REQUIREMENTS OF THE SPECIFIED USE. CONNECTIONS TO THE PROJECT WATER MAIN SHALL BE MADE WITH TAPPING SLEEVES AND VALVES.

TYPICAL COPPER SERVICE CONNECTION

N.T.S.

CONCRETE THRUST BLOCK DIMENSIONS								
PIPE DIA. (IN.)	TEE		90° BEND OR STUB		45° BEND		22.5° BEND	
	H	L	H	L	H	L	H	L
4"/6"	1'-6"	1'-6"	1'-6"	2'-0"	1'-6"	1'-6"	1'-6"	1'-6"
8"	2'-0"	2'-0"	2'-0"	3'-0"	1'-6"	2'-0"	1'-6"	1'-6"
10"	2'-0"	3'-0"	2'-6"	3'-6"	2'-0"	2'-6"	1'-6"	2'-0"
12"	2'-6"	3'-6"	3'-0"	4'-0"	2'-0"	3'-6"	1'-6"	2'-6"
15"	3'-0"	4'-6"	3'-6"	5'-6"	3'-0"	3'-6"	2'-0"	2'-6"
18"	4'-0"	5'-0"	4'-6"	6'-0"	3'-6"	4'-0"	2'-6"	3'-0"
24"	5'-0"	7'-0"	6'-0"	8'-0"	4'-0"	6'-0"	3'-0"	4'-6"

PIPING W/ MECHANICAL JOINT FITTINGS SHALL HAVE RETAINING GLANDS



NOTES

1. VALUES SHOWN ARE FOR TEST PRESSURE OF 150 PSI WITH A 100 PSI SURGE ALLOWANCE.
2. THRUST BLOCKS SHALL NOT BE PLACED AGAINST THE FOLLOWING SOILS: PEAT, ORGANIC SILT AND ORGANIC SOILS, SOFT CLAY, RUBBISH FILL AND OTHER UNSUITABLE ARTIFICIAL FILL, SHATTERED SHALE, INORGANIC SILT AND VERY FINE SANDS.
3. POURED CONCRETE THRUST BLOCKS SHALL NOT COVER ANY JOINTS, CLAMPS, NUTS, BOLTS, ETC.
4. THRUST BLOCKS SHALL BE INSTALLED AT ALL BENDS.

THRUST BLOCK DETAILS

N.T.S.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20'

COMMONWEALTH OF MASSACHUSETTS
ERIC W. BOTTERMAN
CIVIL
No. 41090
REGISTERED PROFESSIONAL ENGINEER
9/4/12

PREPARED FOR

TOWN OF SALISBURY
5 BEACH ROAD
SALISBURY, MA

NO.	DATE	DESCRIPTION	BY

MEI
MILLENNIUM ENGINEERING, INC.
ENGINEERING AND LAND SURVEYING
62 ELM ST. SALISBURY, MA 01952 (978) 463-8980
13 HAMPTON RD. EXETER, NH 03833 (603) 778-0528

SCALE: AS NOTED
DATE: SEPT. 4, 2012
PROJECT: M122410

WATER SYSTEM IMPROVEMENTS PROJECT
AT
SALISBURY SQUARE

WATER DETAILS

SHEET: 7 OF 9

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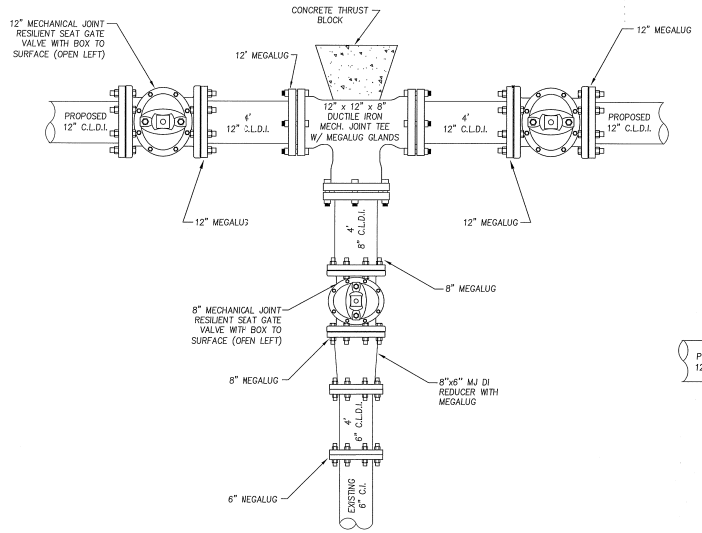
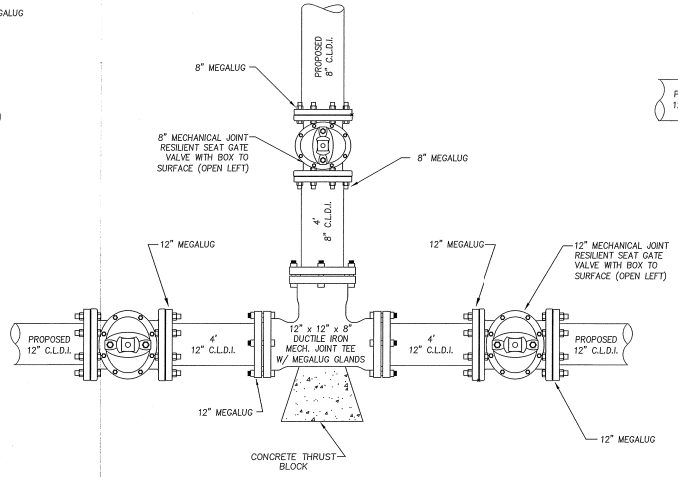


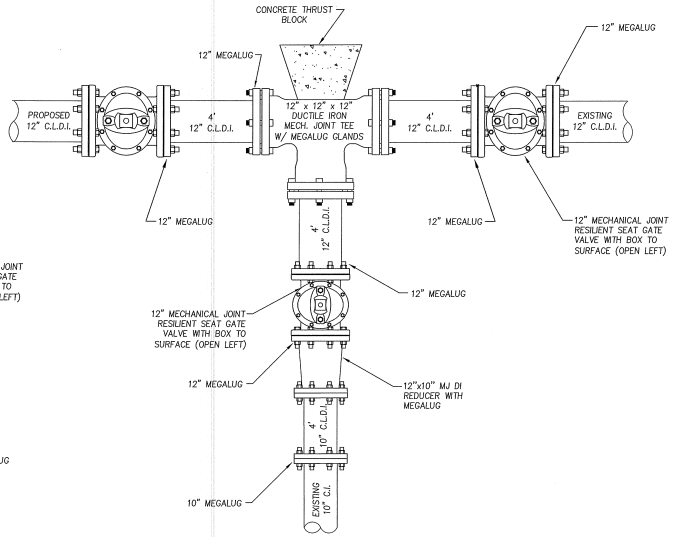
ELM ST./MUDNOCK ROAD BRIDGE ROAD/PLEASANT ST. CONNECTION DETAIL

N.T.S.



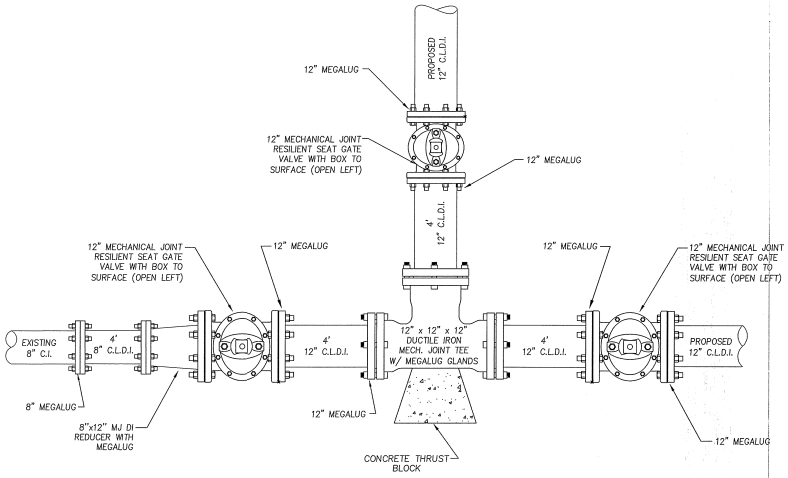
ELM ST/PARK ST CONNECTION DETAIL

N.T.S.



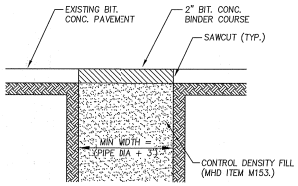
LAFAYETTE ROAD/BEACH ROAD CONNECTION DETAIL

N.T.S.



SCHOOL ST/BRIDGE ROAD CONNECTION DETAIL

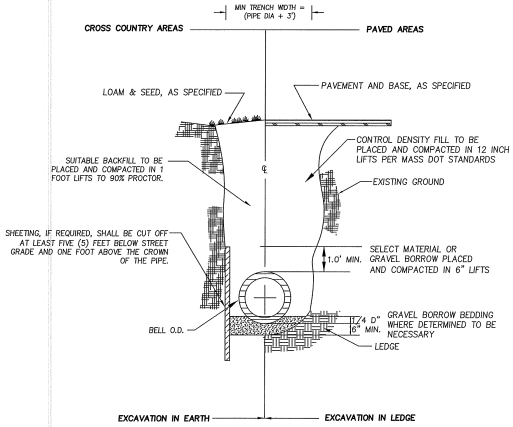
N.T.S.



NOTE: PRIOR TO PAVING, IN AREAS WHERE TRENCH PAVEMENT EDGE IS DAMAGED, THE CONTRACTOR SHALL CUT BACK PAVEMENT EDGE 12". FINAL SAWCUT LINES SHALL BE UNIFORM AND STRAIGHT.

TEMPORARY TRENCH PAVEMENT DETAIL

N.T.S.



TYPICAL TRENCH DETAIL

N.T.S.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20'

COMMONWEALTH OF MASSACHUSETTS
ERIC W. ROTTERMAN
CIVIL
No. 41080
REGISTERED PROFESSIONAL ENGINEER
9/4/12

PREPARED FOR

TOWN OF SALISBURY
5 BEACH ROAD
SALISBURY, MA

NO.	DATE	DESCRIPTION	BY

MEI MILLENNIUM ENGINEERING, INC.
ENGINEERING AND LAND SURVEYING
62 ELM ST. SALISBURY, MA 01952 (978) 463-8980
13 HAMPTON RD. EXETER, NH 03833 (603) 778-0528

SCALE: AS NOTED
DATE: SEPT. 4, 2012
PROJECT: M122410

WATER SYSTEM IMPROVEMENTS PROJECT
AT
SALISBURY SQUARE

WATER DETAILS

SHEET: 8 OF 9

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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.
2. ALL SIGN LEGENDS, BORDERS AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, 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."
6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
7. THE FIRST THREE PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.
8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE SAFETY OFFICER.
9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE SAFETY OFFICER.
10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
11. MINIMUM LANE WIDTH IS TO BE 11 FEET (3.3m) UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.

LEGEND:

- REFLECTORIZED PLASTIC DRUM
- P POLICE DETAIL
- TYPE III BARRICADE
- FLASHING ARROW PANEL
- FLASHING ARROW PANEL
- WORK ZONE
- DIRECTION OF TRAFFIC
- IMPACT ATTENUATOR
- MEDIAN BARRIER
- MEDIAN BARRIER WITH WARNING LIGHTS
- WORK VEHICLE
- TRUCK MOUNTED ATTENUATOR
- TRAFFIC OR PEDESTRIAN SIGNAL
- SIGN

THE IDEAL 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	
NORMAL (existing)	OPEN (to traffic)		VPH	VPHPL
3	1	7	1,170	1,170
2	1	8	1,340	1,340
5	2	8	2,740	1,370
4	2	4	2,960	1,480
3	2	9	2,980	1,490
4	3	4	4,560	1,520

Source: Dudek, C., Notes on 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.

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 SAFETY OFFICER.

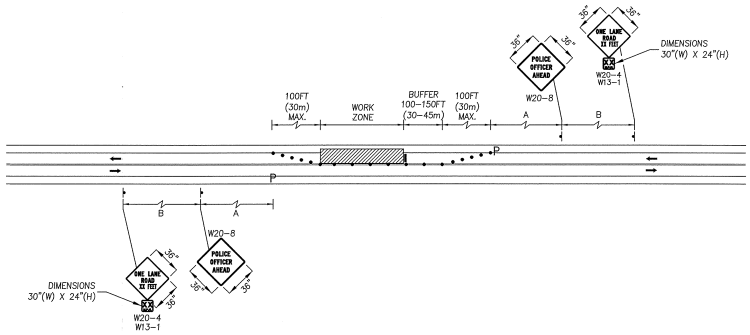
** DISTANCES ARE SHOWN IN FEET (METERS). THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE 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 TMP SETUPS. IT IS THE ONE WHICH MAY OFTEN HAVE THE "STANDARD RED OR RED-ORANGE FLAGS (16 in. X 16 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.

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.

R2-10 SIGNS SHALL BE PLACED BETWEEN THE FIRST AND SECOND SIGNS.

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



TWO LANE ROAD – ONE LANE ALTERNATING WITH POLICE DETAIL

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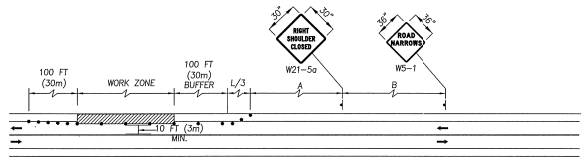

DRUM SPACING DEPENDENT ON SPEED

TWO LANE ROAD – SHOULDER CLOSED

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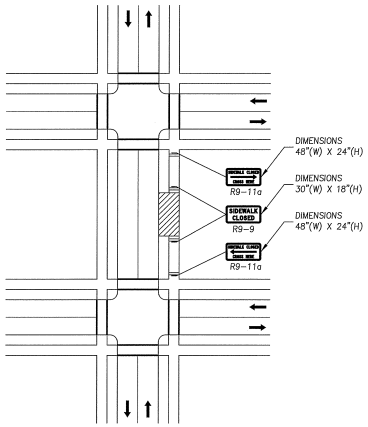

SIDEWALK CLOSED WITH DETOUR

N.T.S.

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED* (km/h)	DISTANCE (m)
30	35
40	50
50	65
60	85
70	105
80	130
90	160
100	185
110	220
120	250

SPEED* (mph)	DISTANCE (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
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.

FORMULAS FOR DETERMINING TAPER LENGTHS

Speed Limit (S)	Taper Length (L) Feet
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	$L = WS$

Speed Limit (S)	Taper Length (L) Meters
60 KM/H OR LESS	$L = \frac{WS^2}{155}$
70 KM/H OR MORE	$L = \frac{WS}{1.6}$

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)

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 0.33L
ONE-LANE, TWO-WAY TRAFFIC TAPER	100 FT (30 m) MAXIMUM
DOWNSTREAM TAPER	100 FT (30 m) PER LANE

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20'

ERIC W. BOTTERMAN CIVIL No. 41958 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

PREPARED FOR

TOWN OF SALISBURY
5 BEACH ROAD
SALISBURY, MA

NO.	DATE	DESCRIPTION	BY

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SCALE: AS NOTED
DATE: SEPT. 4, 2012
PROJECT: M122410

WATER SYSTEM IMPROVEMENTS PROJECT
AT
SALISBURY SQUARE

TRAFFIC MANAGEMENT PLAN

SHEET: 9 OF 9

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