MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

WORCESTER/SHREWSBURY ROUTE 20

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	PRC(FDG90)/PRC(PRC90)-0033(043)	1	45
	PROJECT FILE NO.	612608	

TITLE SHEET

DRAINAGE IMPROVEMENTS OF

ROUTE 20

IN THE CITY/TOWN OF

WORCESTER/SHREWSBURY WORCESTER COUNTY

FEDERAL AID PROJECT NO. PRC(FDG90)/PRC(PRC90)-0033(043)

THESE PLANS ARE SUPPLEMENTED BY THE LATEST EDITIONS OF THE FOLLOWING PUBLICATIONS, AS IDENTIFIED IN THE CONTRACT SPECIAL PROVISIONS: THE MASSDOT CONSTRUCTION STANDARD DETAILS, THE MASSDOT STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE MASSDOT STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, THE MASSDOT OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, THE MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, AND THE ANSI AMERICAN STANDARD FOR NURSERY STOCK.

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KEY PLAN

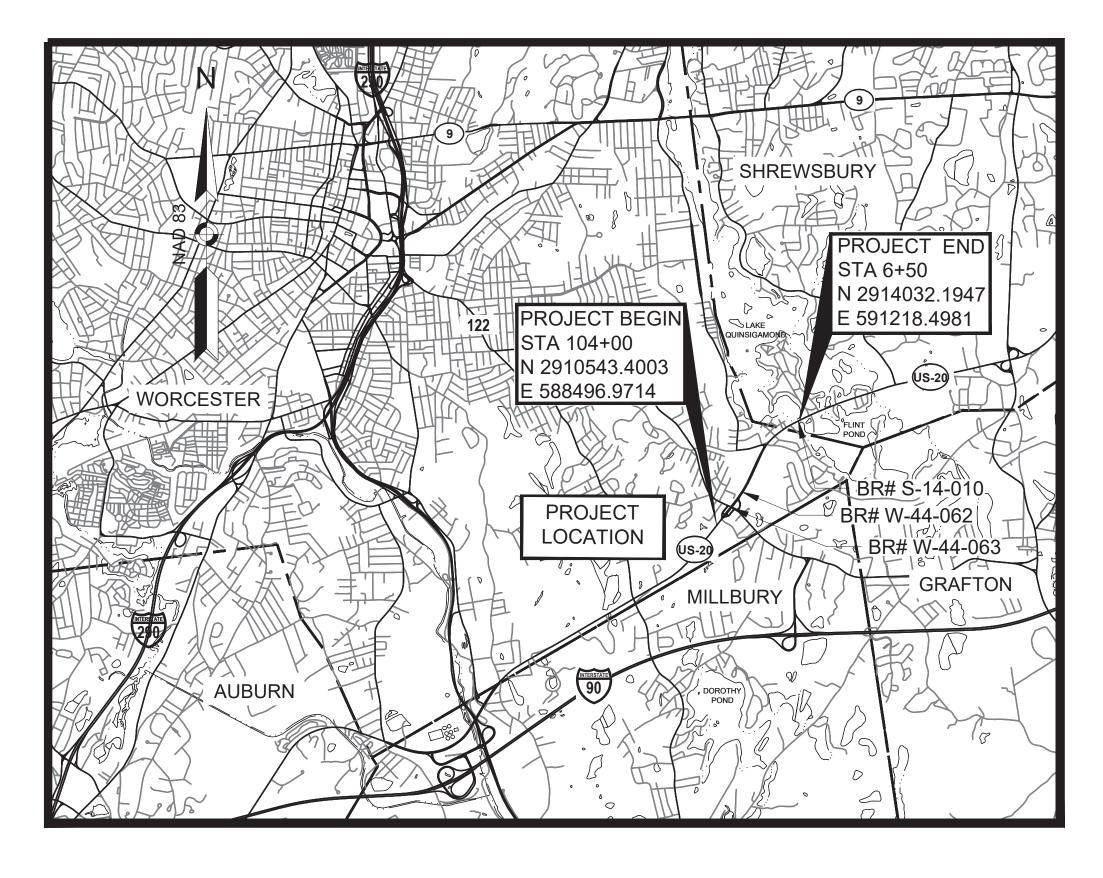
BASELINE DATA

CONSTRUCTION-UTILITY PLANS & PROFILES

TEMPORARY TRAFFIC CONTROL PLANS

CONSTRUCTION DETAILS

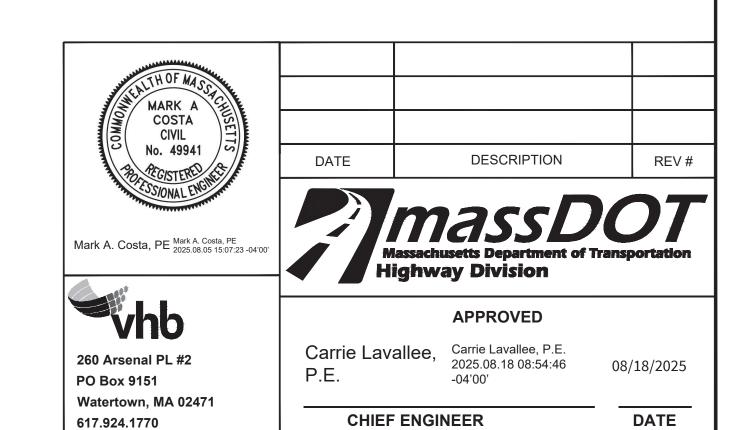
LANDSCAPE PLANS



0 3,500 7,000 10,500 14,000 SCALE: 1" = 3,500'

LENGTH OF PROJECT = 4520.78 FEET = 0.856 MILES

DESIGN DESIGNATION (ROUTE 20)						
DESIGN SPEED 40 & 50 MPH						
ADT (2023)	28,806					
K(2018)	9.10%					
FUNCTIONAL CLASSIFICATION	URBAN PRINCIPAL ARTERIAL					



GENERAL SYMBOL	S					ABBREVIATIO	ONS		WORCESTER/SHREWSBURY
<u>EXISTING</u>	PROPOSED	<u>DESCRIPTION</u>	TRAFFIC SY	MBOLS		GENERAL			ROUTE 20
	JB	JERSEY BARRIER	EXISTING	PROPOSED	DESCRIPTION	AADT	ANNUAL AVERAGE DAILY TRAFFIC		STATE FED. AID PROJ. NO. NO. SHEETS
⊞⊕⊕св	СВ		<u></u>		CONTROLLER PHASE ACTUATED	ABAN	ABANDON		MA PRC(FDG90)/PRC(PRC90)-0033(043) 2 45
		CATCH BASIN CURB INLET	[[]			ADJ APPROX.	ADJUST APPROXIMATE		PROJECT FILE NO. 612608
♥ FP G GP	♥ FP G GP	FLAG POLE GAS PUMP		Ö	TRAFFIC SIGNAL HEAD (SIZE AS NOTED)	A.C.	ASPHALT CONCRETE		LEGEND & ABBREVIATIONS
□ MB	□ MB	MAIL BOX	[<u>O]</u>		MUDE LOOD DETECTOR (N. OLTVELINI EGG OTHERWISE OREGIEIER)	ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE		
		POST SQUARE			WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)	BIT.	BITUMINOUS	ABBREVIATI	ONS (cont.)
0	0	POST CIRCULAR		7	VIDEO DETECTION CAMERA	BC BD.	BOTTOM OF CURB BOUND	GENERAL	
⊕ WELL □ EHH	⊕ WELL □ EHH	WELL ELECTRIC HANDHOLE		>=	MICROWAVE DETECTOR	BL	BASELINE	POT	POINT ON TANGENT
0	0	FENCE GATE POST	\oplus	•	PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE	BLDG	BUILDING	PRC	POINT OF REVERSE CURVATURE
o GG	o GG	GAS GATE	*	*	EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT	BM BOS	BENCHMARK BOTTOM OF SLOPE	PROJ PROP	PROJECT PROPOSED
BHL #	⊕ BHL#	BORING HOLE	<	—	VEHICULAR SIGNAL HEAD	BR.	BRIDGE	PSB	PLANTABLE SOIL BORROW
	◆ MW# ■ TP#	MONITORING WELL TEST PIT	≪-	←	VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED	СВ	CATCH BASIN	PT	POINT OF TANGENCY
- ·· //	· · · · · · · · · · · · · · · · · · ·	HYDRANT	<	—	FLASHING BEACON	CBCI	CATCH BASIN WITH CURB INLET	PVC PVI	POLYVINLY CHLORIDE POINT OF VERTICAL INTERSECTION
*	*	LIGHT POLE			PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)	CBDB CC	DOUBLE CATCH BASIN CEMENT CONCRETE	PVT	POINT OF VERTICAL TANGENCY
□ CO.BD.		COUNTY BOUND GPS POINT	⊠ RRSG			CCM	CEMENT CONCRETE MASONRY	PVMT	PAVEMENT
(c)	©	CABLE MANHOLE		⊠ RRSG	RAILROAD SIGNAL	CEM	CEMENT	PWW P	PAVED WATER WAY RADIUS OF CURVATURE
(D)	®	DRAINAGE MANHOLE		•	SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)	CI CIP	CURB INLET CAST IRON PIPE	R&D	REMOVE AND DISPOSE
E	E C	ELECTRIC MANHOLE	○	20'	MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)	CIPP	CURED-IN-PLACE PIPELINER	R&R	REMOVE AND RESET
(G)	© M	GAS MANHOLE MISC MANHOLE			HIGH MAST POLE OR TOWER	CLF	CHAIN LINK FENCE	RCP	REINFORCED CONCRETE PIPE ROAD
(S)	(S)	SEWER MANHOLE			SIGN AND POST	CL	CENTERLINE CEMENT LINED DUCTUE IDON	RD RDWY	ROADWAY
T	T	TELEPHONE MANHOLE	$\overline{\bigcirc}$	00	SIGN AND POST (2 POSTS)	CLDI CMP	CEMENT LINED DUCTILE IRON CORRUGATED METAL PIPE	REM	REMOVE
w MUD	₩ - MUD	WATER MANHOLE		**20'	MAST ARM WITH LUMINAIRE	CSP	CORRUGATED STEEL PIPE	RET	RETAIN DETAINING WALL
■ MHB □ MON	■ MHB	MASSACHUSETTS HIGHWAY BOUND MONUMENT		-	OPTICAL PRE-EMPTION DETECTOR	CO.	COUNTY	RET WALL ROW	RETAINING WALL RIGHT OF WAY
□ SB		STONE BOUND		\bowtie	CONTROL CABINET, GROUND MOUNTED	CONC CONT	CONCRETE CONTINUOUS	RR	RAILROAD
■ TB		TOWN OR CITY BOUND		₾	CONTROL CABINET, POLE MOUNTED	CONST	CONSTRUCTION	R&R	REMOVE AND RESET
△ -• TPL or GUY	→ TPL or GUY	TRAVERSE OR TRIANGULATION STATION TROLLEY POLE OR GUY POLE				CR GR	CROWN GRADE	R&S RT	REMOVE AND STACK RIGHT
• HTP	→ TPL OF GOT	TRANSMISSION POLE	_		FLASHING BEACON CONTROL AND METER PEDESTAL	DHV DCB	DESIGN HOURLY VOLUME DOUBLE CATCH BASIN	SB	STONE BOUND
-&- UFB	- 占 - UFB	UTILITY POLE W/ FIREBOX		\boxtimes	LOAD CENTER ASSEMBLY	DCB	DUCTILE IRON	SHLD	SHOULDER
-∳- UPDL	-∳- UPDL	UTILITY POLE WITH DOUBLE LIGHT			PULL BOX 12"x12" (OR AS NOTED)	DIA	DIAMETER	SMH SOE	SEWER MANHOLE SUPPORT OF EXCAVATION
-&- ULT -≎- UPL	-&- ULT -∽- UPL	UTILITY POLE W / 1 LIGHT UTILITY POLE			ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)	DIP	DUCTILE IRON PIPE	SS	SANITARY SEWER
	o or E	BUSH			TRAFFIC SIGNAL CONDUIT	DMH DW	DRAINAGE MANHOLE STEADY DON'T WALK - PORTLAND ORANGE	ST	STREET
•SIZE & TYPE		TREE				DWY	DRIVEWAY	STA	STATION STOPPING SIGHT DISTANCE
0		STUMP SWAMP / MARSH				,	ELEVATION	SSD SHLO	STATE HIGHWAY LAYOUT LINE
	\bowtie	WATER GATE VALVE				EMB EOP	EMBANKMENT EDGE OF PAVEMENT	SW	SIDEWALK
• WG	• WG	WATER GATE				EXIST (or EX)		TAN	TANGENT DISTANCE OF CURVE/TRUCK %
• PM	• PM	PARKING METER				EXC	EXCAVATION	TAN TEMP	TANGENT TEMPORARY
		— OVERHEAD CABLE/WIRE — CURRING				F&C F&G	FRAME AND COVER FRAME AND GRATE	TC	TOP OF CURB
		— CONTOURS (ON-THE-GROUND SURVEY DATA)				FAG FDN.	FOUNDATION	TOS	TOP OF SLOPE
700		— CONTOURS (PHOTOGRAMMETRIC DATA)	PAVEMENT MARKIN	IGS SYMBOLS		FES	FLARED END SECTION	TYP UP	TYPICAL UTILITY POLE
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)	_,,,,_,,,			FLDSTN	FIELDSTONE	VAR	VARIES
		— UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)	EXISTING	<u>PROPOSED</u>	DESCRIPTION	FO GAR	FIBER OPTIC GARAGE	VERT	VERTICAL
		— UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)		•	PAVEMENT ARROW - WHITE	GD	GROUND	VC WCR	VERTICAL CURVE WHEEL CHAIR RAMP
		 UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER) UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER) 	ONLY	ONLY	LEGEND "ONLY" - WHITE	GG	GAS GATE	WG	WATER GATE
0000000000		■ UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER) SALANCED STONE WALL		SL	STOP LINE - 12" WIDE	GI GIP	GUTTER INLET GALVANIZED IRON PIPE	WIP	WROUGHT IRON PIPE
		— GUARD RAIL - STEEL POSTS		cw	CROSSWALK (WIDTH AS NOTED)	GRAN	GRANITE	WM X-SECT	WATER METER/WATER MAIN CROSS SECTION
		— GUARD RAIL - WOOD POSTS		SWL	SOLID WHITE LINE - 6" WIDE	GRAV	GRAVEL	Х ОДОТ	CINCOC CECTION
		— GUARD RAIL - DOUBLE FACE - STEEL POSTS — GUARD RAIL - DOUBLE FACE - WOOD POSTS		SYL	SOLID YELLOW LINE - 6" WIDE	GRD HDW	GUARD HEADWALL	TRAFFIC SIG	GNAL ABBREVIATIONS
		— GUARD RAIL - DOUBLE FACE - WOOD FOSTS — CHAIN LINK OR METAL FENCE		BWL		HMA	HOT MIX ASPHALT	CAB	CABINET
		— WOOD FENCE			BROKEN YELLOW LINE - 6" WIDE	HOR	HORIZONTAL	CCVE DW	CLOSED CIRCUIT VIDEO EQUIPMENT STEADY UPRAISED HAND
· c:::::x:::::x:::::x		> · SEDIMENT CONTROL BARRIER → TREE LINE		<u>DWL</u>		HP HYD	HIGH PRESSURE HYDRANT	FDW	FLASHING UPRAISED HAND
		— SAWCUT LINE				INV	INVERT	FR	FLASHING CIRCULAR RED
		— TOP OR BOTTOM OF SLOPE		<u>DYL</u>		JCT	JUNCTION	FRL FRR	FLASHING RED LEFT ARROW FLASHING RED RIGHT ARROW
		— LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY		DWLEx	DOTTED WHITE LINE EXTENSION - 6" WIDE	L	LENGTH OF CURVE	FY	FLASHING RED RIGHT ARROW FLASHING CIRCULAR YELLOW
		BANK OF RIVER OR STREAM BORDER OF WETLAND		DYLEx	DOTTED YELLOW LINE EXTENSION - 6" WIDE	LF LP	LINEAR FEET LIGHT POLE	FYL	FLASHING YELLOW LEFT ARROW
		100 FT WETLAND BUFFER		DBWL	DOUBLE WHITE LINE - 6" WIDE	LT	LEFT	FYR G	FLASHING YELLOW RIGHT ARROW STEADY CIRCULAR GREEN
		200 FT RIVERFRONT BUFFER		DBYL	DOUBLE YELLOW LINE - 6" WIDE	MAX	MAXIMUM	G GL	STEADY CIRCULAR GREEN STEADY GREEN LEFT ARROW
		— STATE HIGHWAY LAYOUT — TOWN OR CITY LAYOUT		SWCHL	SOLID WHITE CHANNELIZATION LINE - 12" WIDE	MB MH	MAILBOX MANHOLE	GR	STEADY GREEN RIGHT ARROW
		— COUNTY LAYOUT		SYCHL	SOLID YELLOW CHANNELIZATION LINE - 12" WIDE	MHB	MASSACHUSETTS HIGHWAY BOUND	GSL	STEADY GREEN SLASH LEFT ARROW
		— RAILROAD SIDELINE		****	YIELD TRIANGLE - WHITE	MIN	MINIMUM	GSR GV	STEADY GREEN SLASH RIGHT ARROW STEADY GREEN VERTICAL ARROW
		TOWN OR CITY BOUNDARY LINE		* * * * *		M&O NIC	MILL AND OVERLAY NOT IN CONTRACT	OL	OVERLAP
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE — FASEMENT				NO.	NUMBER	PED	PEDESTRIAN BAN TILT ZOOM
						OSC	OUTLET CONTROL STRUCTURE	PTZ R	PAN, TILT, ZOOM STEADY CIRCULAR RED
						OHW	OVERHEAD WIRE	RL	STEADY RED LEFT ARROW
						PC PCC	POINT OF CURVATURE POINT OF COMPOUND CURVATURE	RR	STEADY RED RIGHT ARROW
						P.G.L.	PROFILE GRADE LINE	TR SIG TSC	TRAFFIC SIGNAL TRAFFIC SIGNAL CONDUIT
						PI	POINT OF INTERSECTION	W	STEADY WALKING PERSON
						PL POC	POYLURETHANE LINED POINT ON CURVE	Y	STEADY CIRCULAR YELLOW
						. 55		YL	STEADY YELLOW LEFT ARROW

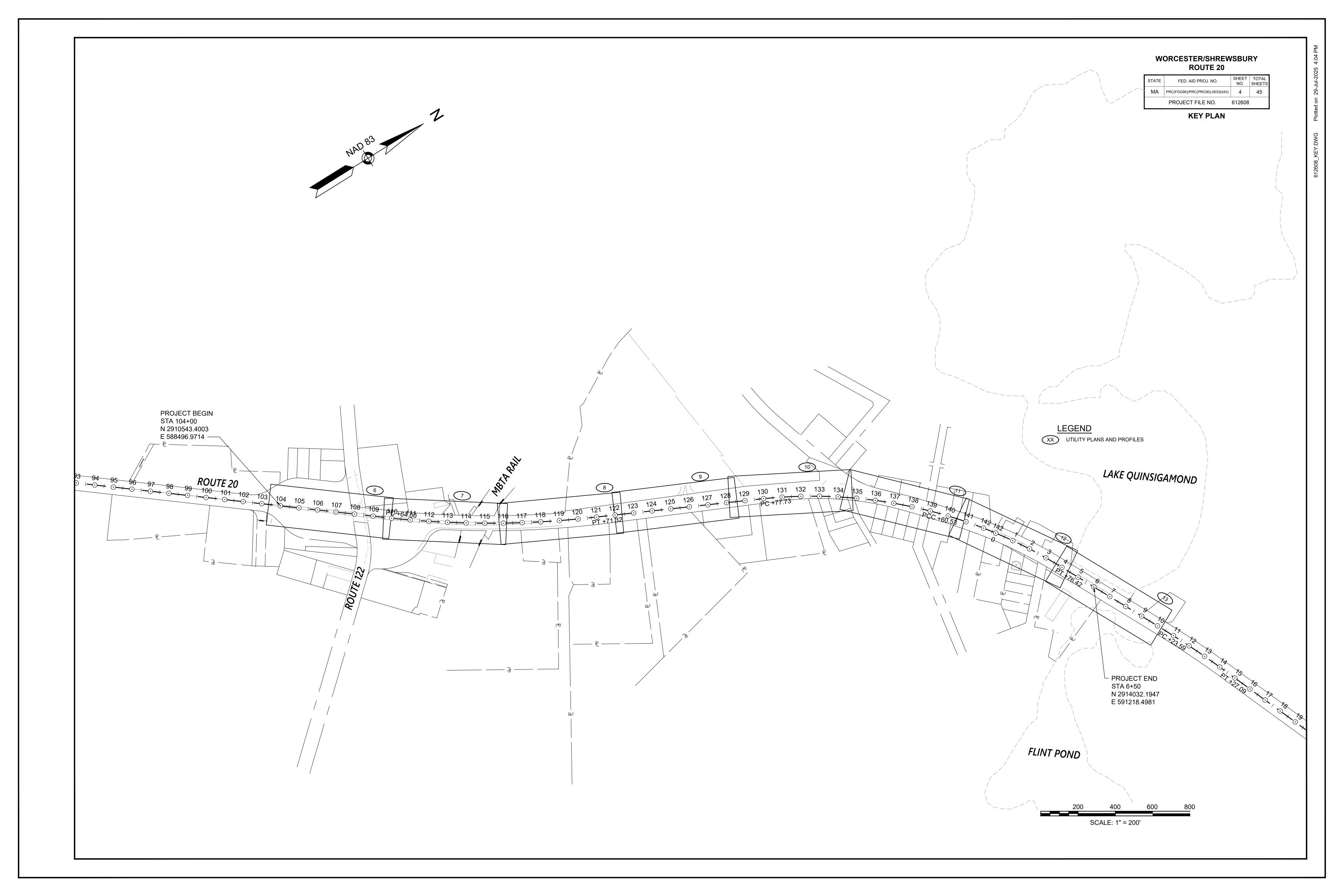
GENERAL NOTES

- 1. THE EXISTING CONDITIONS SHOWN ON THIS PLAN ARE FROM FIELD TOPOGRAPHICAL SURVEY DATA CONDUCTED DECEMBER 2022 THROUGH OCTOBER 2023, TITLED "PLAN OF TOPOGRAPHICAL SURVEY OF ROUTE 20 IN THE TOWN OF WORCESTER AND SHREWSBURY" DATED OCTOBER 24, 2023.
- 2. THE HORIZONTAL DATUM SHOWN IS IN THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM SYSTEM WAS DERIVED THROUGH THE USE OF GPS EQUIPMENT. THE VERTICAL DATUM SHOWN REFERENCES NAVD 88 BASED ON THE FOLLOWING SOURCE CONTROL POINTS ESTABLISHED BY MASDOT: 3097,3098,3329,3330.
- 3. THE TOPOGRAPHICAL SURVEY USED CONTAINS LOCATIONS FOR SEWER AND DRAINAGE BUT DOES NOT LOCATE WATER, GAS, TELECOM, AND OTHER UTILITIES. SUPPLEMENTARY UTILITY LOCATION WAS CONDUCTED BY OVERLAND ENGINEERING, LLC TO LOCATE ADDITIONAL UTILITIES.
- 4. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL CONTACT DIGSAFE TO REQUEST EXISTING UTILITY MARKOUT IN THE FIELD.
- 5. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- 6. THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE STRUCTURES AS NECESSARY FOR CHANGES IN GRADE, AND RESET ALL WATER AND DRAINAGE FRAMES, GRATES AND BOXES TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK CONFORMING TO M4.05.2.
- 7. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
- 8. TREES AND SHRUBS WITHIN THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.
- 9. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER.
- 10. THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
- 11. JOINTS BETWEEN NEW HOT MIX ASPHALT ROADWAY PAVEMENT TOP COURSE AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH HMA JOINT ADHEISIVE.
- 12. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- 13. ALL EXISTING GRANITE CURB & EDGING SHALL BE RE-USED IN THE PROPOSED WORK, EXCEPT CURVED STONES OF A DIFFERENT RADIUS THAN PROPOSED CURB.
- 14. ALL PROPOSED CATCH BASINS AND DOUBLE CATCH BASINS SHALL HAVE MASSDOT CASCADE GRATES UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- 15. EXISTING STATE, COUNTY, CITY, AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATION ARE NOT GUARANTEED.
- 16. BASINS SHALL HAVE ESTABLISHED VEGETATION PRIOR TO STORMWATER DISCHARGING TO THE BASIN.
- 17. EXISTING 10" CONCRETE ROADWAY SUBGRADE SHOWN ON 1931 CONSTRUCTION PLANS AND CONFIRMED WITH TEST PITS THROUGHOUT RT 20 CORRIDOR. EXCAVATION TO BE INCLUDED IN PAY ITEM 127. CONCRETE EXCAVATION.
- 18. ALL RCP PIPE SHALL BE CLASS V UNLESS OTHERWISE SPECIFIED ON PLANS.

WORCESTER/SHREWSBURY ROUTE 20

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MA	PRC(FDG90)/PRC(PRC90)-0033(043)	3	45
	PROJECT FILE NO. 6	12608	

GENERAL NOTES



	1931 SHLO 2846 CONSTRUCTION BASELINE DATA											
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING				
L1	58+94.86	2907535.9718	585227.4802		N59°37'10"E 1359.38'	72+54.24	2908223.467	586400.197				
L2	58+94.86	2907535.9718	585227.4802		N59°37'10"E 1359.38'	72+54.24	2908223.467	586400.197				
C1	72+54.24	2908223.4669	586400.1969	R=3001.38 [°] Δ=21°15'20" L=1113.45' T=563.20'		83+67.69	2908949.896	587235.612				
L3	83+67.69	2908949.8962	587235.6117		N38°21'50"E 2596.31'	109+64.00	2910985.624	588847.020				
C2	109+64.00	2910985.6244	588847.0199	R=5003.85 [°] Δ=12°40'45" L=1107.32' T=555.93'		120+71.32	2911922.522	589433.010				
L4	120+71.32	2911922.5220	589433.0102		N25°41'05"E 906.41'	129+77.73	2912739.372	589825.865				
C3	129+77.73	2912739.3723	589825.8648	R=2564.11 [°] Δ=19°43'35" L=882.80' T=445.81'		138+60.53	2913454.102	590336.579				
C4	138+60.53	2913454.1024	590336.5788	R=2500.00 [°] Δ=9°24'08" L=410.25' T=205.59'		142+70.78	2913716.895	590651.011				

		1:	931 SHLO 28	45 CONSTRUCTION BA	SELINE DATA	4		
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C5	0+00.00	2913716.8948	590651.0114	R=2500.00 [°] Δ=8°37'37" L=376.42' T=188.57'		3+76.42	2913909.869	590973.789
L5	3+76.42	2913909.8686	590973.7894		N63°26'25"E 647.17'	10+23.59	2914199.238	591552.663
C6	10+23.59	2914199.2384	591552.6626	R=4997.20 [°] Δ=4°37'35" L=403.50' T=201.86'		14+27.09	2914364.897	591920.469
L6	14+27.09	2914364.8965	591920.4685		N68°04'00"E 833.45'	22+60.54	2914676.214	592693.592
C7	22+60.54	2914676.2136	592693.5924	R=4996.32 [°] Δ=3°46'00" L=328.46' T=164.29'		25+89.00	2914788.803	593002.090
L7	25+89.00	2914788.8028	593002.0900		N71°50'00"E 1491.32'	40+80.32	2915253.771	594419.073
C8	40+80.32	2915253.7708	594419.0728	R=4997.70 [°] Δ=6°08'00" L=534.99' T=267.75'		46+15.31	2915393.072	594935.344
L8	46+15.31	2915393.0719	594935.3443		N77°58'00"E 2201.05'	68+16.36	2915851.949	597088.029
L9	68+16.36	2915851.9491	597088.0294		N76°58'10"E 744.43'	75+60.79	2916019.797	597813.290

	1931 SHLO 2846 AUX A CONSTRUCTION BASELINE DATA										
NUMBER	IUMBER STARTING NORTHING EASTING CURVE DATA LINE DATA ENDING NORTHING EASTING										
L10	0+00.00	2910878.1733	588761.9655		N66°48'30"W 266.36'	2+66.36	2910983.068	588517.129			

	1931 SHLO 2846 AUX B CONSTRUCTION BASELINE DATA											
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING				
L11	0+00.00	2910878.1733	588761.9655		S66°48'30"E 127.19'	1+27.19	2910828.085	588878.878				
C9	1+27.19	2910828.0849	588878.8777	R=439.66 [°] Δ=25°02'50" L=192.20' T=97.66'		3+19.39	2910716.778	589033.691				

WORCESTER/SHREWSBURY **ROUTE 20**

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MA	PRC(FDG90)/PRC(PRC90)-0033(043)	5	45
	PROJECT FILE NO. 6	12608	

PROP DRAIN CENTERLINE CONSTRUCTION BASELINE DATA

CURVE DATA

ENDING

STATION

NORTHING

-7+27.67 | 2910385.534 | 588378.838

-5+80.19 | 2910505.471 | 588464.671

-4+32.11 | 2910617.719 | 588561.241

-1+62.00 | 2910827.965 | 588730.818

-0+98.81 | 2910871.172 | 588776.934

-0+00.87 | 2910949.814 | 588835.303

2+55.34 | 2911153.708 | 588990.450

4+44.96 | 2911310.204 | 589097.526

8+36.28 | 2911644.219 | 589300.939

10+18.76 | 2911808.094 | 589381.199

13+22.68 | 2912084.761 | 589507.002

23+16.04 | 2912982.222 | 589932.231

24+21.48 | 2913072.892 | 589986.050

25+04.98 | 2913142.503 | 590032.165

25+73.95 | 2913197.279 | 590074.082

26+62.94 | 2913263.836 | 590133.149

36+80.38 | 2913875.914 | 590940.447

39+68.70 | 2913968.994 | 591212.878

N47°00'34"E 29+72.17 2913474.692 590359.340

N62°40'43"E 66.40' 32+72.31 2913656.201 590596.729

N55°44'59"E 34+22.67 2913740.825 590721.015

N57°28'10"E 117.58' 35+40.25 2913804.051 590820.144

N74°33'26"E 131.52' 38+11.90 2913910.934 591067.218

EASTING

LINE DATA

N38°20'24"E

709.33'

N35°35'23"E

147.49'

N40°42'23"E

N38°53'18"E

270.11'

N46°51'55"E

63.19'

N36°35'00"E

97.94'

N37°16'06"E

256.21'

N34°22'49"E

189.62'

N29°40'39"E

234.63'

N26°05'37"E

182.47'

N24°27'06"E

303.93'

N27°54'02"E

183.97'

N30°41'31"E

105.44'

N33°31'23"E

83.50'

68.97'

N41°35'16"E

N59°08'53"E 140.13'

N68°16'05"E 156.80'

STARTING

STATION

NORTHING

-14+37.00 | 2909829.1785 | 587938.8224

-7+27.67 | 2910385.5344 | 588378.8379

-5+80.19 | 2910505.4709 | 588464.6710

-4+32.11 | 2910617.7193 | 588561.2413

-1+62.00 | 2910827.9650 | 588730.8179

-0+98.81 | 2910871.1717 | 588776.9336

-0+00.87 2910949.8137 588835.3027

6+01.65 | 2911440.3655 | 589184.7696

8+36.28 | 2911644.2186 | 589300.9393

10+18.76 | 2911808.0944 | 589381.1987

21+32.07 | 2912819.6392 | 589846.1458

23+16.04 | 2912982.2223 | 589932.2310

24+21.48 | 2913072.8924 | 589986.0498

25+04.98 | 2913142.5034 | 590032.1647

25+73.95 | 2913197.2794 | 590074.0820

26+62.94 2913263.8359 590133.1485

32+05.91 | 2913625.7253 | 590537.7383

32+72.31 | 2913656.2009 | 590596.7294

34+22.67 | 2913740.8246 | 590721.0151

35+40.25 | 2913804.0510 | 590820.1441

36+80.38 | 2913875.9137 | 590940.4466

38+11.90 | 2913910.9342 | 591067.2182

39+68.70 | 2913968.9935 | 591212.8782 |

2911153.7085 | 588990.4505

EASTING

NUMBER

L74

L105

L78

L82

L83

L89

L90

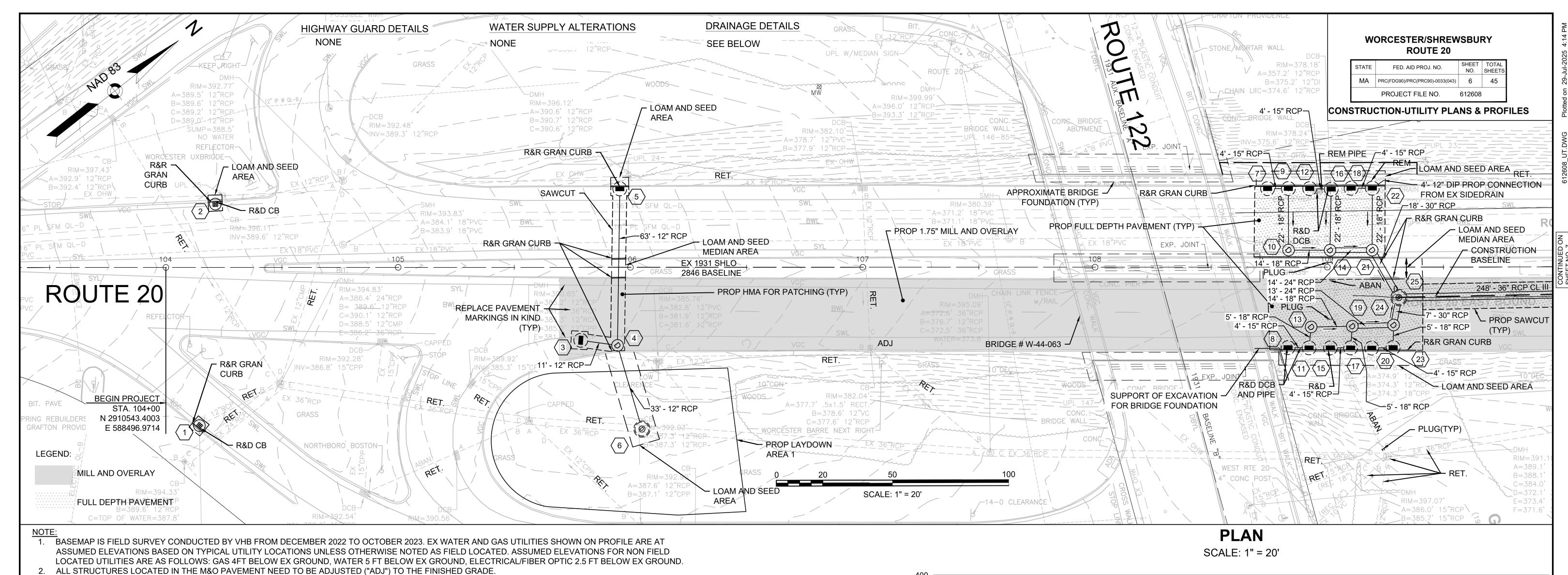
L91

L92

L93

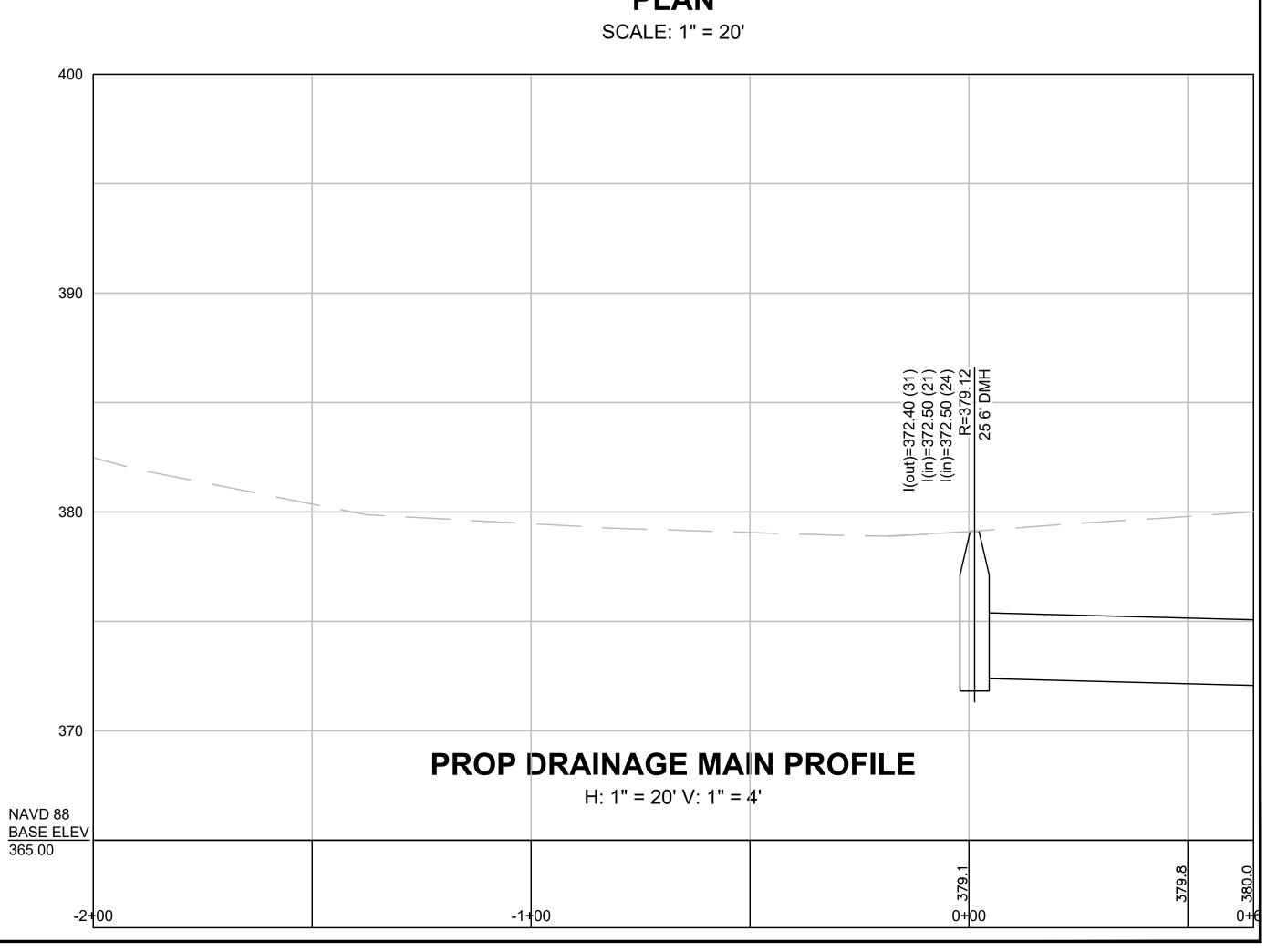
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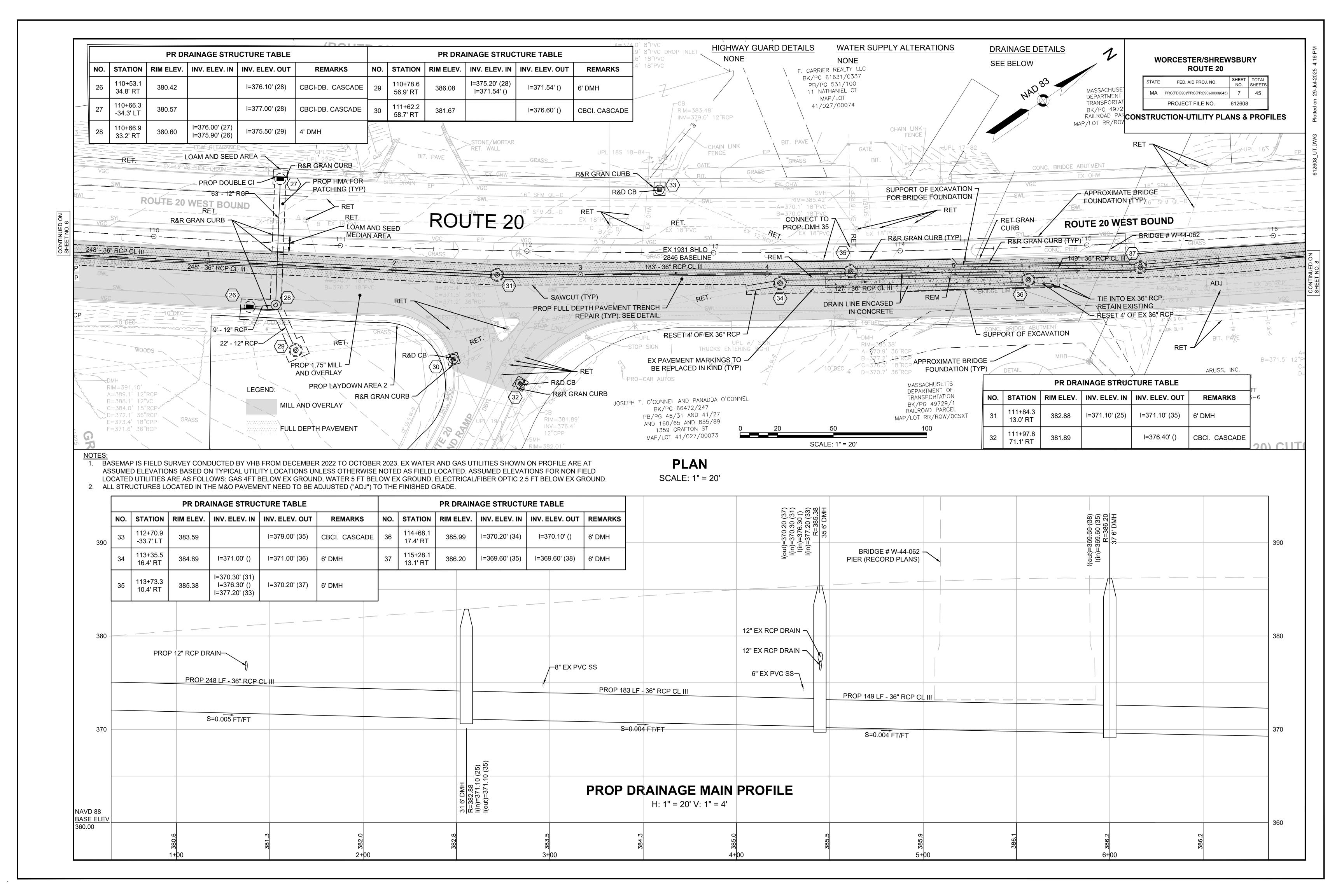
BASELINE DATA

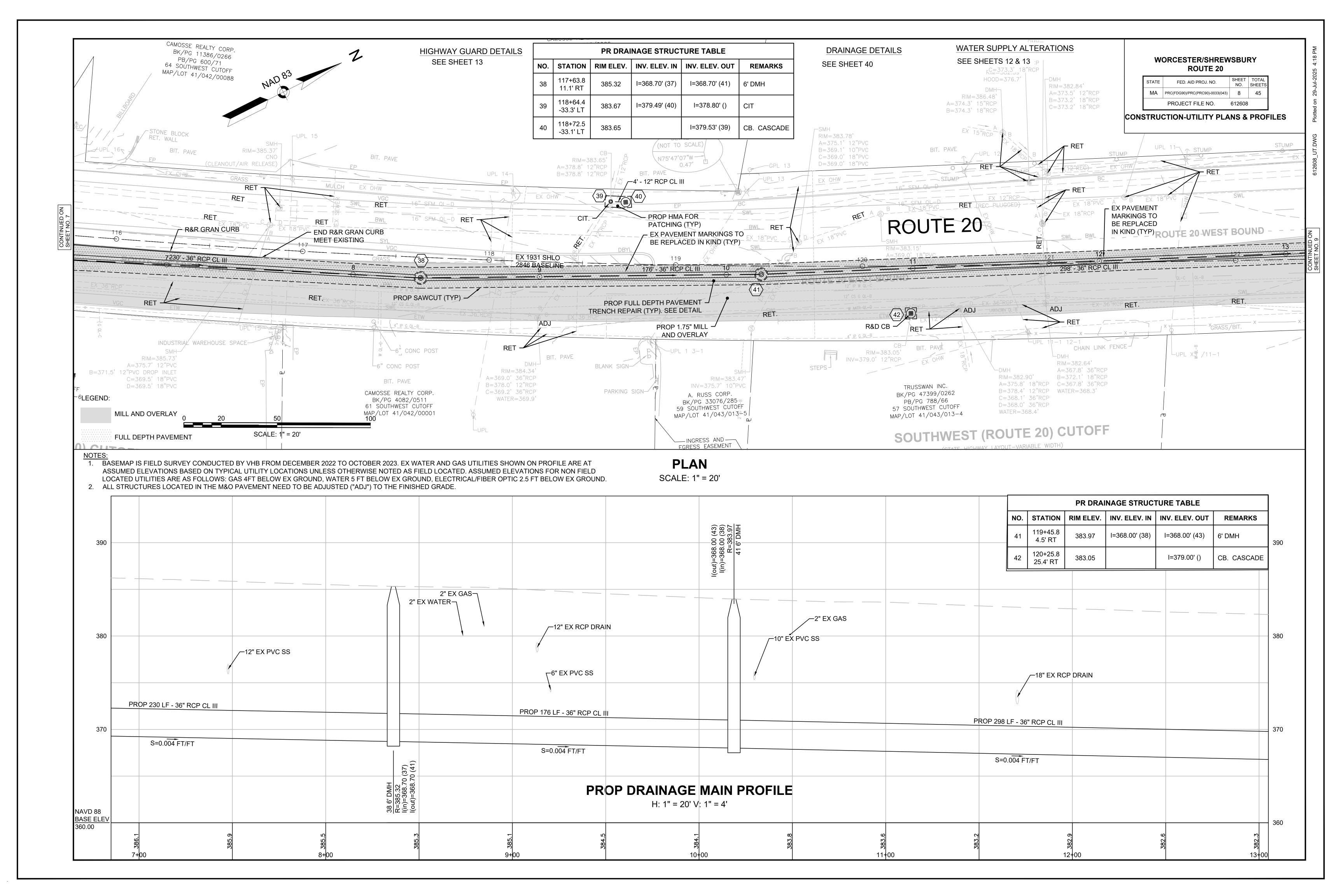


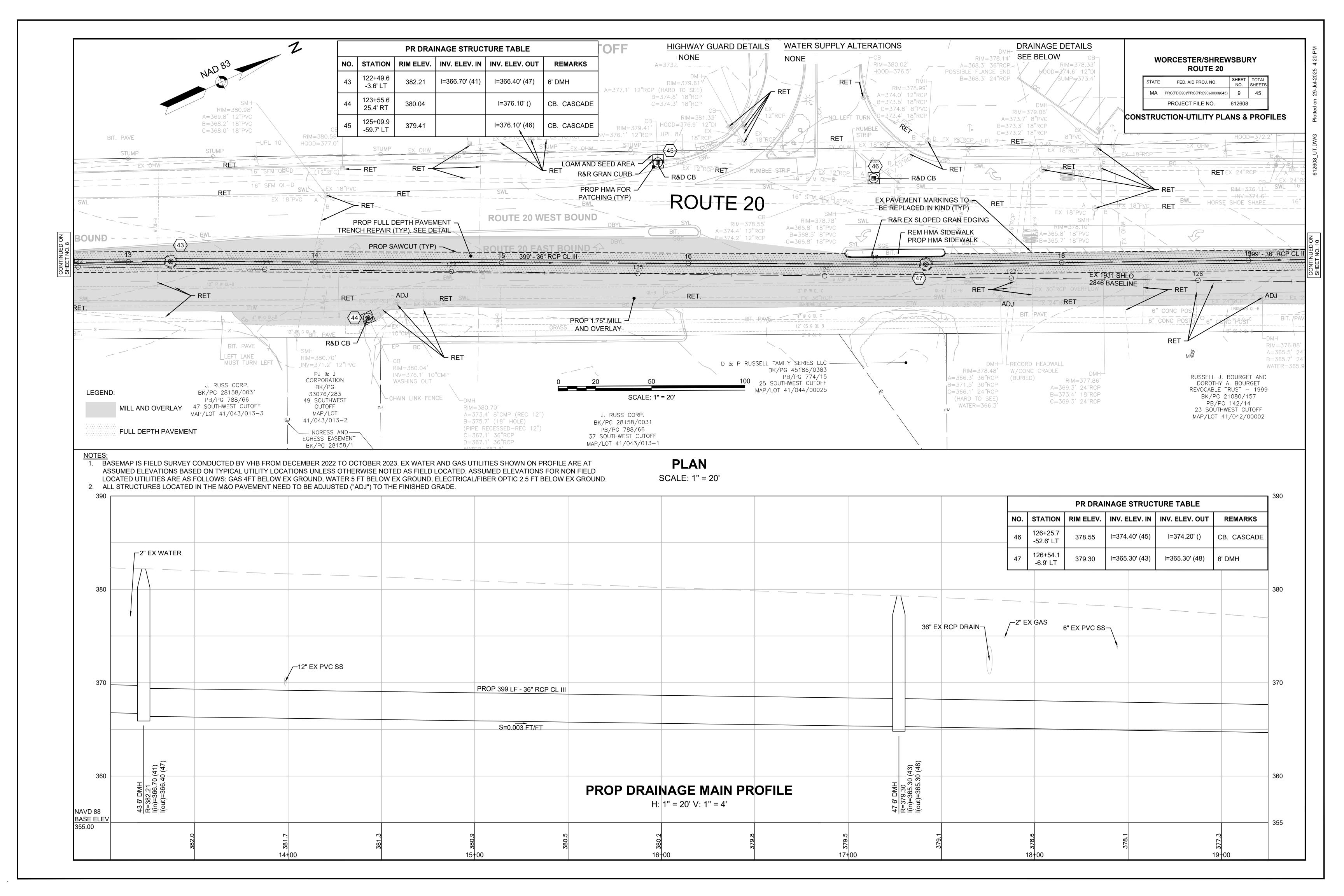
	PR DRAINAGE STRUCTURE TABLE									
NO.	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS					
1	104+14.4 68.1' RT	395.25		I=390.40' ()	CBCI. CASCADE					
2	104+21.3 -27.3' LT	396.11		I=389.60' ()	CBCI. CASCADE					
3	105+78.6 31.4' RT	387.96		I=382.70' (4)	CBDB. CASCADE					
4	105+94.4 33.6' RT	386.97	I=382.40' (5) I=382.40' (3)	I=382.30' (6)	4' DMH					
5	105+95.5 -33.8' LT	387.20		I=382.90' (4)	CBCI-DB. CASCADE					
6	106+04.9 69.6' RT	390.24	I=381.90' (4) I=379.30' ()	l=379.20' ()	6' DMH					
7	108+74.3 -33.8' LT	378.35		I=374.50' (9)	CBCI-DB. SPEC. GRATE					
8	108+83.1 34.7' RT	378.40		I=374.50' (11)	CBCI-DB. SPEC. GRATE					
9	108+83.3 -33.8' LT	378.29	l=374.40' (7)	I=374.10' (10)	CBCI-DB. SPEC. GRATE					
10	108+83.3 -7.3' LT	379.05	I=373.90' (9)	I=373.90' (14)	4' DMH					
11	108+92.2 34.7' RT	378.35	l=374.40' (8)	I=374.10' (13)	CBCI-DB. SPEC. GRATE					
12	108+92.4 -33.8' LT	378.25		I=374.40' (16)	CBCI-DB. SPEC. GRATE					
13	108+93 25.8' RT	378.50	I=374.00' (11)	I=374.00' (19)	4' DMH					

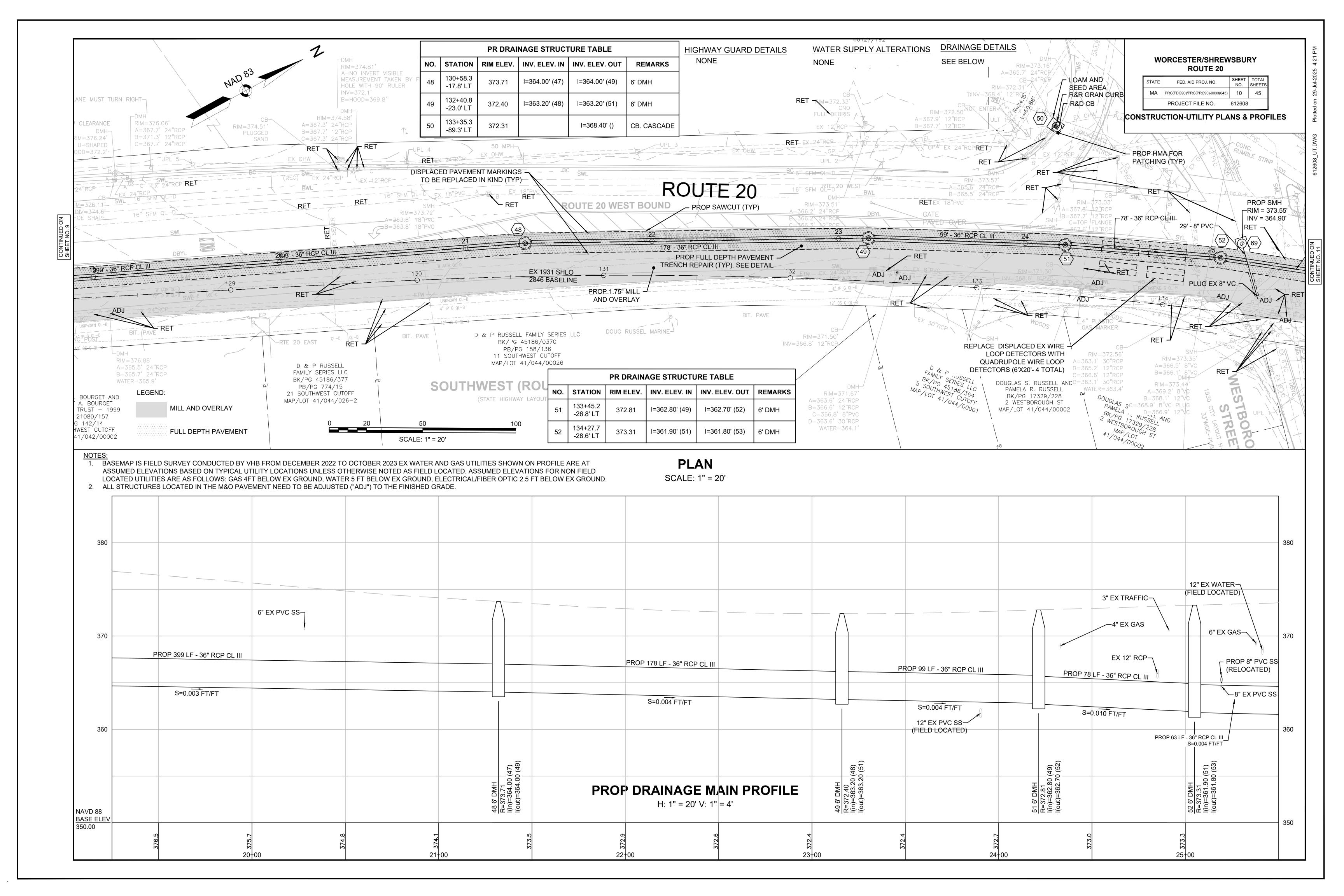
		PR D	RAINAGE STR	RUCTURE TABLE	
NO.	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
14	109+01.2 -7.3' LT	379.02	I=373.80' (16) I=373.80' (10)	I=373.30' (21)	4' DMH
15	109+01.3 34.8' RT	378.30		I=374.50' (17)	CBCI-DB. SPEC. GRATE
16	109+01.7 -33.5' LT	378.09	I=374.30' (12)	I=374.00' (14)	CBCI-DB. SPEC. GRATE
17	109+10 34.7' RT	378.41	I=374.40' (15)	I=374.10' (19)	CBCI-DB. SPEC. GRATE
18	109+10.3 -33.9' LT	378.30		I=374.50' (22)	CBCI-DB. SPEC. GRATE
19	109+10.8 25.4' RT	378.58	I=373.80' (13) I=373.80' (17)	I=373.30' (24)	4' DMH
20	109+19.1 34.8' RT	378.50		I=374.70' (23)	CBCI-DB. SPEC. GRATE
21	109+19.3 -7.3' LT	379.13	I=373.90' (22) I=373.20' (14)	I=372.70' (25)	5' DMH
22	109+19.4 -34.0' LT	378.40	I=374.40' (18) I=375.40' ()	I=374.10' (21)	CBCI-DB. SPEC. GRATE
23	109+28.3 34.6' RT	378.62	l=374.60' (20)	I=374.40' (24)	CBCI-DB. SPEC. GRATE
24	109+28.5 24.9' RT	378.83	I=373.10' (19) I=374.30' (23)	I=372.60' (25)	5' DMH
25	109+30.8 13.1' RT	379.12	I=372.50' (21) I=372.50' (24)	I=372.40' (31)	6' DMH

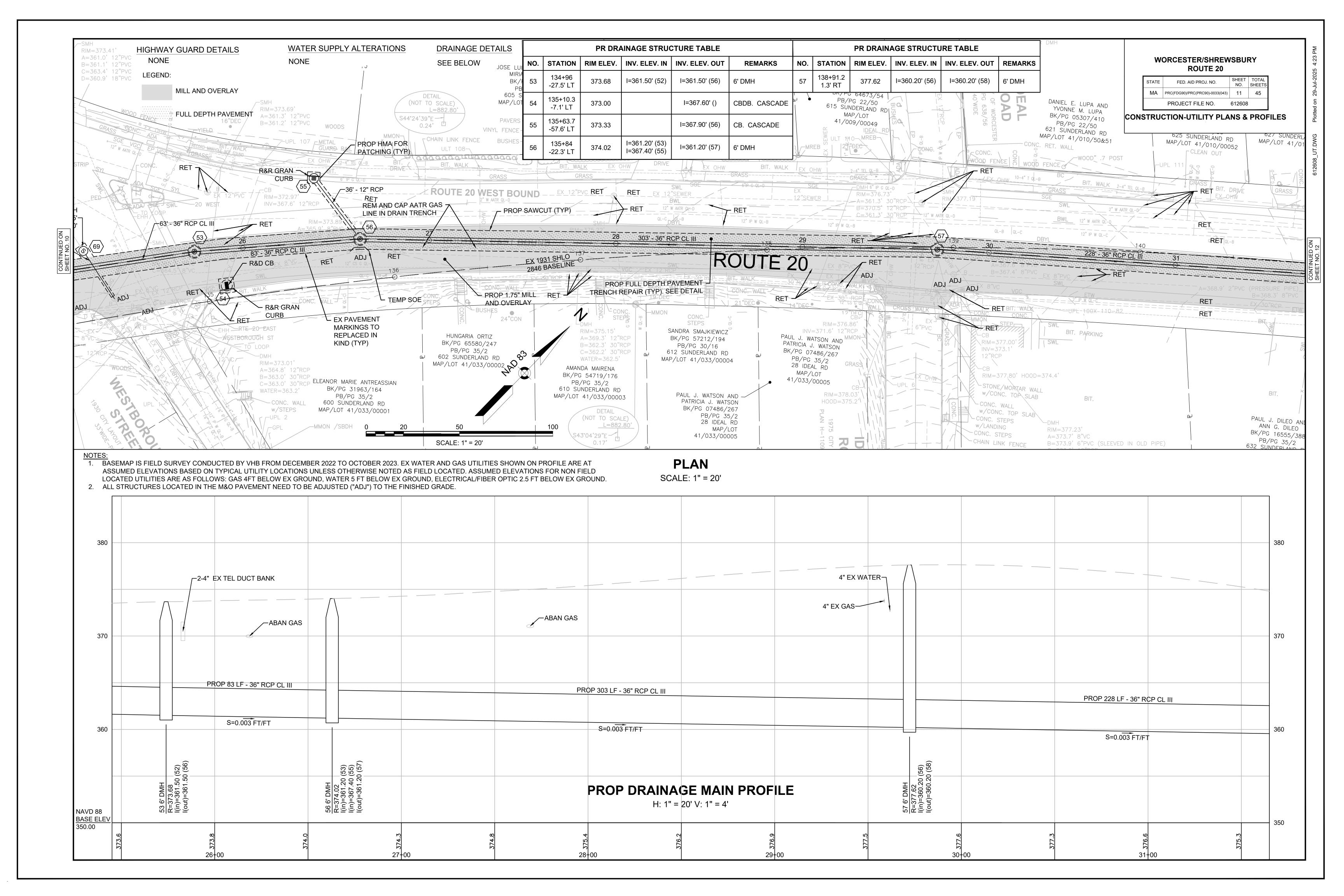


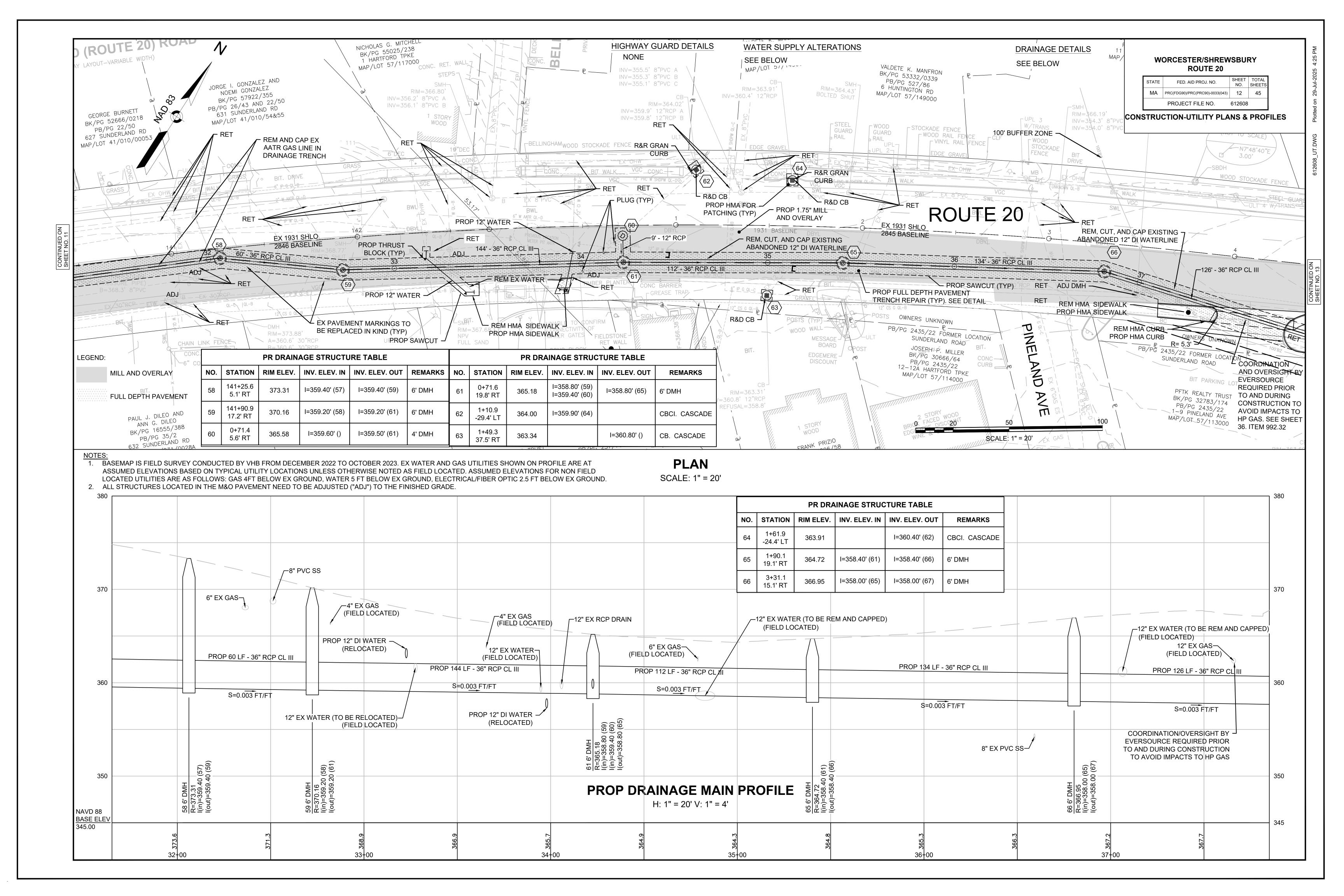


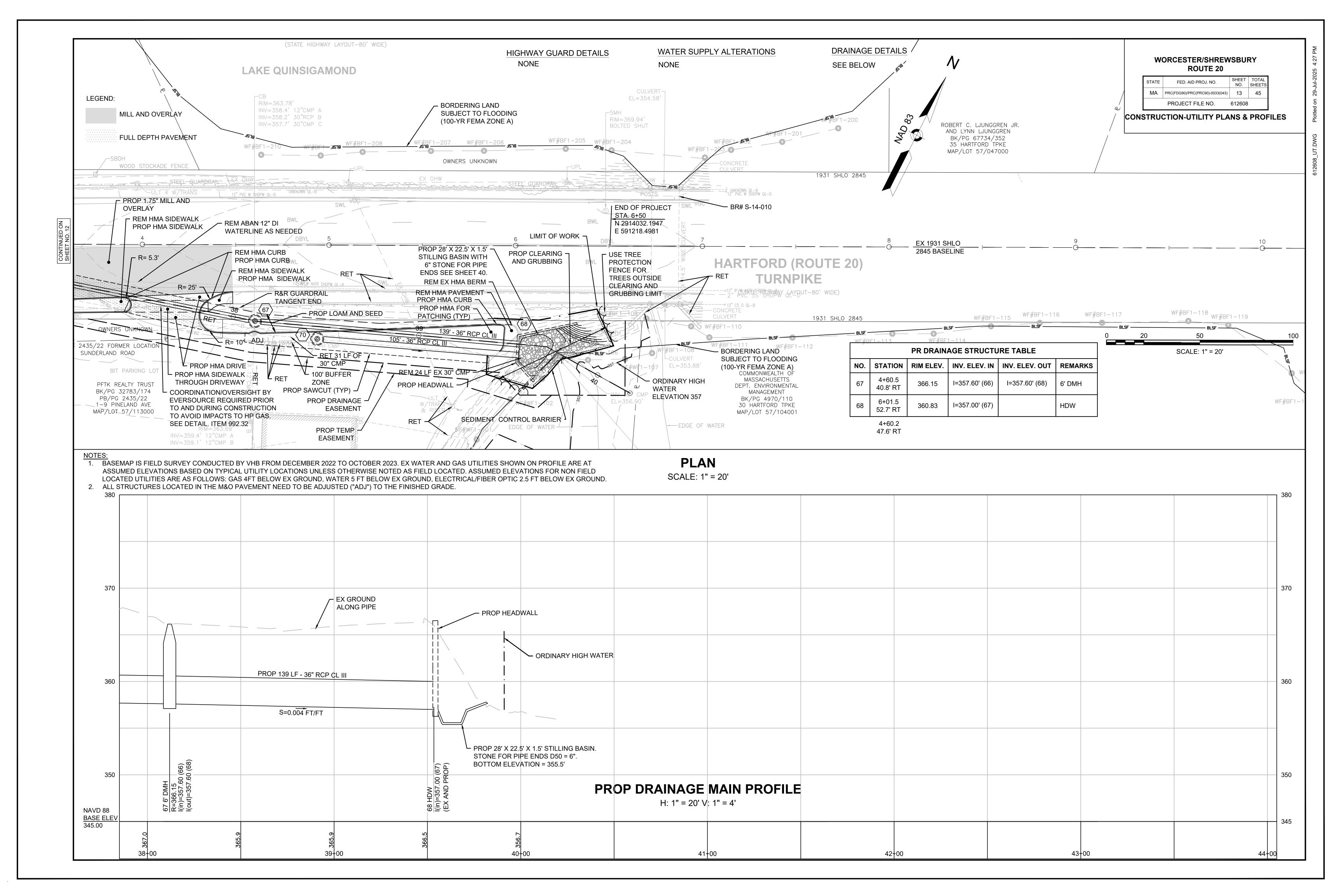








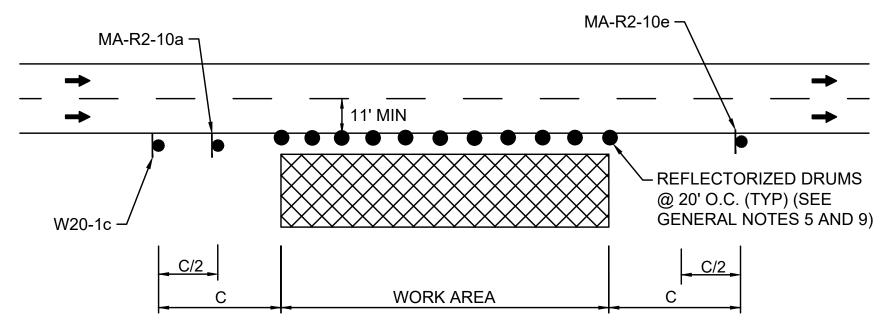




GENERAL NOTES

- ALL CONSTRUCTION SIGNING, TEMPORARY TRAFFIC CONTROL DEVICES, AND ROADSIDE ELEMENTS SHALL CONFORM WITH THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AS AMENDED, THE MASSDOT STANDARD DETAILS AND DRAWINGS FOR THE DEVELOPMENT OF TEMPORARY TRAFFIC CONTROL PLANS, THE LATEST REVISIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, (AASHTO) ROADSIDE DESIGN GUIDE, AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, AND THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).
- 2. WORK HOURS SHALL BE AS STATED IN THE CONTRACT DOCUMENTS UNLESS APPROVED BY MASSDOT.
- 3. HOLIDAY WORK RESTRICTION SHALL BE IN ACCORDANCE WITH CONTRACT DOCUMENTS UNLESS APPROVED BY THE RESIDENT ENGINEER
- 4. ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (MAAB) AND AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) REQUIREMENTS AND PUBLIC RIGHTS-OF WAY ACCESSIBILITY GUIDELINES (PROWAG).
- ALL DRUMS OUTSIDE TAPERS ON ROUTE 20 SHALL BE SET AT 40' ON CENTER MAX. AND ALL DRUMS OUTSIDE TAPERS ON ALL OTHER ROADWAYS SHALL BE SET AT 20' ON CENTER MAX. UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
- 6. ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN SAFE AND REASONABLE ABUTTER ACCESS. WORK MAY REQUIRE ADDITIONAL SIGNS, DRUMS AND OTHER TRAFFIC CONTROL DEVICES, GRADING AND TEMPORARY PAVEMENT FOR PASSAGE OF PEDESTRIAN, VEHICULAR AND EMERGENCY TRAFFIC THROUGH THE WORK AREAS, BOTH DURING AND AFTER WORKING HOURS, TO MAINTAIN SUCH ACCESS.
- 7. THE FIRST 10 DRUMS ON MERGING TAPERS SHALL BE REFLECTORIZED DRUMS WITH SEQUENTIAL FLASHING WARNING LIGHTS AND SHALL BE OPERATING, AT A MINIMUM, BETWEEN DUSK AND DAWN, WHEN MERGING TAPER IS DEPLOYED.
- 8. REFLECTORIZED CONES SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT
- 9. CONES MAY BE USED IN LIEU OF DRUMS OUTSIDE OF TAPER AREAS.
- 10. THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 48 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OR RESTRICTION OF ACCESS.
- 11. FOR DROP-OFFS 3" OR LESS WITHIN THE CLEAR ZONE, CONDITION MAY BE MITIGATED WITH W8-9 (LOW SHOULDER) SIGN OR TEMPORARY CHANNELIZATION DEVICES. FOR DROP-OFFS GREATER THAN 3" BUT NO MORE THAN 36", DETERMINE WHETHER IT IS MORE COST EFFECTIVE TO INSTALL BOTH W8-9 SIGN AND TEMPORARY CHANNELIZATION DEVICES IN ACCORDANCE WITH MASSDOT WORK ZONE SAFETY GUIDE OR W8-9 SIGN WITH A 2H:1V (MIN) WEDGE OR TO REMOVE THE HAZARD. FOR DROP-OFFS 36" OR GREATER USE TEMPORARY BARRIER IN ACCORDANCE WITH MASSDOT WORK ZONE POSITIVE PROTECTION GUIDELINES.
- 12. CONSTRUCTION CLEAR ZONE SHALL BE IN ACCORDANCE WITH MASSDOT BOSTON TRAFFIC GUIDELINES AS FOLLOWS:
 - 4' IF POSTED SPEED IS LESS THAN 35 MPH
 - 8' IF POSTED SPEED IS 35 MPH 15' IF POSTED SPEED IS 40 MPH
- 13. ALL TEMP BARRIERS SHALL MEET OR EXCEED MASH TL-3 REQUIREMENTS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
- 14. THE CONTRACTOR SHALL PROVIDE TEMPORARY IMPACT ATTENUATORS TO PROTECT ALL BLUNT-ENDS OF TEMPORARY BARRIER OR AS REQUIRED BY THE ENGINEER. ALL TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED TO MEET OR EXCEED MASH TEST LEVEL 3 (TL-3).
- 15. CONTRACTOR SHALL HAVE TRUCK MOUNTED ATTENUATORS (1 PER CLOSED LANE OR USABLE SHOULDER) IN ADVANCE OF WORK AREA FOR ALL TEMPORARY WORKZONES ON ROUTE 20 OR AS DIRECTED BY THE ENGINEER.
- 16. PROVIDE CLEAR ZONES AROUND TRUCK MOUNTED ATTENUATORS AS REQUIRED BY THE MANUFACTURER.
- 17. 11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED UNLESS OTHERWISE NOTED.
- 18. TEMPORARY TRAFFIC CONTROL DEVICES AND SIGNS SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS WHEN NOT IN USE.
- 19. SIGNS INSTALLED ON PORTABLE STANDS REQUIRE 12 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
- 20. SIGNS INSTALLED ON PORTABLE STANDS PLACED AMONG CHANNELIZATION DEVICES REQUIRE A 36 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.

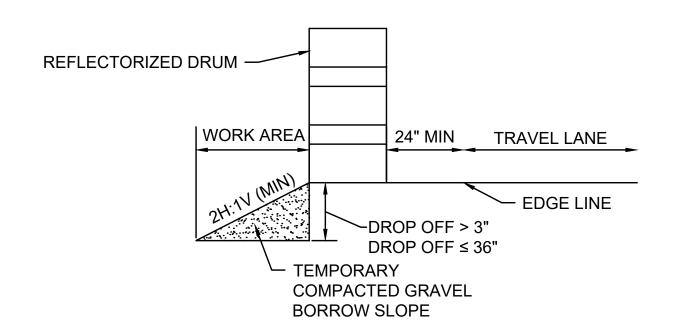
- 21. SIGNS MOUNTED ON POSTS REQUIRE A MINIMUM 84 INCH MOUNTING HEIGHT FROM THE ROADWAY OR SIDEWALK SURFACE TO THE BOTTOM OF THE SIGN. CONTRACTOR SHALL MAINTAIN A MINIMUM SIDEWALK HORIZONTAL CLEAR WIDTH OF 36" AT ALL TIMES.
- 22. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN MASH CRASH TESTED SIGN SUPPORTS AND INSTALLED IN ACCORDANCE WITH THE MUTCD. SIGNS SHALL NOT BE MOUNTED TO OR LEANED AGAINST DRUMS OR CONES.
- 23. ARROW BOARD FLASHING CAUTION SHALL FLASH IN FOUR-POINT CAUTION MODE ONLY.
- 24. W21-7 SIGNS SHALL BE INSTALLED IN ADVANCE (350' MIN) OF AREAS WHERE UTILITY CASTINGS HAVE BEEN RAISED IN ADVANCE OF PAVING OPERATIONS OR AS REQUESTED BY THE ENGINEER.
- 25. TEMPORARY MARKINGS SHALL BE WATER-BORNE PAINT OR SURFACE-APPLIED REMOVABLE TAPE, AS APPROVED BY THE ENGINEER.
- 26. ALL TEMPORARY CROSSWALKS AND STOP LINES SHALL BE 12 INCHES WIDE
- 27. ALL TEMPORARY DOUBLE YELLOW LINES (DBYL) SHALL BE 6 INCHES WIDE.
- 28. W20-1c, MA-R2-10a OR MA-R2-10e SIGNS SHOWN ON ADVANCE SIGN SCHEMATIC MAY BE USED IN LIEU OF THOSE SIGNS SHOWN ON TYPICAL DETAILS ON THE TEMPORARY TRAFFIC CONTROL PLANS IF MINIMUM SIGN SPACING IS MET.
- 29. CONTRACTOR SHALL SECURE WORK AREAS BY APPROPRIATE MEANS, TO PREVENT UNAUTHORIZED ACCESS AT ALL TIMES.
- 30. THERE IS NO DESIGNATED BICYCLE LANE ON THE ROADWAY WITHIN THE PROJECT LIMITS. BICYCLES ARE EXPECTED TO SHARE THE ROAD WITH GENERAL VEHICULAR TRAFFIC.
- 31. WHEN UTILIZING TYPICAL TRAFFIC CONTROL DETAILS OR STAGING SETUPS, COVER EXISTING CONFLICTING ADVANCE WARNING SIGNS AS REQUIRED TO COMPLETE THE WORK.
- 32. PRIOR TO START OF ANY WORK, CONTRACTOR SHALL ESTABLISH A STATIC WORK ZONE SPEED LIMIT IN ACCORDANCE WITH MASSDOT STANDARDS.
- 33. NIGHTTIME WORK SHALL REQUIRE PRIOR APPROVAL FROM MASSDOT.
- 34. ILLUMINATION REQUIRED FOR NIGHTTIME WORK APPROVED BY THE ENGINEER SHALL BE DIFFUSED OR ANTI-GLARE LIGHTING AND IN ACCORDANCE WITH MASSDOT STANDARDS.



- SEE ADVANCED SIGN SPACING CHART ON SHEET 14.
- 2. SEE TTCP GENERAL NOTES ON SHEET 14 FOR ADDITIONAL INFORMATION.
- 3. AT END OF WORK SHIFT, CONTRACTOR TO RESTORE TRAFFIC BACK TO ORIGINAL CONDITION.

TYPICAL WORK BEYOND THE SHOULDER

SCALE: NTS



WORCESTER/SHREWSBURY **ROUTE 20**

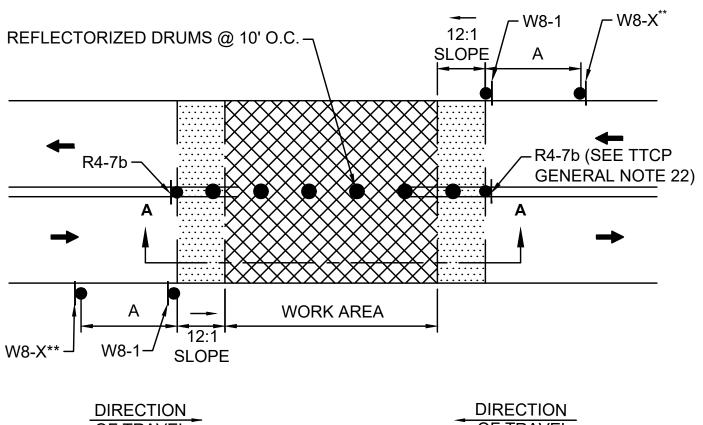
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	PRC(FDG90)/PRC(PRC90)-0033(043)	14	45
	PROJECT FILE NO. 6°	12608	

TEMPORARY TRAFFIC CONTROL PLANS **GENERAL NOTES & LEGEND**

1. CONTRACTOR SHALL INSTALL W8-9 SIGN ON ALL ROADWAYS 350 FT IN ADVANCE OF THE START OF DROP-OFF CONDITION.

TYPICAL ROADWAY DROP-OFF PROTECTION

SCALE: NTS



OF TRAVEL GRAVEL BORROW/ SUBBASE **SECTION A-A**

- 1. SQUARE OFF THE FULL WIDTH OF THE ROADWAY AT THE END OF WORK
- 2. ** CONTRACTOR SHALL INSTALL W8-1 AT LIMIT OF EXCAVATION AND A W8-3. W8-8. W8-15. OR W8-24 SIGN. AS APPROPRIATE. ON ALL ROADWAYS IN ADVANCE OF THE TRANSITION UNLESS OTHERWISE APPROVED BY THE ENGINEER.

TEMPORARY PAVEMENT TRANSITION

SCALE: NTS

		1			
BUFFER SF	PACING	ADVANCE SIGN S	SPACING		
SPEED	DISTANCE		DISTANCE E	BETWEEN SI	GNS (FEET)
(MPH)	(FEET)	ROADWAY	А	В	С
15	80	ROUTE 20	500	500	500
20	115	GRAFTON ST (ROUTE 122),	350	350	350
25	155	SUNDERLAND AVE ALL OTHER ROADWAYS	100	100	100
30	200	ALL OTTLIN NOADWATS	100	100	100
35	250				
40	305				

LEGE	END
	POLICE OFFICER
S	TRAFFIC SIGNAL
•	REFLECTORIZED DRUM
•	REFLECTORIZED DRUMS WITH SEQUENTIAL FLASHING WARNING LIGHTS (SEE NOTE 7)
•	TEMPORARY CONSTRUCTION SIGN
A	TRAFFIC CONE
-	TYPE III BARRICADE
→	ARROW BOARD (AB) (RIGHT OR LEFT)
• •	ARROW BOARD (AB) (CAUTION)
ТМА	TRUCK MOUNTED ATTENTUATOR
	TEMPORARY BARRIER
А	TEMPORARY IMPACT ATTENUATOR (TYPE NOTED)
	WORK AREA (PUBLIC ACCESS RESTRICTED)
	TRANSITION/BUFFER AREAS
+	TRAFFIC FLOW
* /	PEDESTRIAN ROUTE
100	CONSTRUCTION FENCE
CARRIAN.	TEMPORARY PEDESTRIAN BARRICADE
NTS	NOT TO SCALE
TTCP	TEMPORARY TRAFFIC CONTROL PLAN

LANE TAPER LENGTH FORMULAS

L= TAPER LENGTH IN FEET
W= WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED IN FEET
S= POSTED SPEED LIMIT IN MPH
POSTED SPEED
40 MPH OR LESS
$L = \frac{WS^2}{60}$

STAGING NOTES:

- CONTRACTOR SHALL DEVELOP AND SUBMIT TEMPORARY TRAFFIC CONTROL PLANS (TTCP) FOR ALL WORK ACTIVITIES INCLUDING DRAINAGE PIPE AND MANHOLE CONSTRUCTION FOR MASSDOT REVIEW AND APPROVAL. TTCP PROVIDED HEREIN ARE SUGGESTED SETUPS AND CAN BE USED AS A GUIDE. ALL PLAN DEVELOPMENT AND THEIR IMPLEMENTATION SHALL BE INCIDENTAL TO THE PROJECT.
- 2. NO WORK TO BE PERFORMED WITHIN THE TRAVEL WAY AT THE SIGNALIZED INTERSECTION OF ROUTE 20/SUNDERLAND RD/WESTBOROUGH ST DURING THE PEAK TRAFFIC PERIODS (MONDAY THRU FRIDAY 7-9 AM, 3-6 PM).
- 3. ONE LANE (11' MIN) IN EACH DIRECTION MUST REMAIN OPEN AT ALL TIMES FOR THE REMAINDER OF THE CORRIDOR.
- 4. WORK REQUIRING THE DETOUR OF TRUCKS FROM THE ROUTE 122 NORTHBOUND RAMP MUST BE EXPEDITED. THE DETOUR SHALL NOT BE IN PLACE FOR MORE THAN 1 WEEK UNLESS APPROVED BY THE ENGINEER.
- 5. ACCESS TO BUSINESSES AND RESIDENCES ALONG THE CORRIDOR MUST BE MAINTAINED.
- 6. MAINTAIN LARGE TRUCK TURN MANEUVERS IN/OUT OF ALL COMMERCIAL DRIVEWAYS WITHIN THE PROJECT LIMITS AT ALL TIMES AND AS COORDINATED WITH THE PROPERTY OWNERS.
- 7. MAINTAIN PEDESTRIAN ACCESS AT ALL TIMES.
- 8. ESTABLISH WORK ZONE SPEED LIMIT ON ROUTE 20 AS SHOWN ON SHEET 33 AND DIRECTED BY THE ENGINEER.
- 9. MAINTAIN EXIST TRAFFIC SIGNAL EQUIPMENT AND OPERATIONS AT ROUTE 20/SUNDERLAND RD/WESTBOROUGH ST INTERSECTION AT ALL TIMES UNLESS APPROVED BY THE ENGINEER. ANY TEMPORARY SIGNAL TIMING MODIFICATIONS SHALL BE AS APPROVED BY MASSDOT.
- 10. MAINTAIN ROADWAY DRAINAGE AT ALL TIMES.
- 11. MAINTAIN EMERGENCY VEHICLE ACCESS AT ALL TIMES.

SUGGESTED CONSTRUCTION SEQUENCE:

- 1. CONSTRUCT MANHOLES SECTION-BY-SECTION AS APPROVED BY MASSDOT
- 2. CONSTRUCT DRAINAGE PIPE SECTION-BY-SECTION ALONG ROUTE 20 AS SUGGESTED BELOW AND APPROVED BY MASSDOT:

STA 0+00 TO 6+40	LONG-TERM BARRIER SETUP (SHEETS 23-25) – COORDINATION WITH ABUTTERS AND LARGE TRUCK ACCESS IN/OUT OF THE COMMERCIAL DRIVEWAYS SHALL BE MAINTAINED. DETOUR TRUCKS FROM THE ROUTE 122 NORTHBOUND RAMP (SHEETS 36 & 37). EXPEDITE WORK TO LIMIT DETOUR DURATION
STA 6+40 TO 13+50	LONG-TERM BARRIER SETUP (SHEETS 27-28) – COORDINATION WITH ABUTTERS AND LARGE TRUCK ACCESS IN/OUT OF THE COMMERCIAL DRIVEWAYS SHALL BE MAINTAINED. RESTRICTED LEFT TURNS INTO THE DRIVEWAY SHALL BE DIRECTED TO ROUTE20/122 INTERCHANGE TO TURNAROUND (SHEET 34). LEFT TURNS OUT OF THE DRIVEWAY SHALL BE DIRECTED TO ROUTE20/140 INTERCHANGE TO TURNAROUND (SHEET 35).
STA 13+50 TO 18+10 (RMV INTERSECTION)	DAILY WORK AT INTERSECTION SETUP (SHEETS ## & ##)
STA 18+10 TO 21+00	LONG-TERM BARRIER SETUP (SHEETS 29-31) – COORDINATION WITH ABUTTERS AND LARGE TRUCK ACCESS IN/OUT OF THE COMMERCIAL DRIVEWAYS SHALL BE MAINTAINED. RESTRICTED LEFT TURNS OUT OF THE DRIVEWAY SHALL BE DIRECTED TO ROUTE20/140 INTERCHANGE TO TURNAROUND (SHEET 35).
STA 21+00 TO 28+00 (RTE20/SUNDERLAND RD/WESTBOROUGH ST INTERSECTION)	 DAILY WORK AT INTERSECTION SETUP (SHEETS ## & ##). WORK ON ROUTE 20 AT SUNDERLAND RD/WESTBOROUGH ST INTERSECTION (SOUTH SIDE) WORK ON ROUTE 20 AT SUNDERLAND RD/WESTBOROUGH ST INTERSECTION (NORTH SIDE)
STA 28+00 TO 32+00	DAILY INTERIOR LANE CLOSURE SETUP (SHEET ##).
STA 32+00 TO 33+00	DAILY HALF ROAD CLOSURE SETUP (SHEET ##).
STA 33+00 TO 38+00	DAILY RIGHT LANE AND SHOULDER CLOSURE SETUP (SHEET ##). MAINTAIN ACCESS TO RESIDENTIAL DRIVEWAYS AT ALL TIMES.
STA 38+00 TO 40+00	TYPICAL OFF-ROADWAY SETUP (SHEET 14).

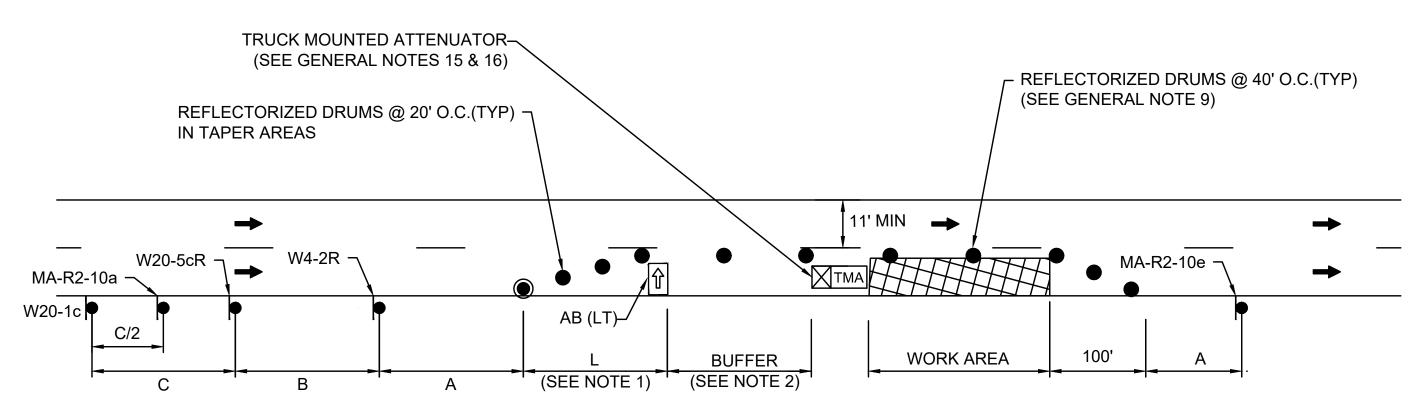
WORCESTER/SHREWSBURY ROUTE 20

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	PRC(FDG90)/PRC(PRC90)-0033(043)	15	45
	PROJECT FILE NO. 6	12608	

TEMPORARY TRAFFIC CONTROL PLANS SUGGESTED CONSTRUCTION STAGING

c so rottold OW

TEMPORARY TRAFFIC CONTROL PLANS TYPICAL DETAILS (1 OF 3)



C/2

₩21-5aR

— REFLECTORIZED DRUMS @ 20' O.C.

IN TAPER AREAS

AB (CAUTION)

-TRUCK MOUNTED ATTENUATOR

(SEE GENERAL NOTES 15 & 16)

-MA-R2-10a

- SEE TAPER LENGTH FORMULA ON SHEET 14.
- SEE BUFFER SPACING CHART ON SHEET 14.
- SEE ADVANCE SIGN SPACING CHART ON SHEET 14.
- 4. SEE TTCP GENERAL NOTE 28 REGARDING ADVANCE SIGNAGE
- 5. AT END OF WORK SHIFT, CONTRACTOR SHALL REPAIR THE PAVEMENT BY THE APPROPRIATE MEANS TO ENSURE HEAVY VEHICLES CAN TRAVERSE SAFELY OVER THE DISTURBED AREA AND RESTORE TRAFFIC BACK TO THE ORIGINAL CONDITION.

TYPICAL ONE LANE CLOSURE - RIGHT DETAIL

SCALE: NTS

MA-R2-10e

SEE TAPER LENGTH FORMULA ON SHEET 14.

100'

2. SEE BUFFER SPACING CHART ON SHEET 14. 3. SEE ADVANCE SIGN SPACING CHART ON SHEET 14.

2. SEE BUFFER SPACING CHART ON SHEET 14.

3. SEE ADVANCE SIGN SPACING CHART ON SHEET 14.

4. SEE TTCP GENERAL NOTE 28 REGARDING ADVANCE SIGNAGE.

TYPICAL ONE LANE CLOSURE - LEFT DETAIL

4. ADVANCE WARNING SIGN PLACEMENT TO BE ADJUSTED BEYOND MINIMUM SPACING SHOWN AS NECESSARY.

WORK AREA

TMA

- 5. SEE TTCP GENERAL NOTE 28 REGARDING ADVANCE SIGNAGE.
- 6. AT END OF WORK SHIFT, CONTRACTOR SHALL REPAIR THE PAVEMENT BY THE APPROPRIATE MEANS TO ENSURE HEAVY VEHICLES CAN TRAVERSE SAFELY OVER THE DISTURBED AREA AND RESTORE TRAFFIC BACK TO THE ORIGINAL CONDITION.

5. AT END OF WORK SHIFT, CONTRACTOR SHALL REPAIR THE PAVEMENT BY THE APPROPRIATE MEANS TO ENSURE HEAVY

VEHICLES CAN TRAVERSE SAFELY OVER THE DISTURBED AREA AND RESTORE TRAFFIC BACK TO THE ORIGINAL CONDITION.

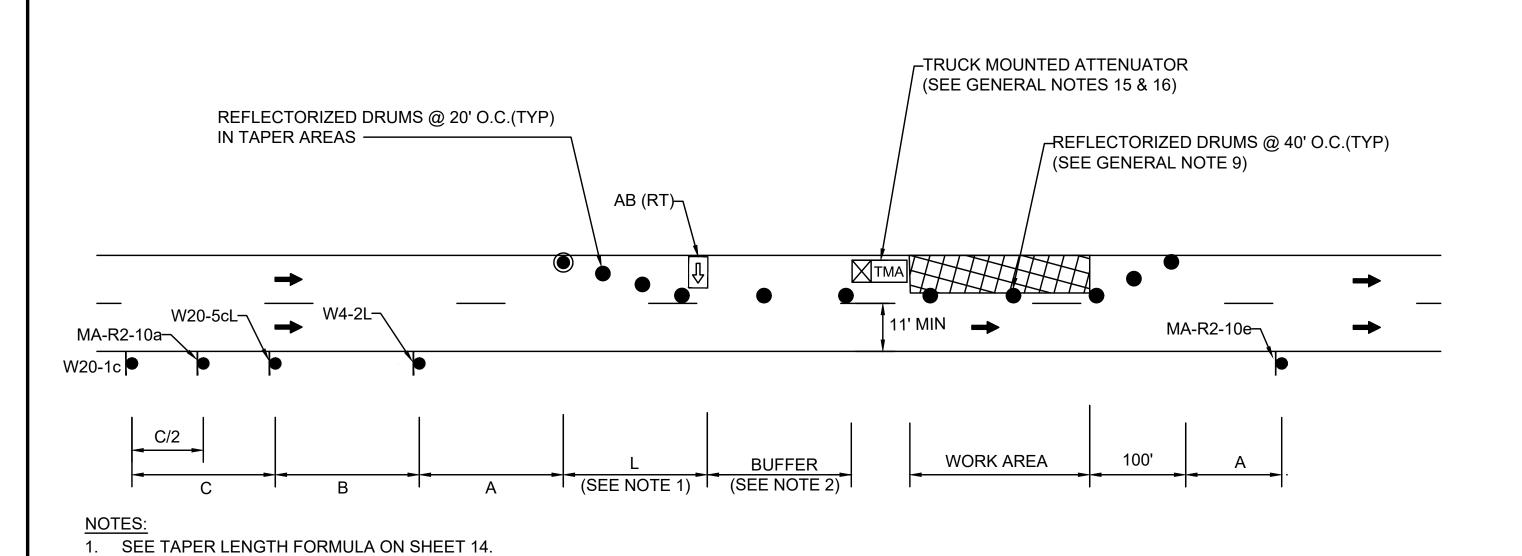
- REFLECTORIZED DRUMS @ 40' O.C.

(TYP) (SEE GENERAL NOTE 9)

TYPICAL SHOULDER CLOSURE - RIGHT DETAIL

SCALE: NTS

SCALE: NTS



BUFFER

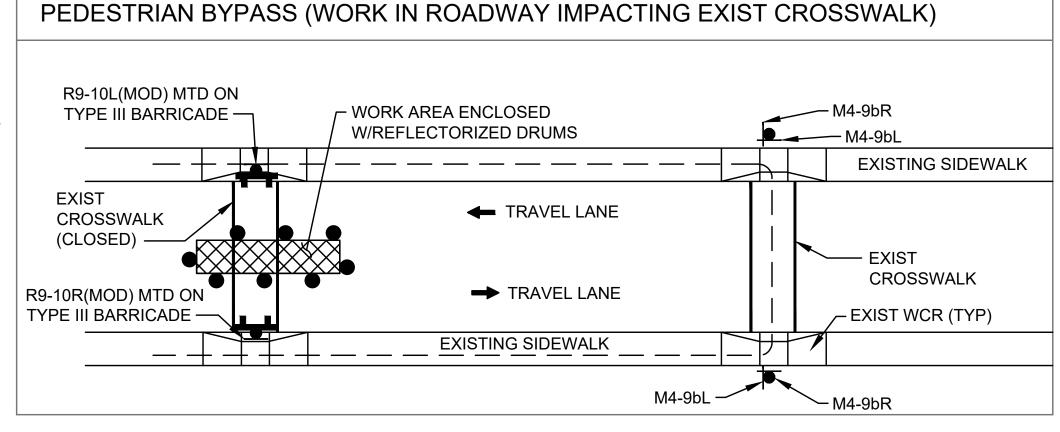
(SEE NOTE 2)

(SEE NOTE 1)

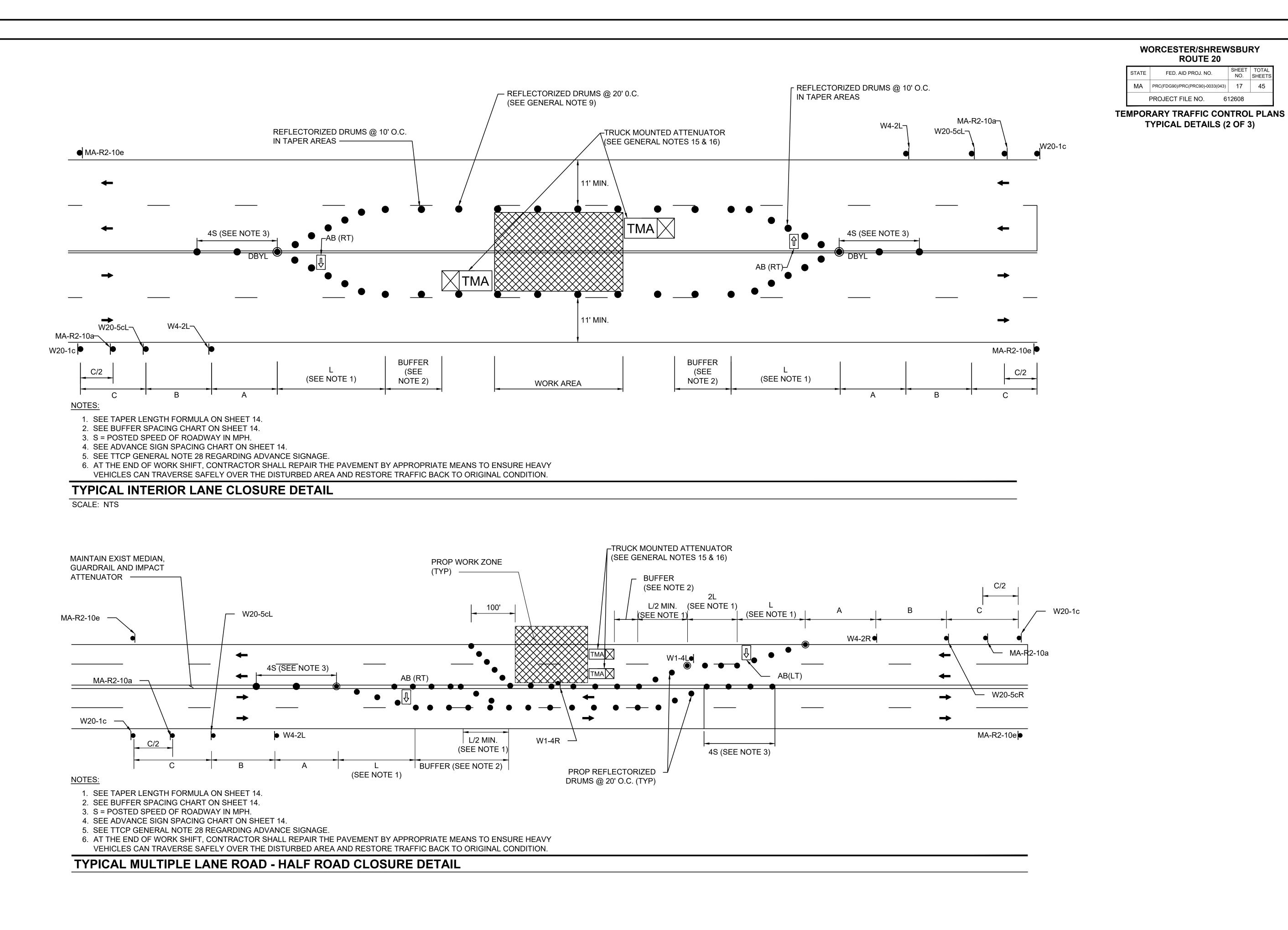
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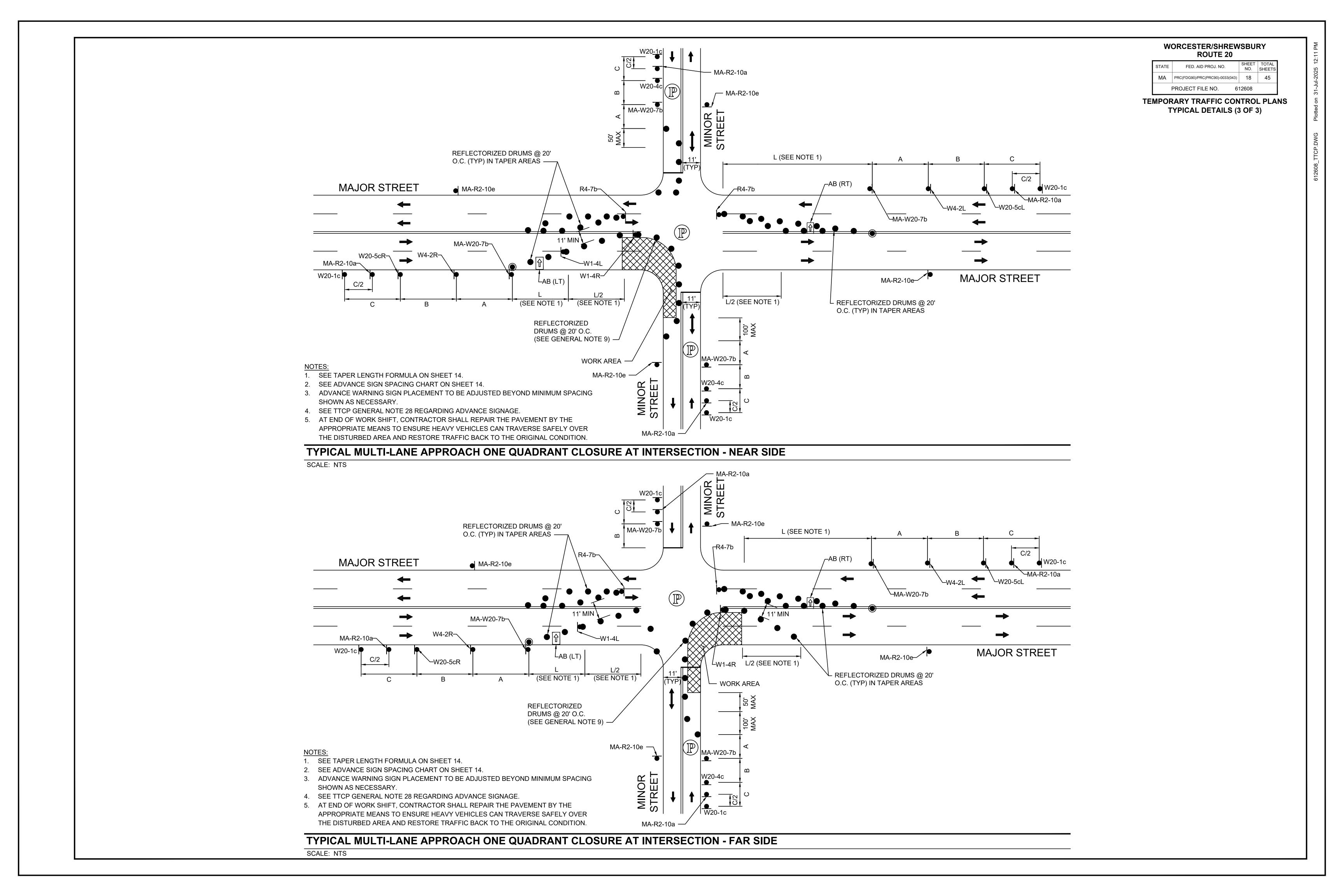
- 1. ADDITIONAL ADVANCE WARNING SIGNS MAY BE NECESSARY AS DETERMINED BY THE ENGINEER.
- 2. CONTROLS FOR PEDESTRIAN TRAFFIC ONLY, ARE SHOWN. VEHICULAR TRAFFIC SHALL BE MAINTAINED AS SHOWN ELSEWHERE.
- 3. STREET LIGHTING SHOULD BE CONSIDERED WHEN LOCATING CONTROL DEVICES.
- TRAVEL.
- 5. ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MAAB AND ADAAG REQUIREMENTS AND INCLUDE THE USE OF A COMPLIANT TEMPORARY PEDESTRIAN DEVICES AT ALL TIMES.
- . CONTRACTOR SHALL MAINTAIN AS WIDE OF A PEDESTRIAN ACCESS AS POSSIBLE AT ALL TIMES. EXCEPT WHERE NECESSARY, THE CONTRACTOR MAY TEMPORARILY REDUCE PEDESTRIAN PATHWAYS TO 4 FEET IN WIDTH (EXCLUDING CURB) FOR NO MORE THAN 200 LINEAR FEET AT A TIME IN ACCORDANCE WITH ALL STANDARDS. A 5' x 5' PASSING AREA SHALL BE PROVIDED IN INTERVALS NOT EXCEEDING 200 FEET
- 7. TEMPORARY PEDESTRIAN BARRICADE SHALL BE PAID FOR UNDER ITEM 852.11 TEMPORARY PEDESTRIAN BARRICADE.
- 8. AT THE END OF WORK SHIFT, CONTRACTOR TO RESTORE SIDEWALK/ CROSSWALK BACK TO ORIGINAL CONDITION.

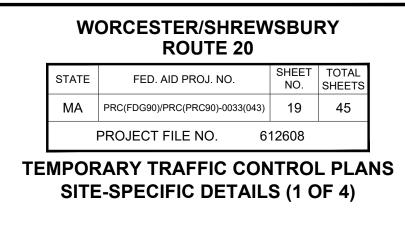
PEDESTRIAN BYPASS (WORK IN SIDEWALK) M4-9bR — M4-9bL M4-9bR — **EXISTING SIDEWALK** EXISTING SIDEWALK **←** TRAVEL LANE - EXIST **EXIST** R9-11L MTD ON **CROSSWALK** CROSSWALK — PEDESTRIAN _ EXIST WCR (TYP) → TRAVEL LANE BARRICADE -R9-9 MTD ON ∽ R9-11R MTD ON TYPE III BARRICADE PEDESTRIAN BARRICADE R9-9 MTD ON TYPE L TEMP PEDESTRIAN WORK AREA ENCLOSED W/CONSTRUCTION FENCING / III BARRICADE — BARRICADE (TYP)

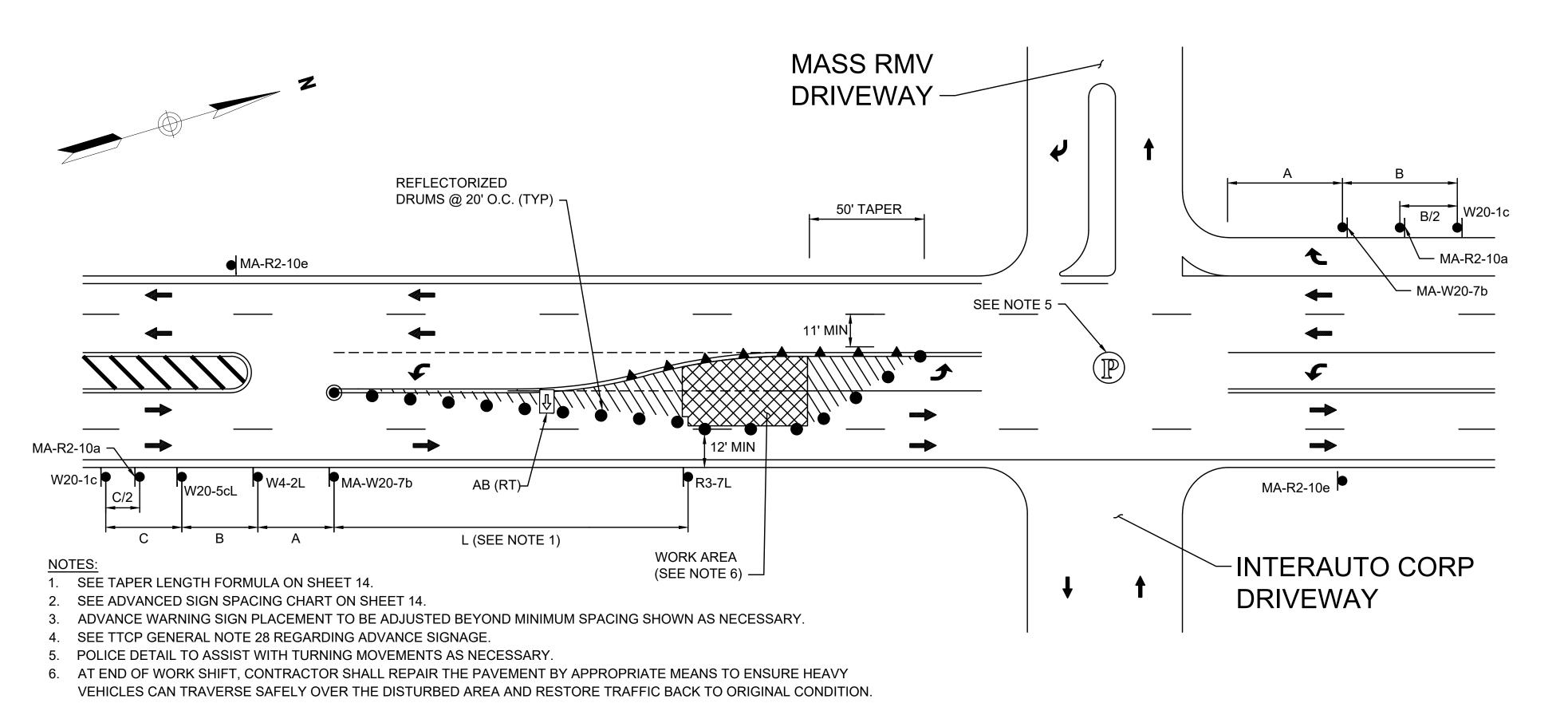


TYPICAL PEDESTRIAN BYPASS DETAILS



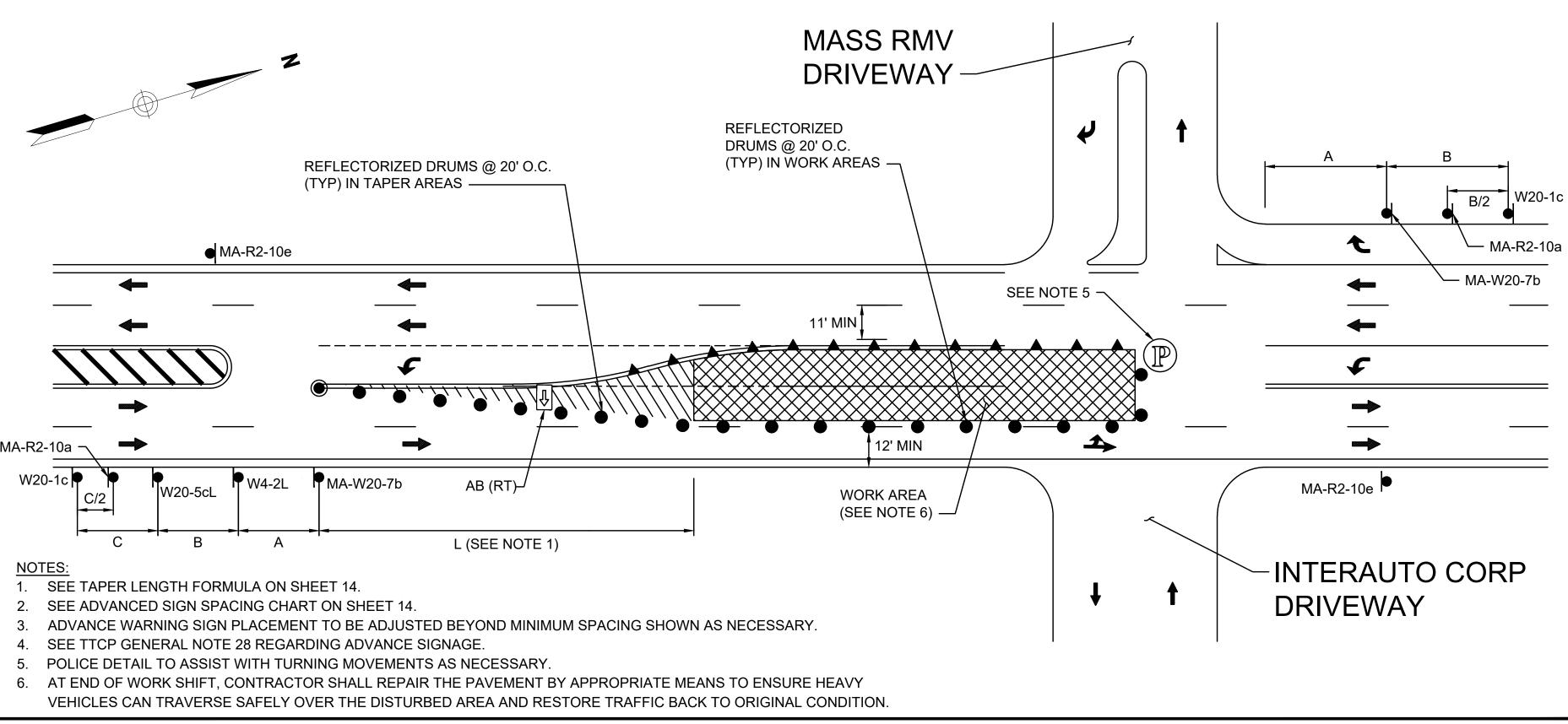






WORK ON ROUTE 20 AT MASS RMV DRIVEWAY INTERSECTION (SOUTH SIDE)

SCALE: NTS



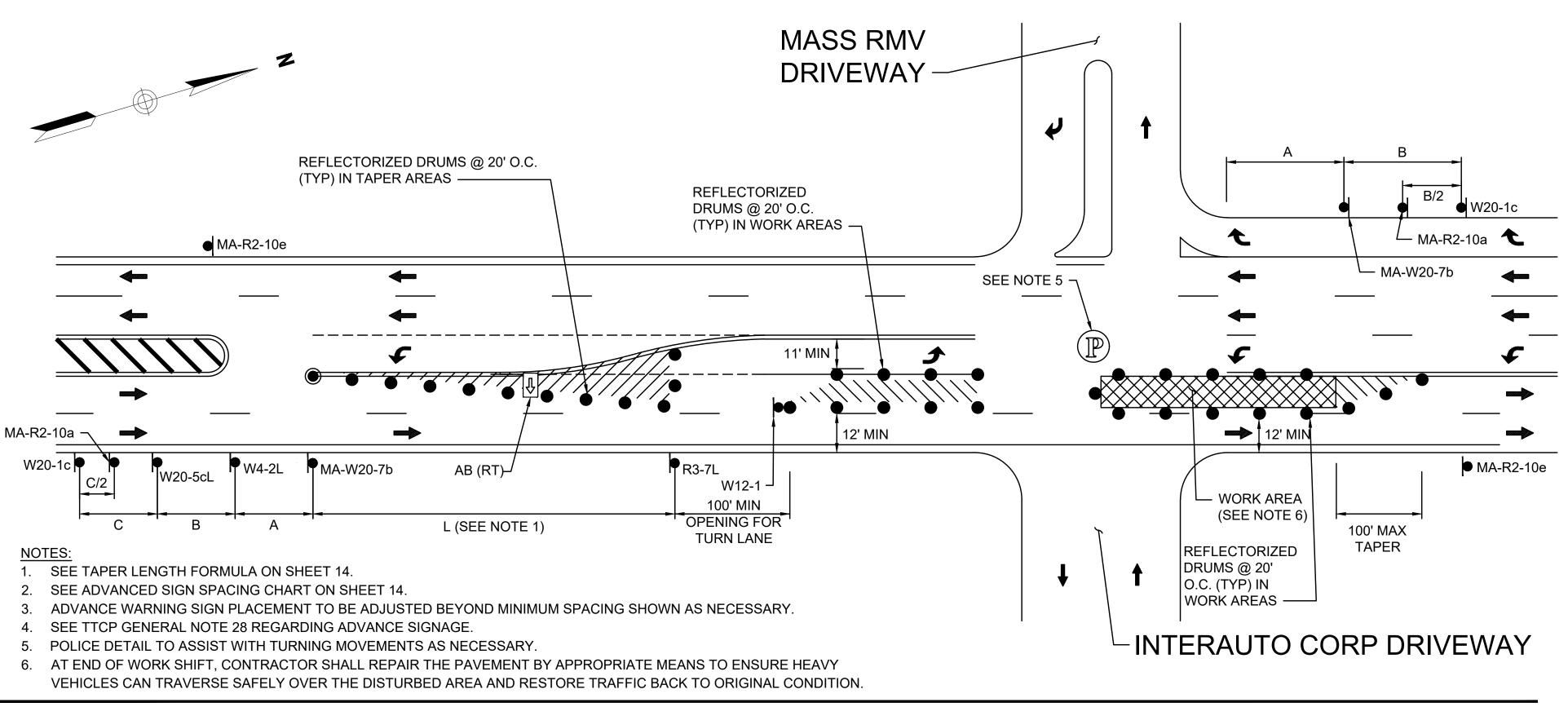
WORK ON ROUTE 20 AT MASS RMV DRIVEWAY INTERSECTION (CENTER)

 STATE
 FED. AID PROJ. NO.
 SHEET NO.
 TOTAL SHEETS

 MA
 PRC(FDG90)/PRC(PRC90)-0033(043)
 20
 45

 PROJECT FILE NO.
 612608

TEMPORARY TRAFFIC CONTROL PLANS SITE-SPECIFIC DETAILS (2 OF 4)



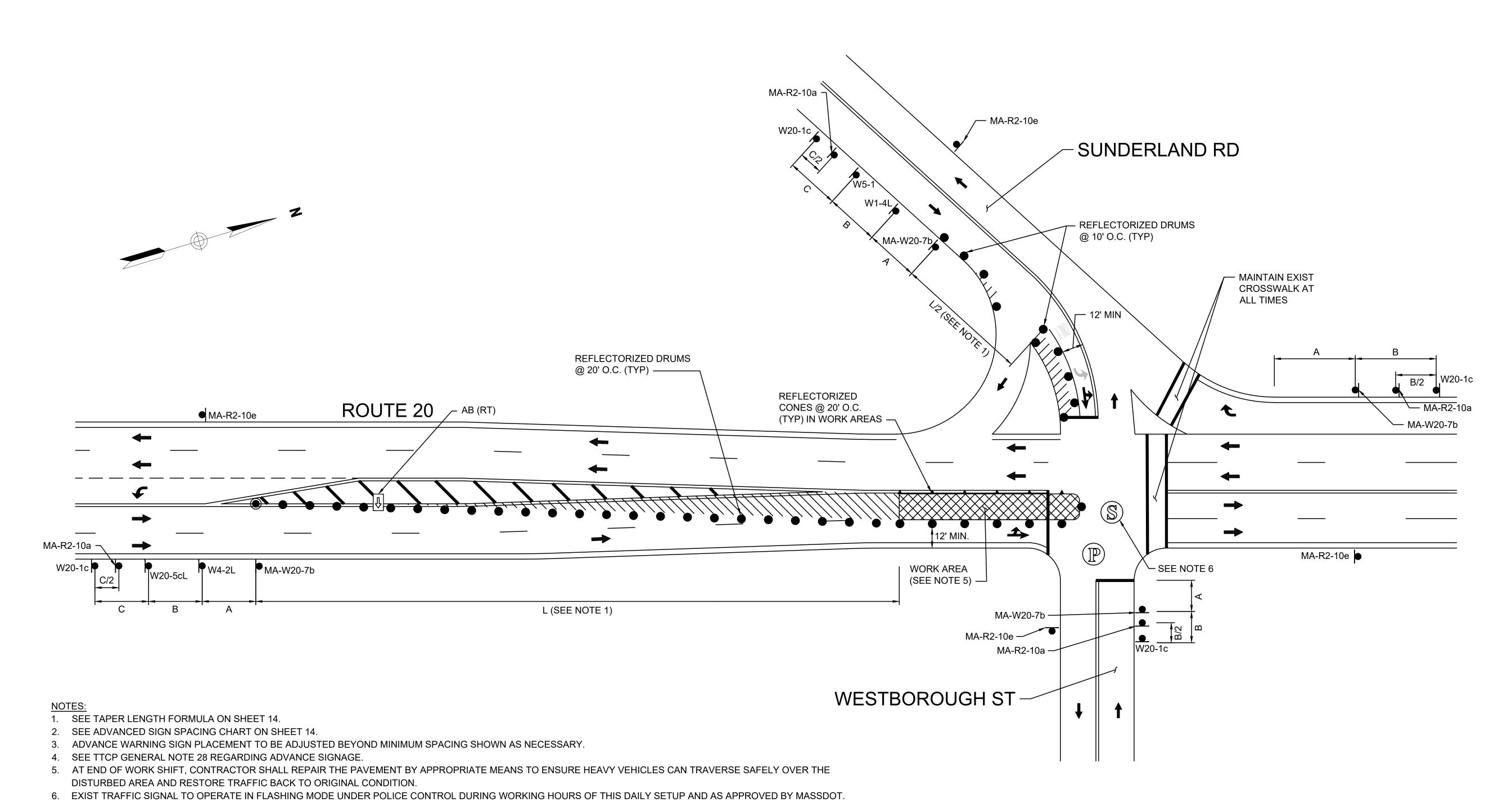
WORK ON ROUTE 20 AT MASS RMV DRIVEWAY INTERSECTION (NORTH SIDE)

STATE FED. AID PROJ. NO. SHEET NO. SHEETS

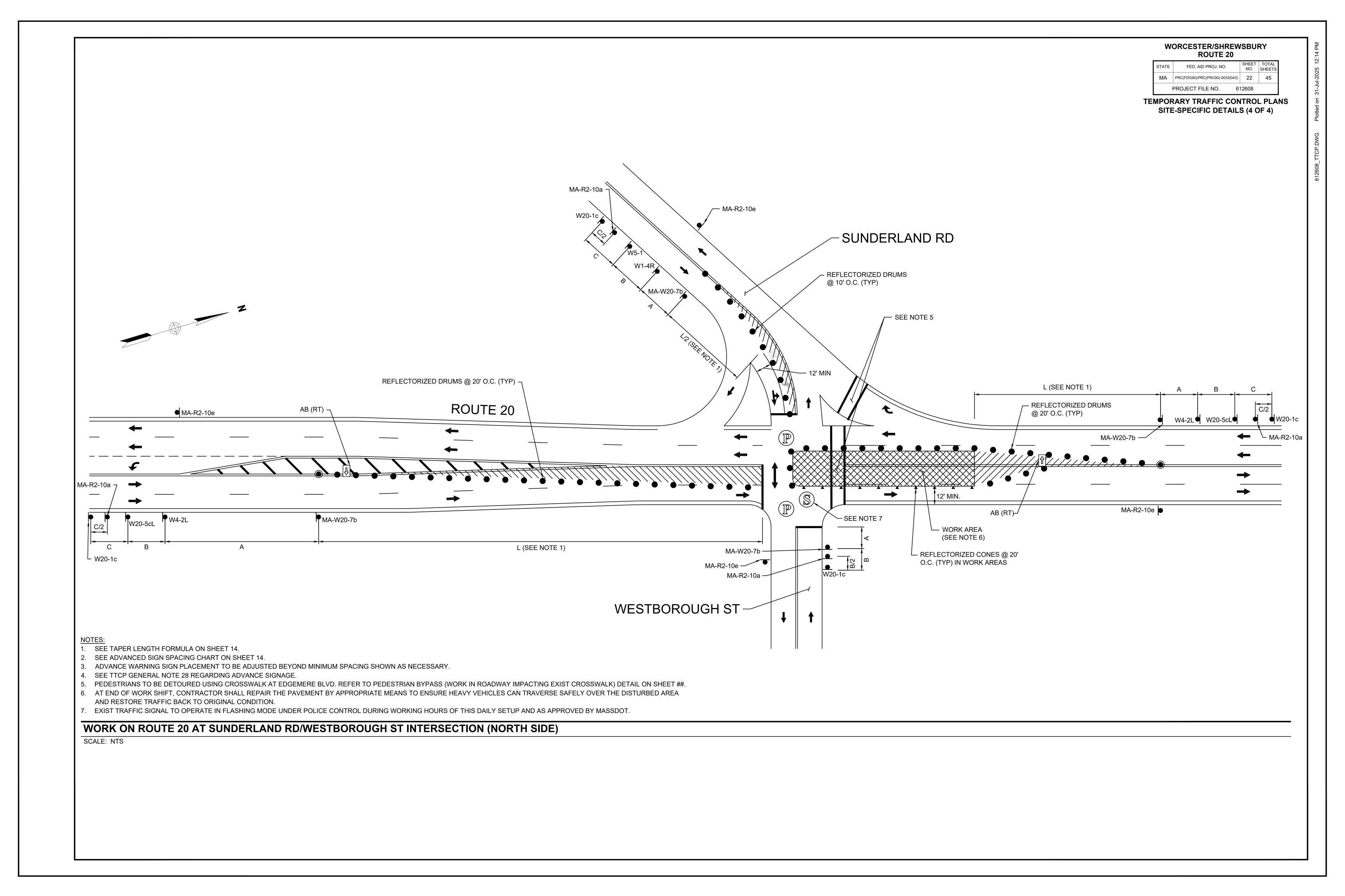
MA PRC(FDG90)/PRC(PRC90)-0033(043) 21 45

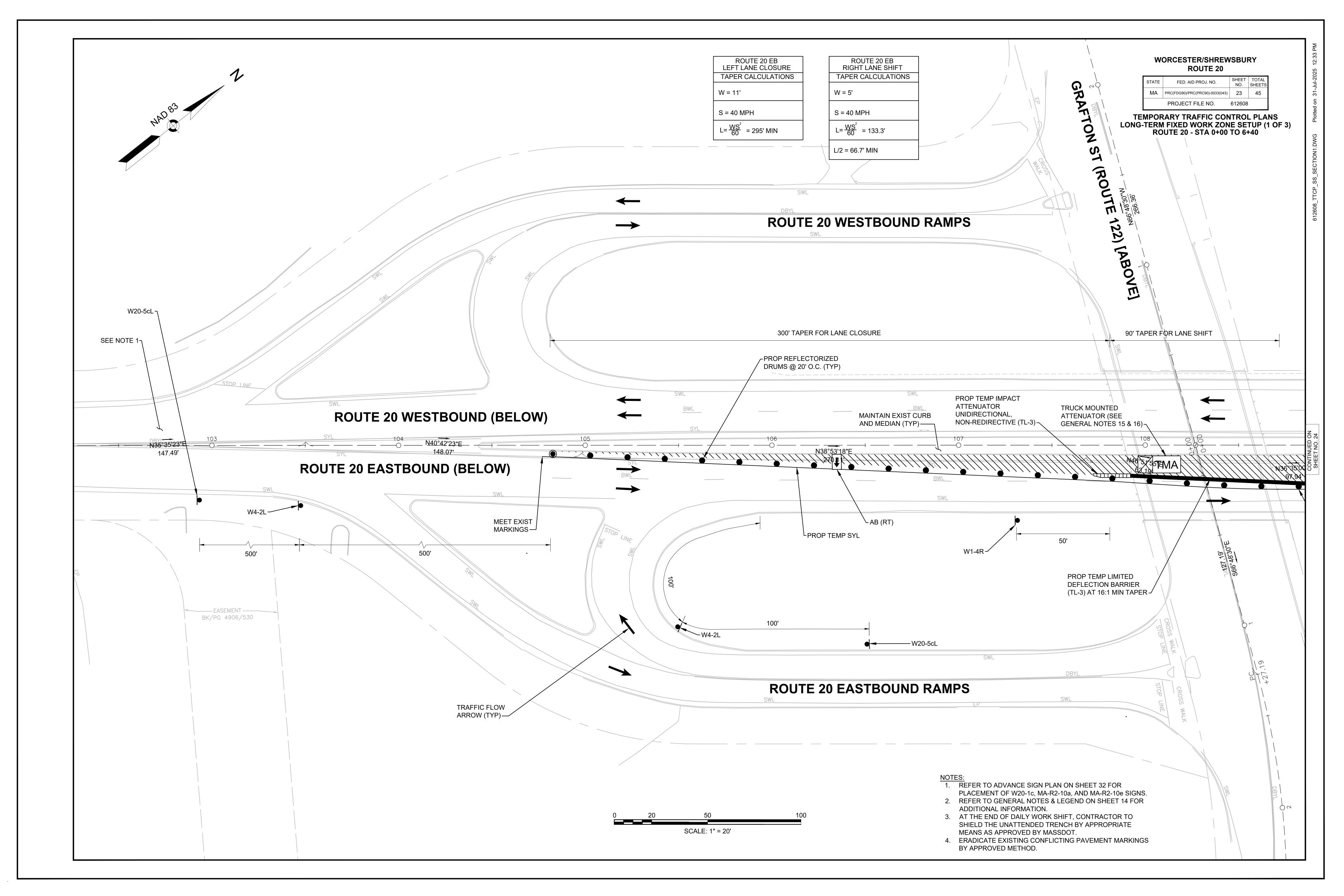
PROJECT FILE NO. 612608

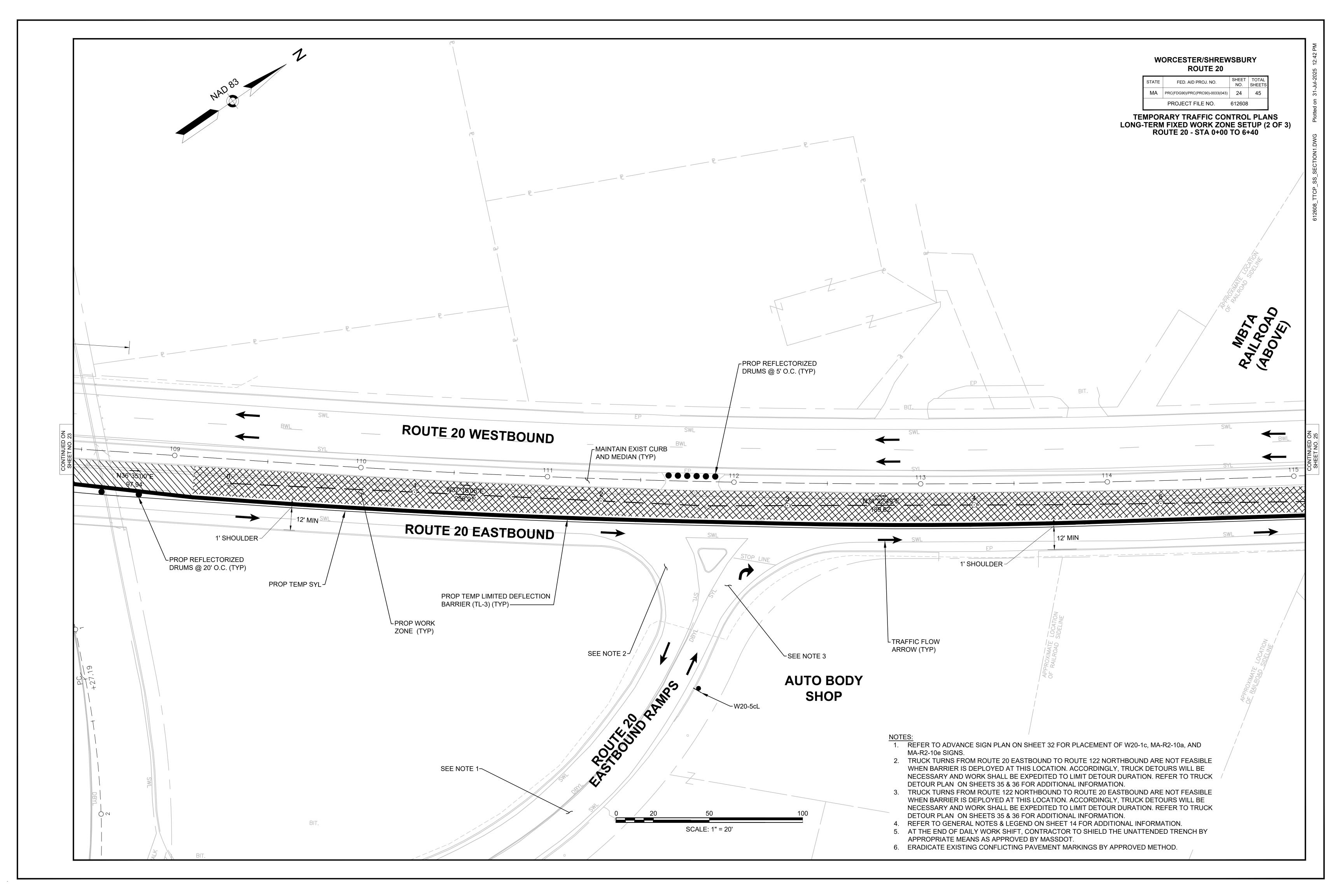
TEMPORARY TRAFFIC CONTROL PLANS SITE-SPECIFIC DETAILS (3 OF 4)

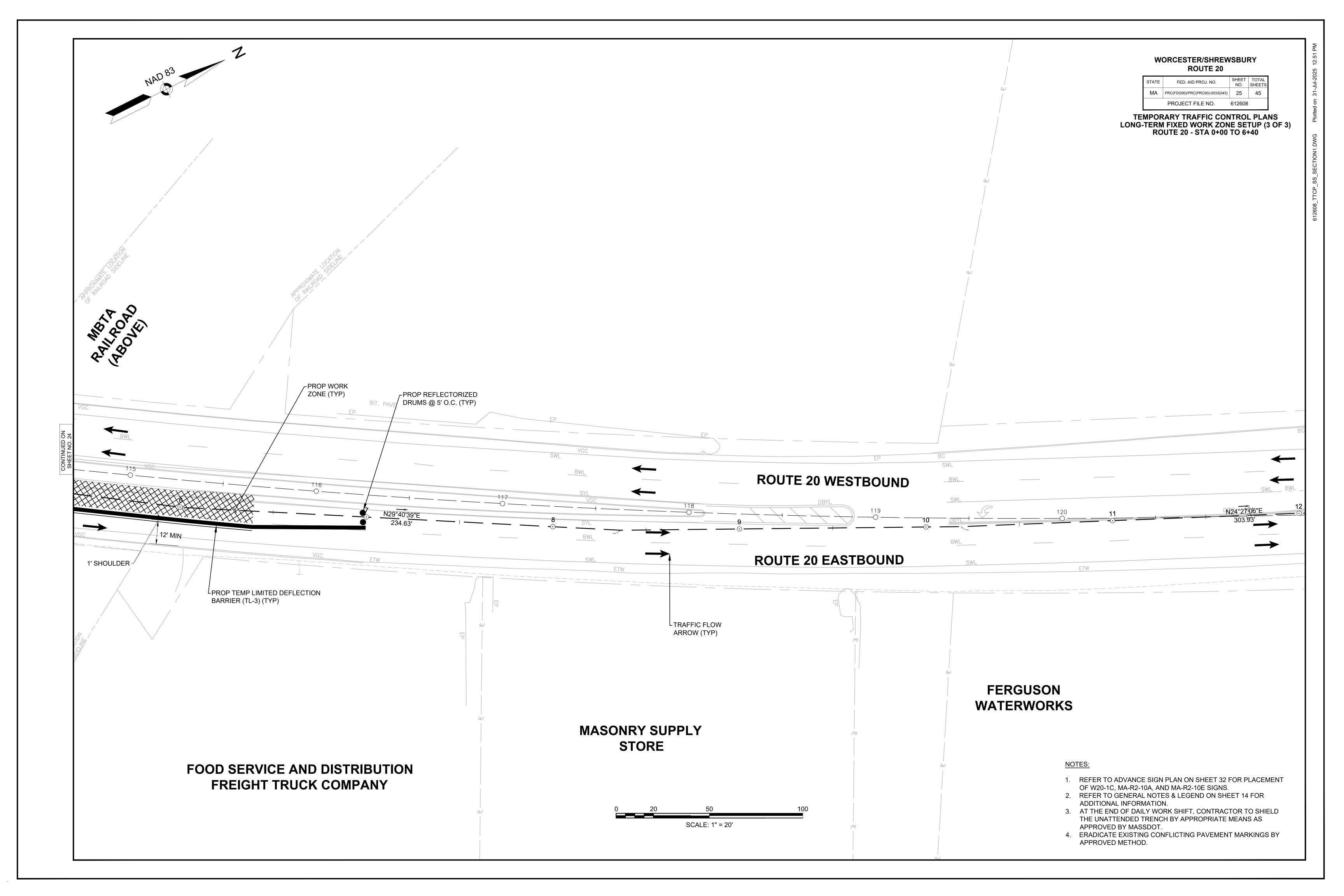


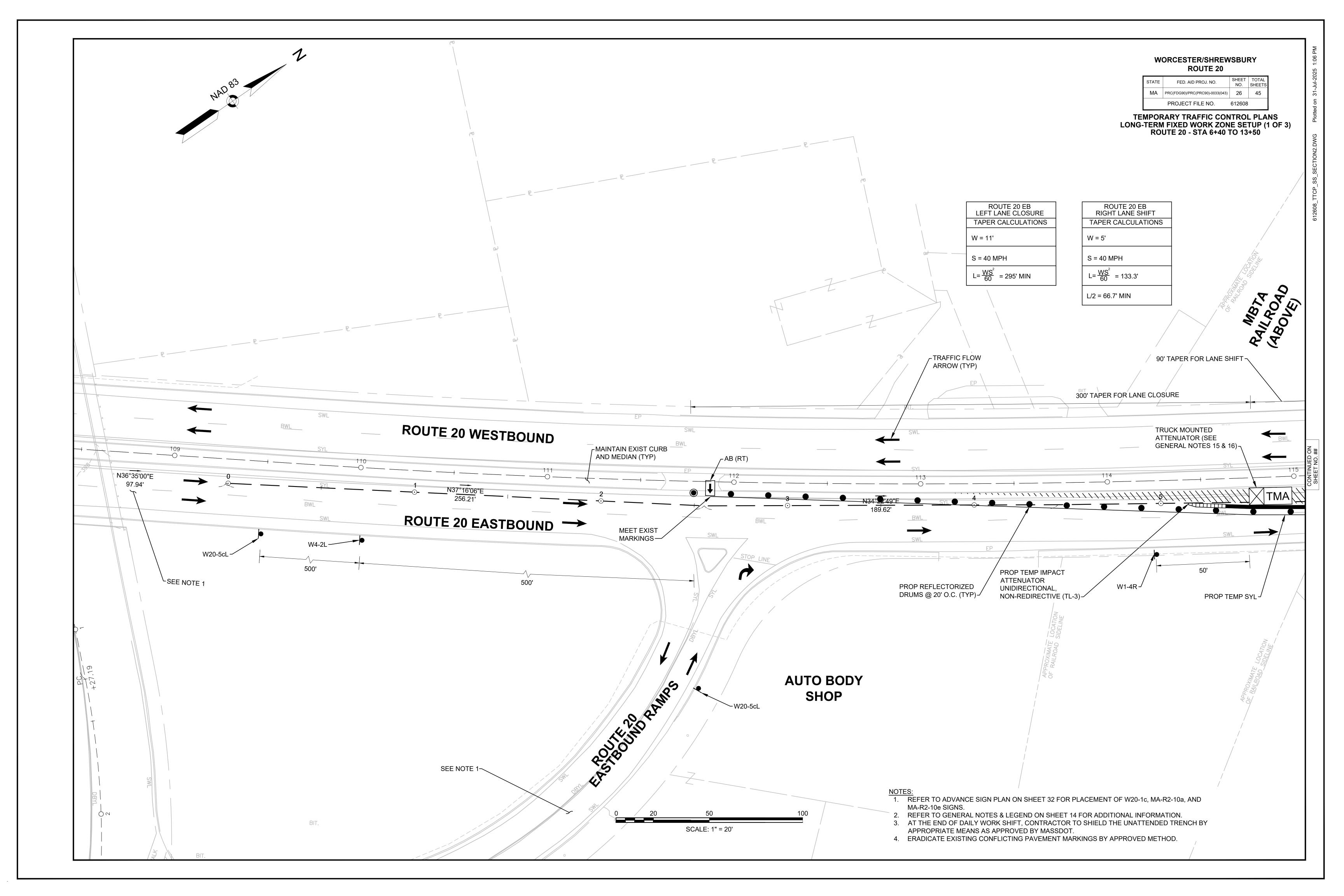
WORK ON ROUTE 20 AT SUNDERLAND RD/WESTBOROUGH ST INTERSECTION (SOUTH SIDE)

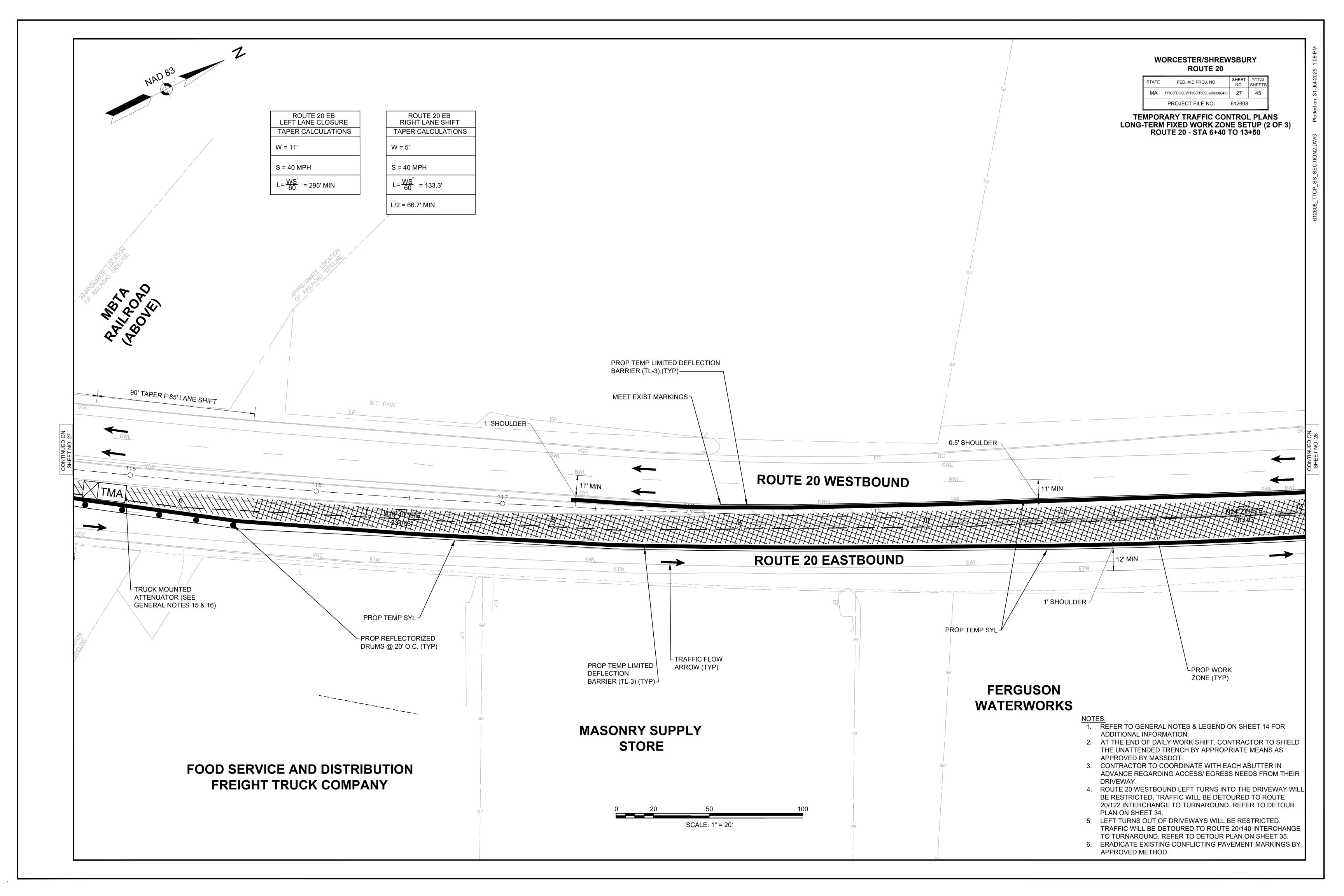


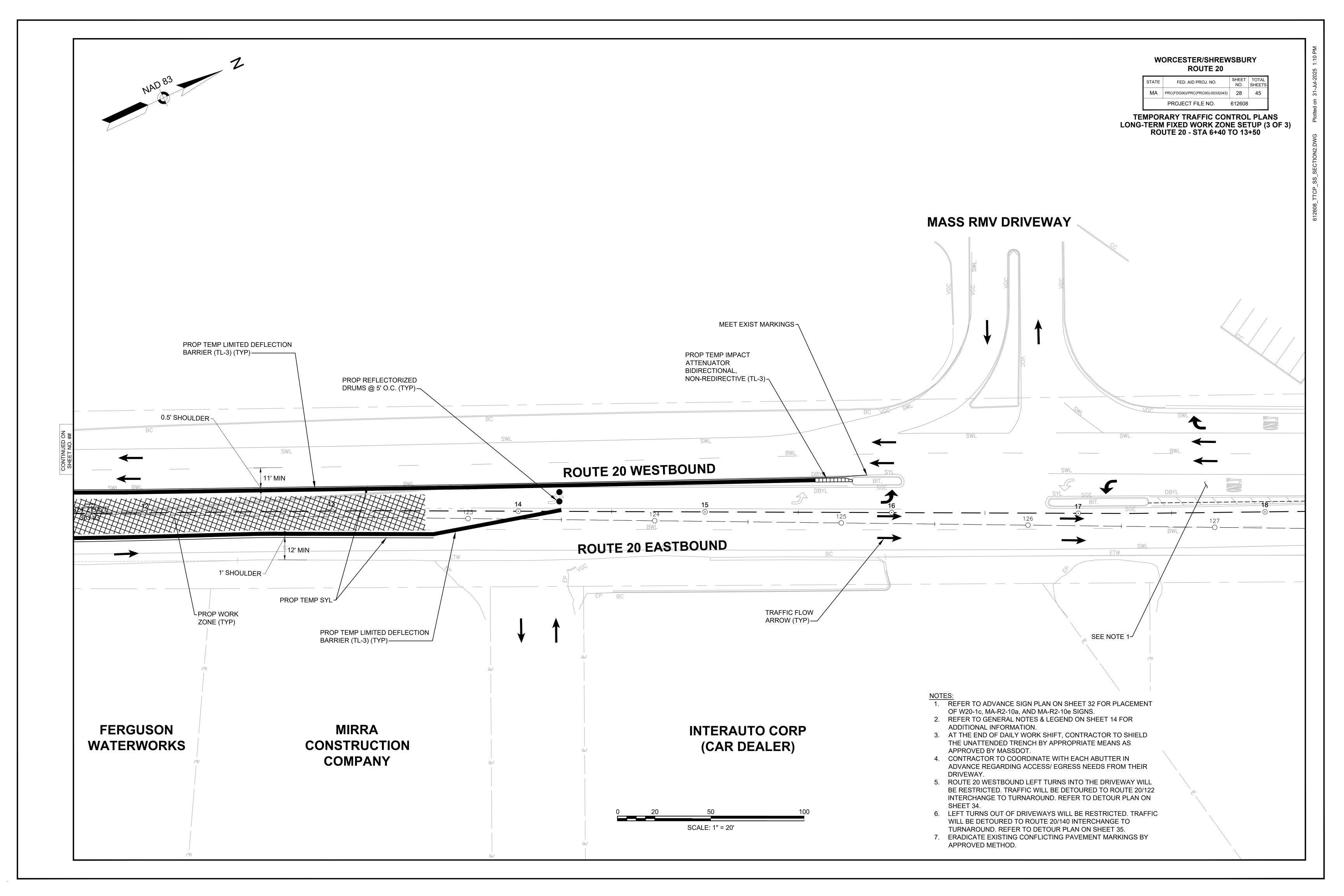


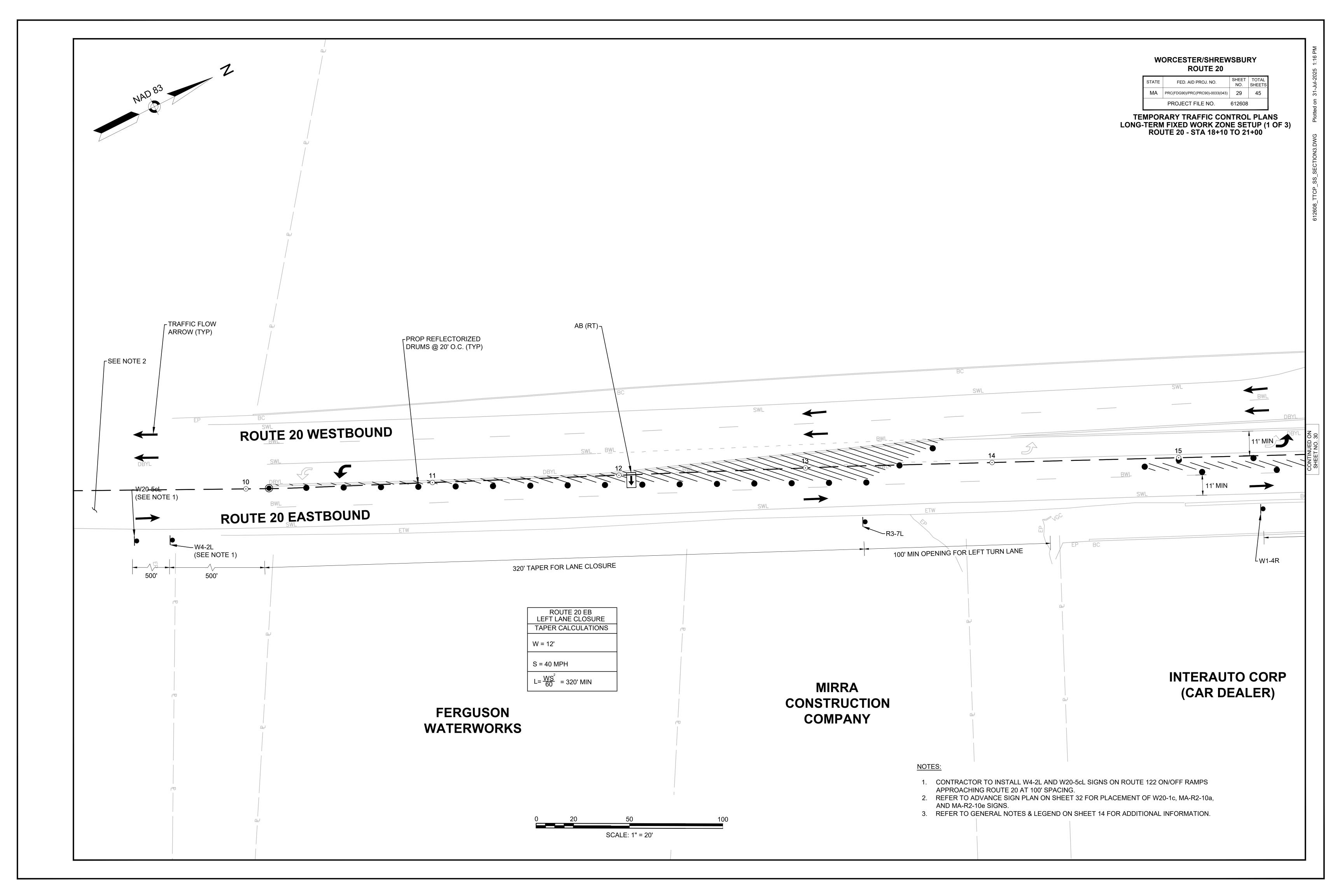


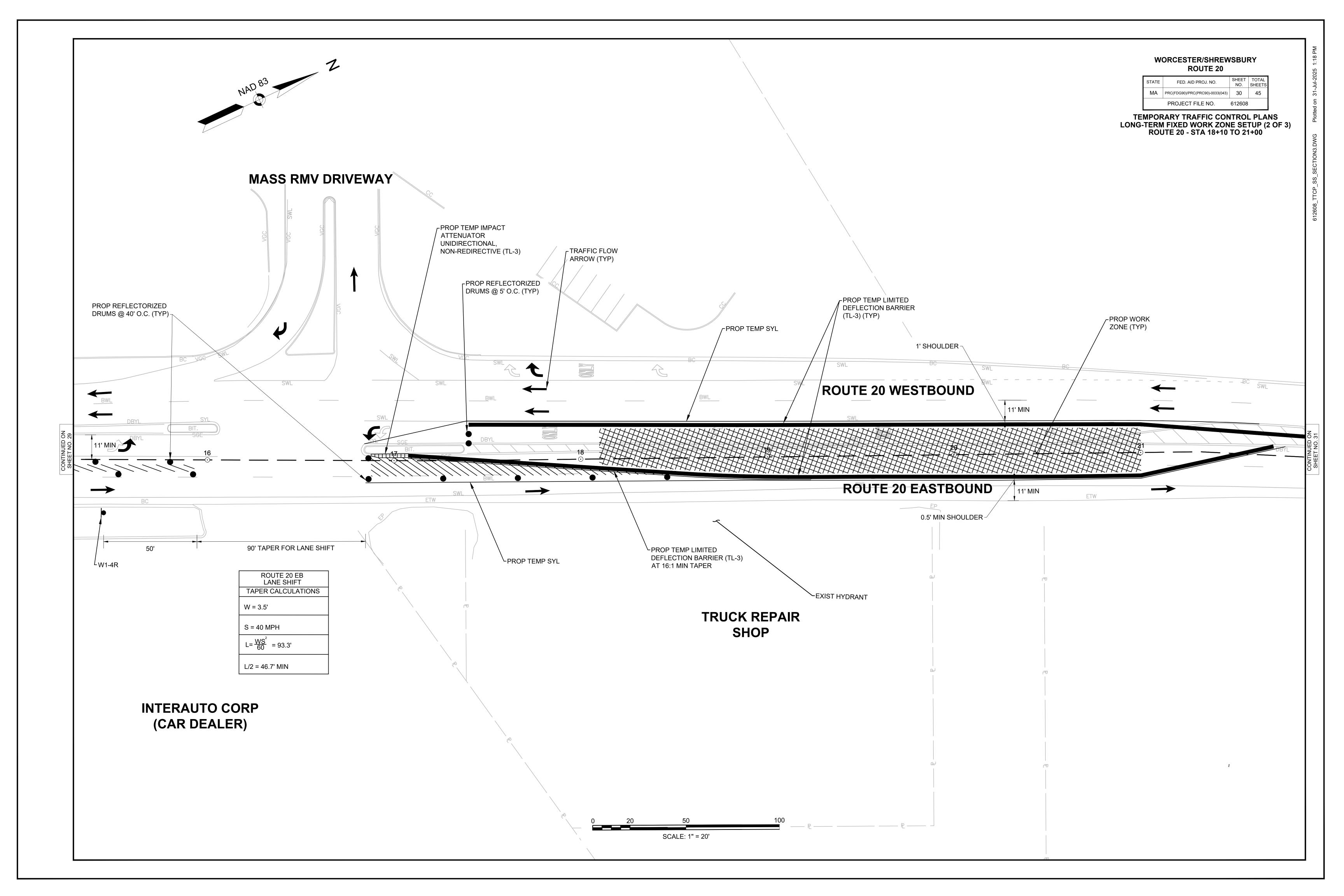


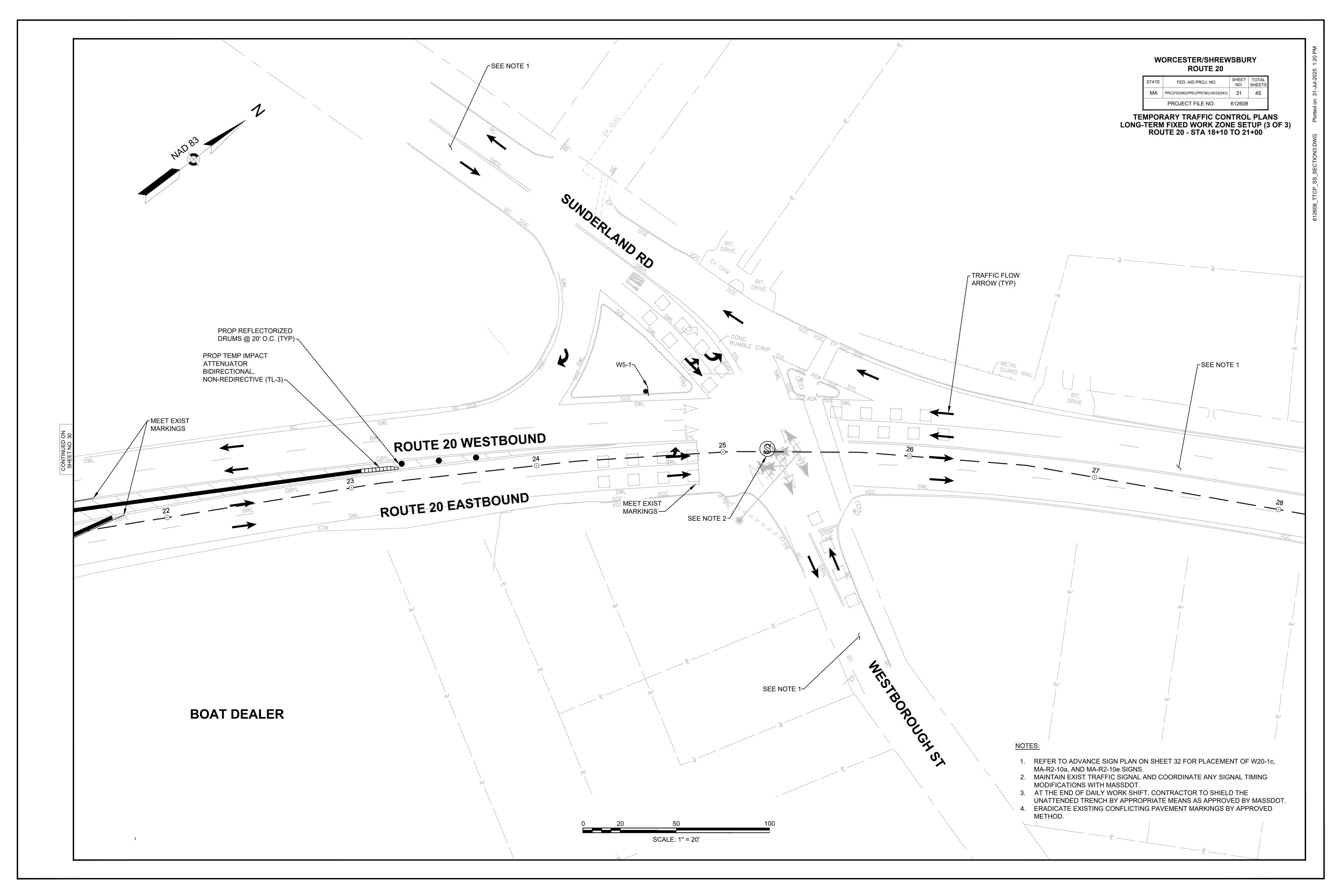


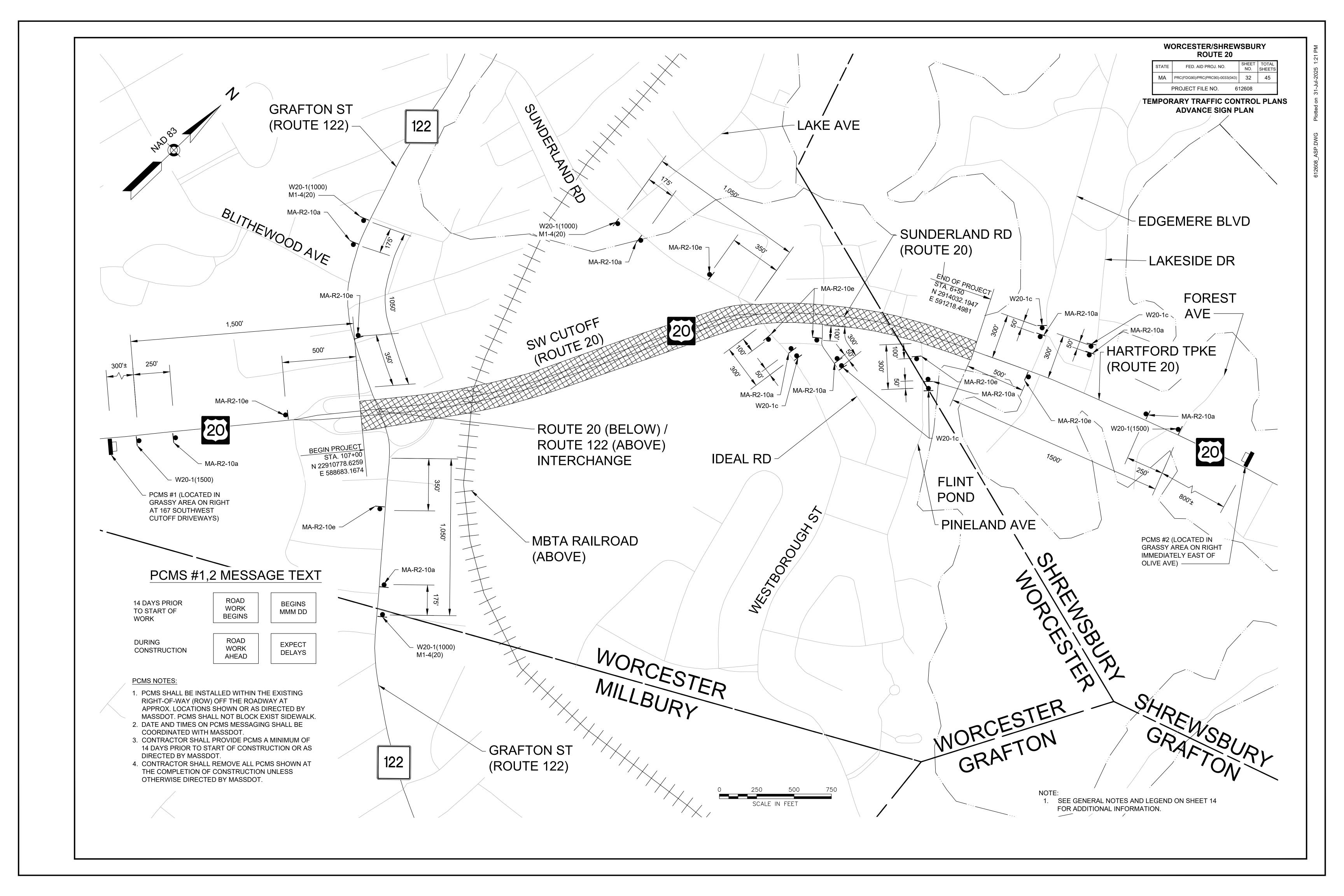


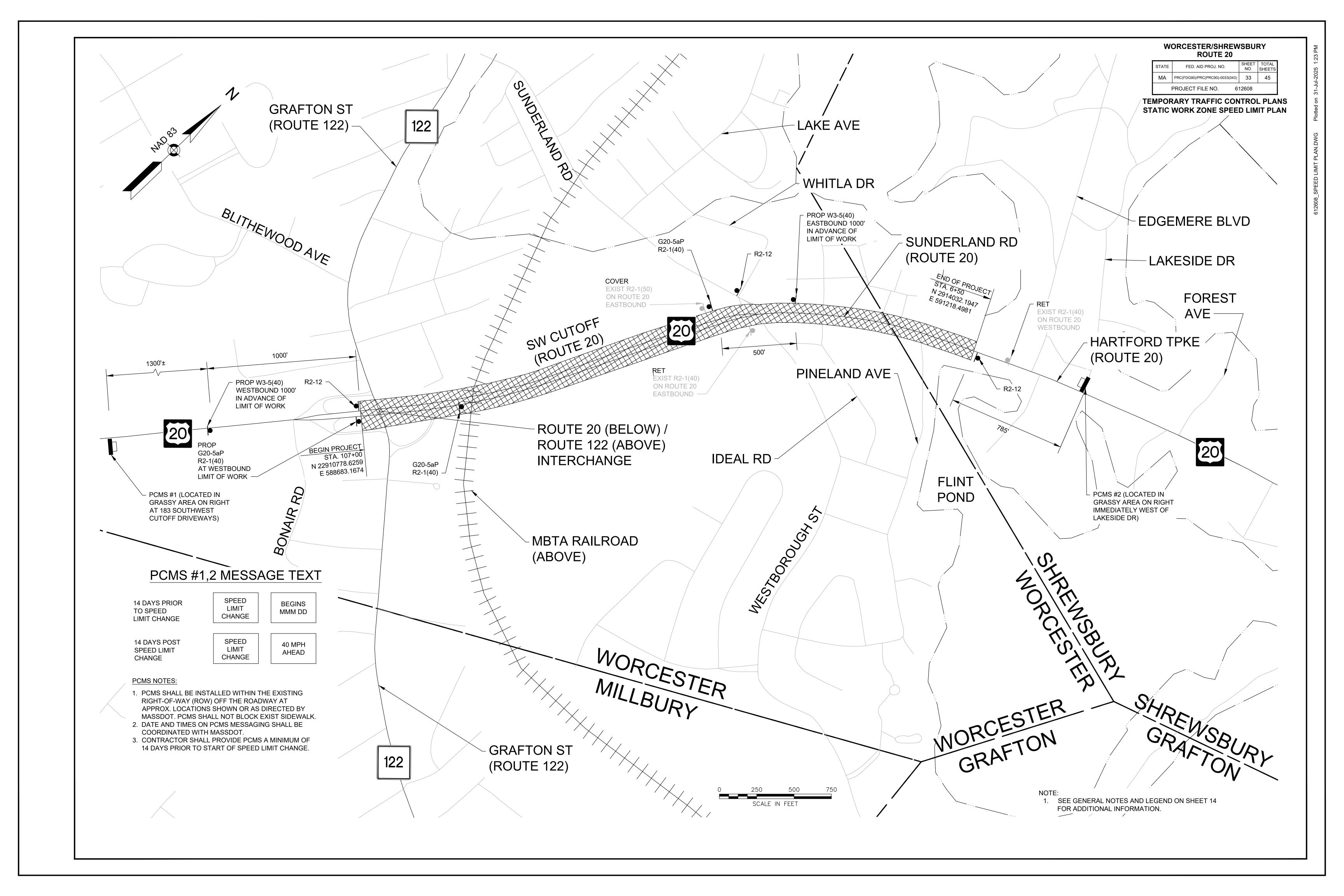


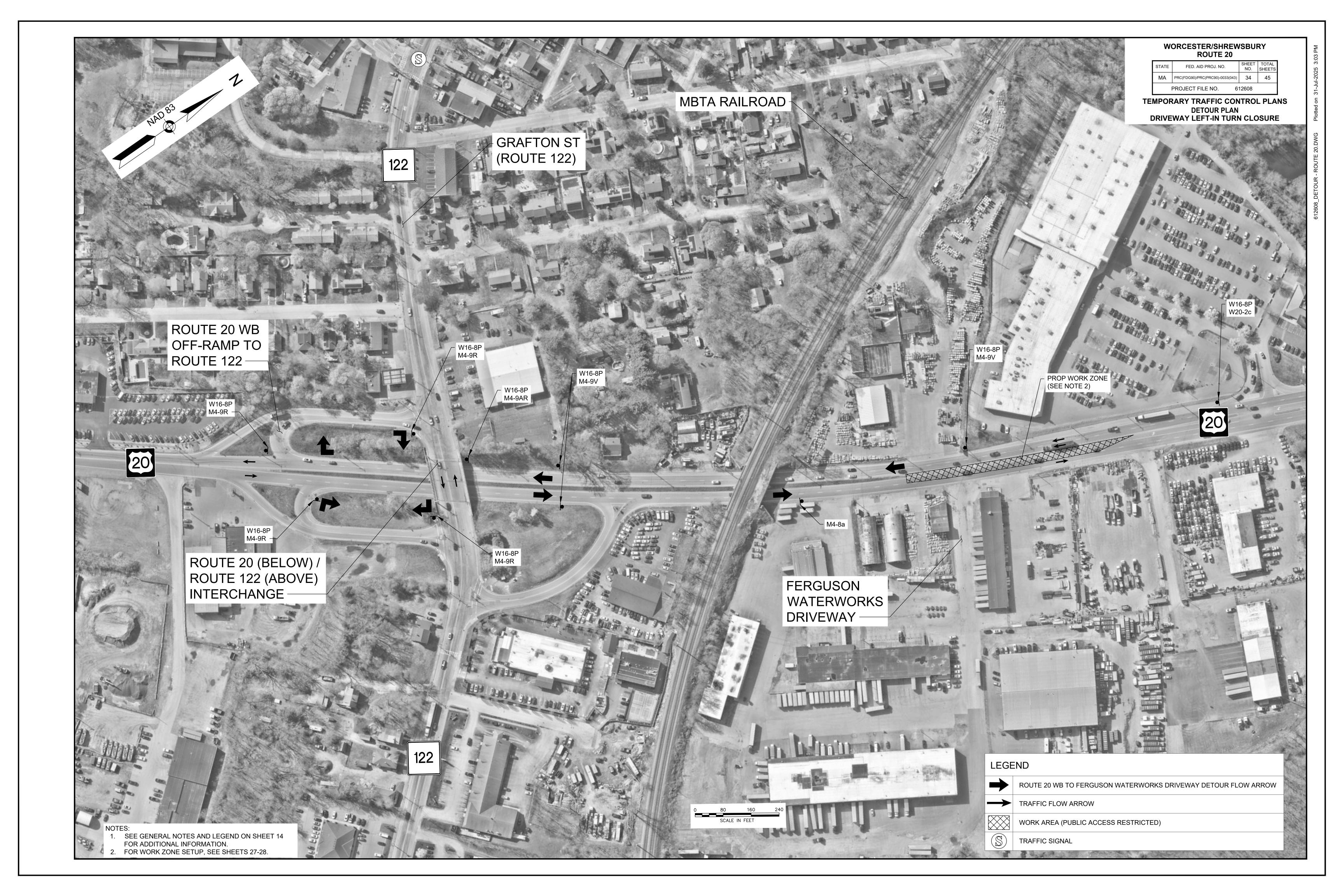


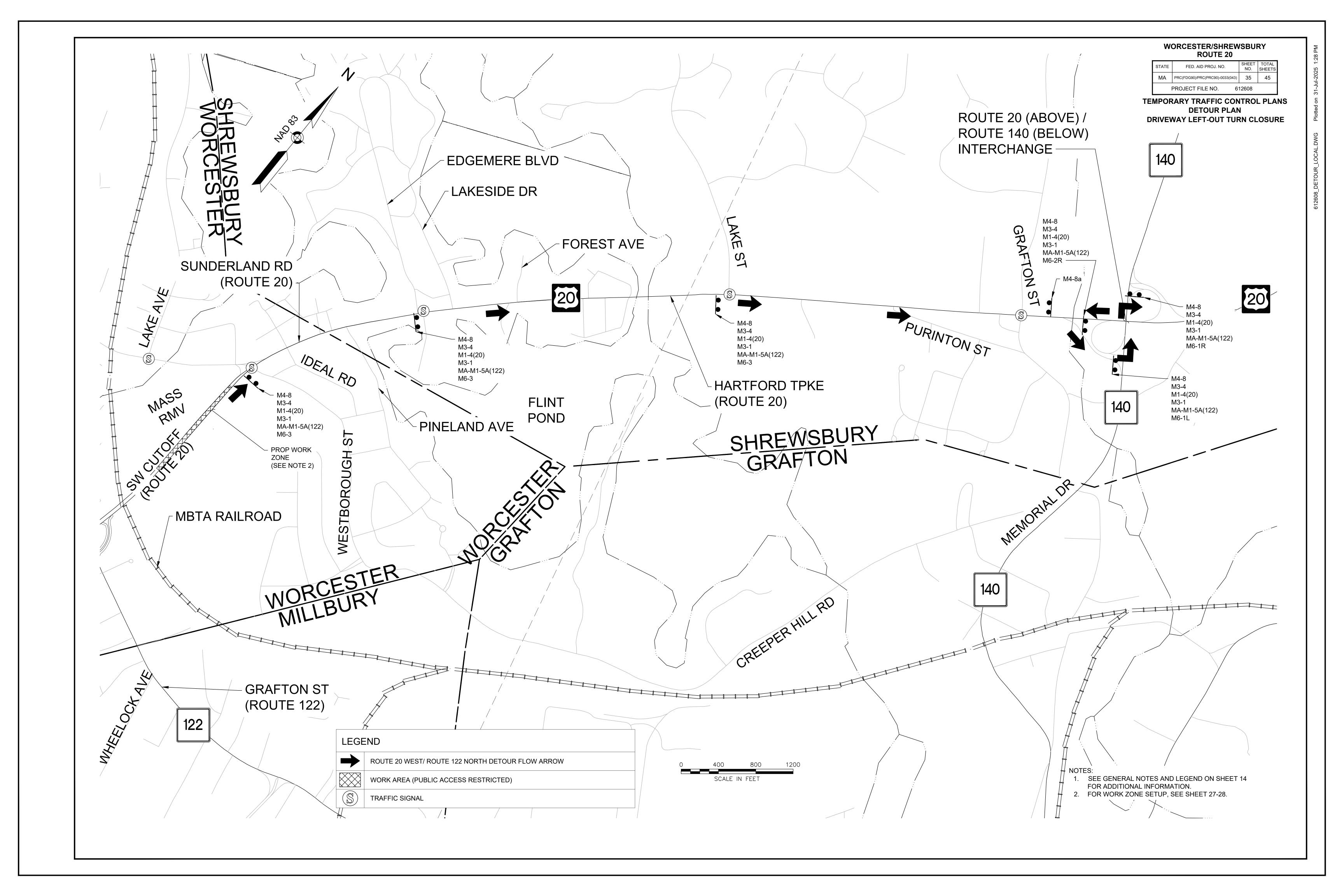


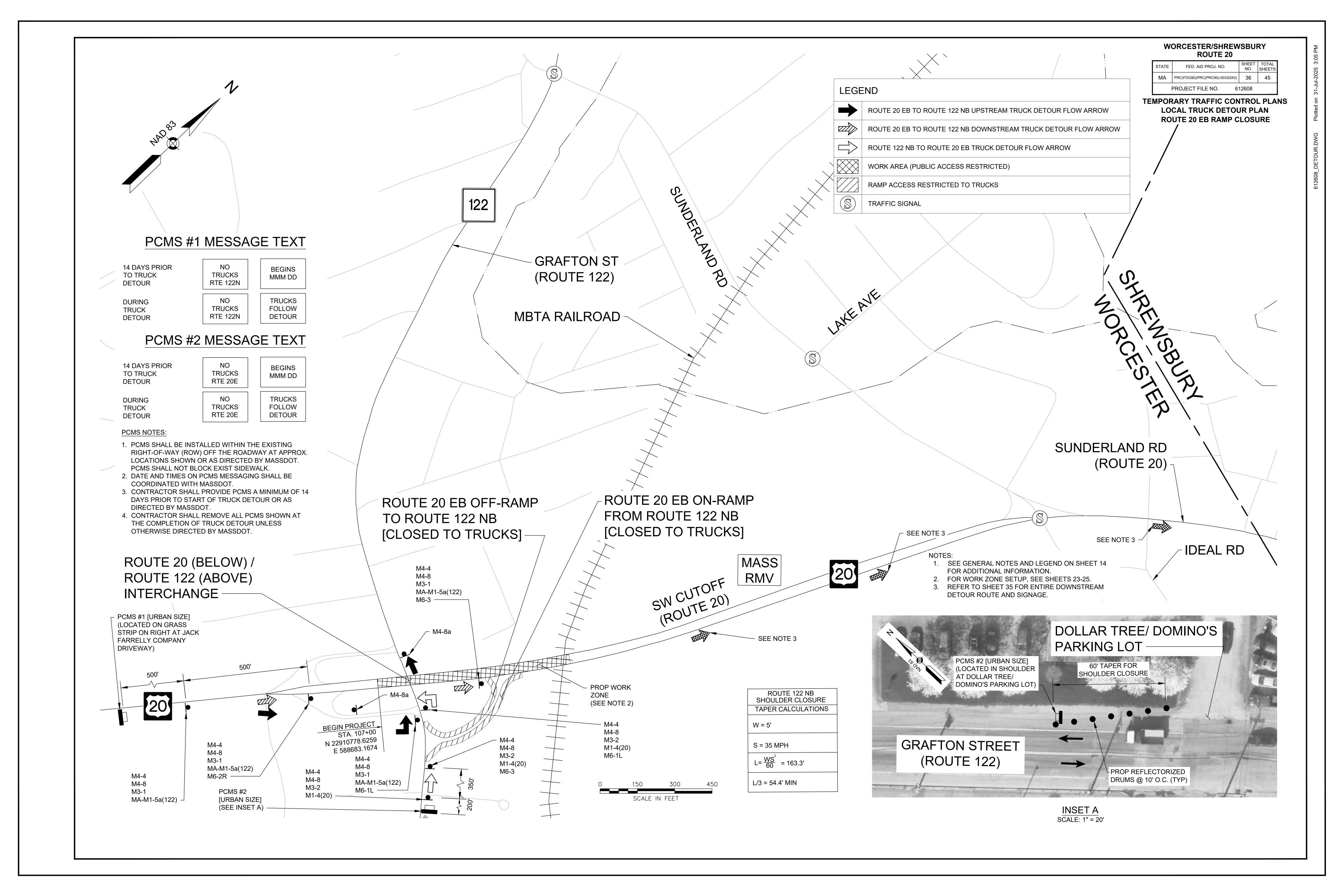


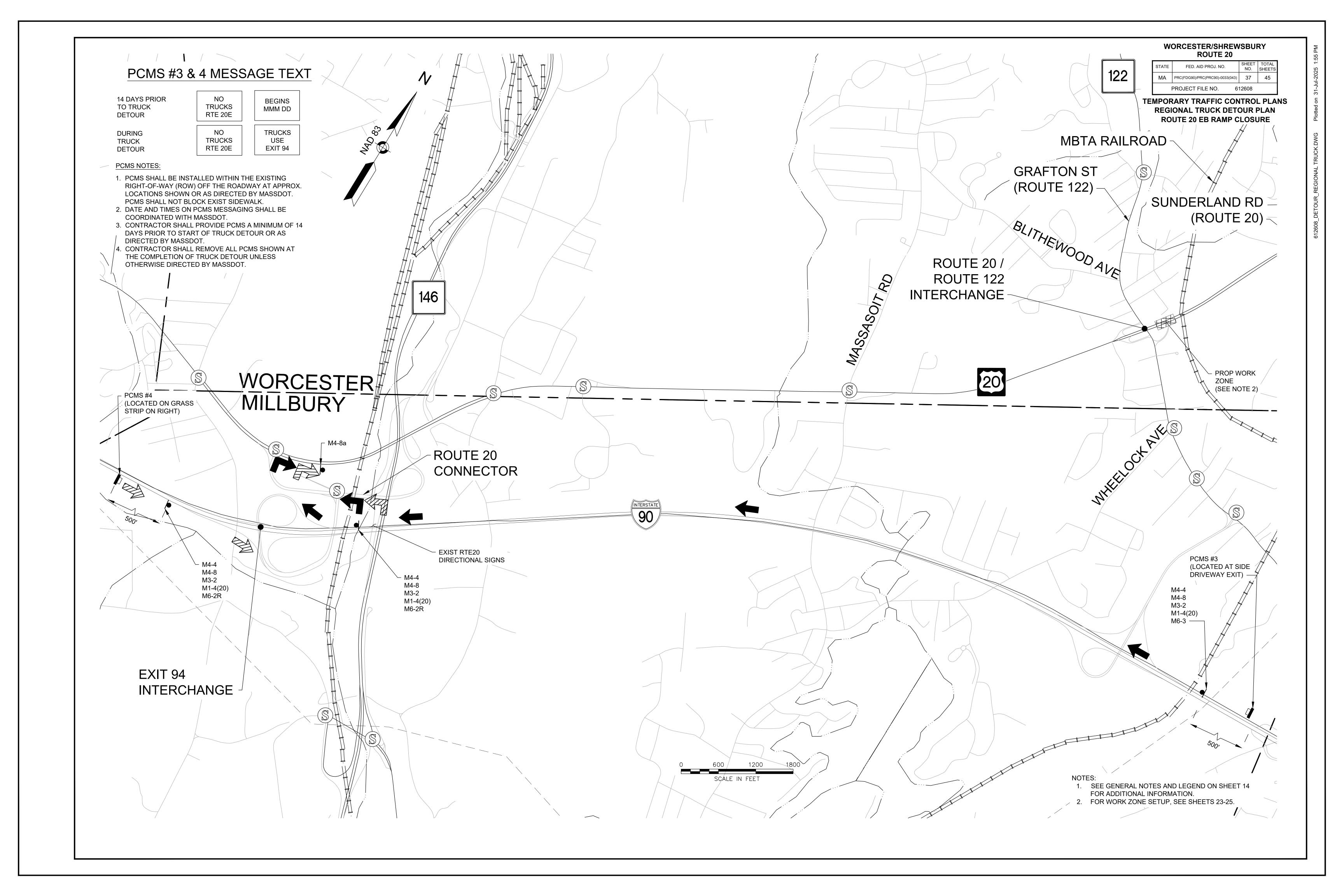












Plotted on 3
308_TTCP.DWG

FED. AID PROJ. NO. MA | PRC(FDG90)/PRC(PRC90)-0033(043) | 38 | 45 PROJECT FILE NO. 612608

WORCESTER/SHREWSBURY **ROUTE 20**

TEMPORARY TRAFFIC CONTROL PLANS SIGN SUMMARY (1 OF 2)

IDENTIFI-	SIZE O	F SIGN		TEXT DII	MENSI	ONS ((INCHES)		COLOR		UNIT
CATION NUMBER	WIDTH	HEIGHT	TEXT	LETTER HEIGHT	VERT SPAC		ARROW RTE. MKR.	BACK- GROUND	LEGEND	BORDER	AREA (S.F.)
MA-R2-10a	48"	36"	WORK ZONE SPEEDING FINES DOUBLED		PER M			FLUOR- ESCENT ORANGE WHITE	BLACK	BLACK	12.00
MA-R2-10e	36"	48"	END ROAD WORK DOUBLE FINES END					FLUOR- ESCENT ORANGE WHITE	BLACK	BLACK	12.00
R2-1(40)	36"	48"	SPEED LIMIT 40	SEE FI HIG 2009 EDIT	HWAY	SIGN	IS,	WHITE	BLACK	BLACK	12.00
R2-12	24"	36"	END WORK ZONE SPEED LIMIT					WHITE	BLACK	BLACK	6.00
R4-7b	24"	30"	KEEP					WHITE	BLACK	BLACK	5.00
R3-7L	30"	30"	LEFT LANE MUST TURN LEFT					WHITE	BLACK	BLACK	6.25
R9-9	24"	12"	SIDEWALK					WHITE	BLACK	BLACK	2.00
R9-10L(MOD)	24"	12"	CROSSWALK CLOSED USE OTHER SIDE					WHITE	BLACK	BLACK	2.00
R9-10R(MOD)	24"	12"	CROSSWALK CLOSED USE OTHER SIDE					WHITE	BLACK	BLACK	2.00
R9-11L	24"	18"	SIDEWALK CLOSED AHEAD CROSS HERE					WHITE	BLACK	BLACK	3.00
R9-11R	24"	18"	SIDEWALK CLOSED AHEAD CROSS HERE					WHITE	BLACK	BLACK	3.00
W1-4L	36"	36"						FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W1-4R	36"	36"						FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W3-5(40)	36"	36"	40					FLUOR- ESCENT ORANGE	BLACK/ WHITE	BLACK	9.00
W4-2L	36"	36"						FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W4-2R	36"	36"						FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W5-1	36"	36"	ROAD					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00

NIOTEO	NIOTEO

W21-5aR

- 1. HIGH INTENSITY REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS. SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION" FOR TEXT DIMENSIONS, AS AMENDED; THE 1977 MASSHIGHWAY DEPARTMENT CONSTRUCTION AND TRAFFIC STANDARD DETAILS, AS AMENDED, FOR SIGNS AND SUPPORTS; THE MASSHIGHWAY DEPARTMENT SIGN LISTINGS 1993 EDITION, AS AMENDED; THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR MOUNTING REQUIREMENTS; AND THE 2017 MASSDOT STANDARD SIGNS BOOK, AS AMENDED.
- 2. ALL SIGNS SHOWN GRAPHICALLY FOR INFORMATION ONLY. SIGN VENDOR SHALL FABRICATE ALL SIGNS IN ACCORDANCE WITH THE APPLICABLE STANDARDS.

TEMPORARY TRAFFIC CONTROL SIGN SUMMARY (CONTINUED)

TEXT

BUMP

PAVEMENT

ROUGH

LOW

GROOVED PAVEMENT

FERGUSON

ROAD WORK 1000 FT

SIZE OF SIGN

HEIGHT

36"

36"

36"

36"

36"

36"

36"

8"

36"

36"

36"

36"

36"

36"

36"

36"

36"

28"

36"

36"

36"

36"

36"

WIDTH

36"

IDENTIFI-

NUMBER

CATION

W8-1

W8-3

W8-8

W8-9

W8-15

W8-24

W12-1

W16-8P

W20-1c

W20-1(1000)

W20-1(1500)

W20-2c

W20-4c

W20-5cL

W20-5cR

MA-W20-7b

TEXT DIMENSIONS (INCHES)

SEE FHWA "STANDARD

HIGHWAY SIGNS,

2009 EDITION"; AS AMENDED

LETTER VERTICAL ARROW BACK-HEIGHT SPACING RTE. MKR. GROUND LEGEND BORDER

FLUOR-

ORANGE

ORANGE

FLUOR-

ORANGE

FLUOR-

ORANGE

ORANGE

FLUOR-

ORANGE

FLUOR-

ORANGE

AS PER MASSDOT

STANDARD

SEE FHWA "STANDARD

HIGHWAY SIGNS,

2009 EDITION"; AS AMENDED

COLOR

| ESCENT | BLACK | BLACK

| ESCENT | BLACK | BLACK

ESCENT | BLACK | BLACK

| ESCENT | BLACK | BLACK

| ESCENT | BLACK | BLACK

| ESCENT | BLACK | BLACK

ESCENT | BLACK | BLACK

ESCENT | BLACK | BLACK

| ESCENT | BLACK | BLACK

ESCENT | BLACK | BLACK

ESCENT | BLACK | BLACK

| ESCENT | BLACK | BLACK

ESCENT | BLACK | BLACK

ESCENT | BLACK | BLACK

UNIT

AREA

(S.F.)

9.00

9.00

9.00

9.00

9.00

9.00

9.00

1.56

9.00

9.00

9.00

9.00

9.00

9.00

9.00

9.00

9.00

COLOR

LEGEND BORDER

BLACK BLACK

BLACK BLACK

BLACK BLACK

BLACK BLACK

BLACK BLACK

BLACK BLACK

ESCENT | BLACK | BLACK

ESCENT | BLACK | BLACK

ESCENT | BLACK | BLACK

| ESCENT | BLACK | BLACK |

ESCENT | BLACK | BLACK

FLUOR-

ORANGE

FLUOR-

ORANGE

ORANGE

FLUOR-

ORANGE

FLUOR-

ORANGE

UNIT AREA

(S.F.)

2.19

2.19

2.19

2.19

2.19

2.19

3.00

IDENTIFI- CATION	SIZE C	F SIGN		TEXT DI	MENSIONS	(INCHES)
NUMBER	WIDTH	HEIGHT	TEXT	LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.
M4-9R	30"	24"	DETOUR	HIG	HWA "STANI GHWAY SIGN TION"; AS AN	IS,
M4-9V	30"	24"	DETOUR			
M4-9bL	30"	24"	DETOUR			
M4-9bR	30"	24"	DETOUR			
M5-1L	21"	15"				
M5-1R	21"	15"				

15"

15"

15"

15"

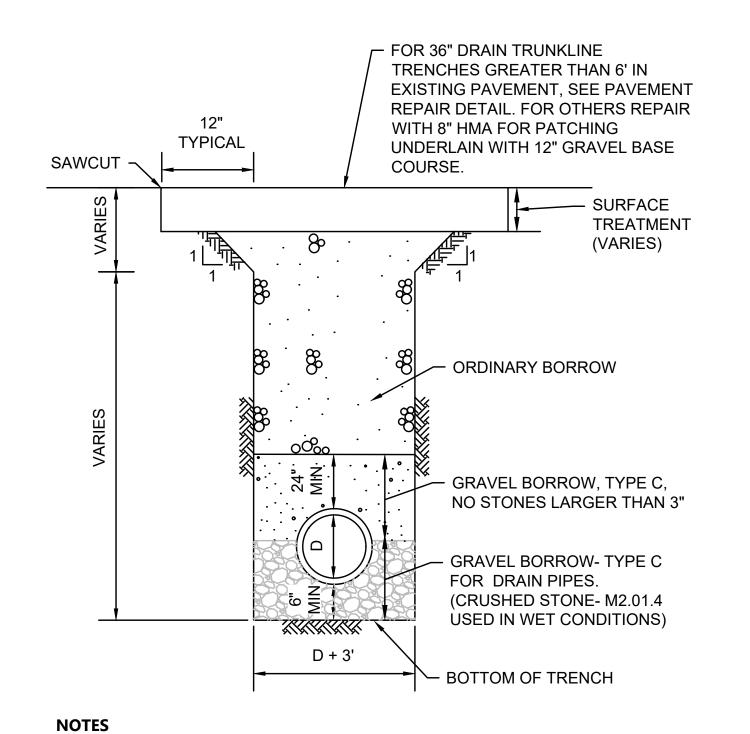
21"

- 1. HIGH INTENSITY REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS. SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION" FOR TEXT DIMENSIONS, AS AMENDED; THE 1977 MASSHIGHWAY DEPARTMENT CONSTRUCTION AND TRAFFIC STANDARD DETAILS, AS AMENDED, FOR SIGNS AND SUPPORTS; THE MASSHIGHWAY DEPARTMENT SIGN LISTINGS 1993 EDITION, AS AMENDED; THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR MOUNTING REQUIREMENTS; AND THE 2017 MASSDOT STANDARD SIGNS BOOK, AS AMENDED.
- 2. ALL SIGNS SHOWN GRAPHICALLY FOR INFORMATION ONLY. SIGN VENDOR SHALL FABRICATE ALL SIGNS IN ACCORDANCE WITH THE APPLICABLE STANDARDS.

WORK

IDENTIFI-	SIZE O	F SIGN		TEXT DI	MENSIONS	NS (INCHES)		COLOR		UNIT
CATION NUMBER	WIDTH	HEIGHT	TEXT	LETTER HEIGHT	VERTICAL SPACING	I	BACK- GROUND	LEGEND	BORDER	AREA (S.F.)
W21-7	36"	36"	UTILITY WORK AHEAD	HIG	HWA "STAI HWAY SIG TION"; AS A		FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
M1-4(20)	36"	36"	20				WHITE	BLACK	BLACK	9.00
MA-M1-5a(122)	45"	36"	122		PER MASS STANDARI		WHITE	BLACK	BLACK	11.25
M3-1	24"	12"	NORTH	SEE FHWA "STANDARD HIGHWAY SIGNS, 2009 EDITION"; AS AMENDED		WHITE	BLACK	BLACK	2.00	
M3-2	24"	12"	EAST				WHITE	BLACK	BLACK	2.00
M3-4	24"	12"	WEST				WHITE	BLACK	BLACK	2.00
M4-4	24"	12"	TRUCK				WHITE	BLACK	BLACK	2.00
M4-8	24"	12"	DETOUR				FLUOR- ESCENT ORANGE	BLACK	BLACK	2.00
M4-8a	24"	18"	END DETOUR				FLUOR- ESCENT ORANGE	BLACK	BLACK	3.00
M4-9AR	30"	24"	DETOUR				FLUOR- ESCENT ORANGE	BLACK	BLACK	5.00
M4-9L	30"	24"	DETOUR				FLUOR- ESCENT ORANGE	BLACK	BLACK	5.00

G20-5aP



1. HMA SHALL BE PLACED IN LAYERS WITH EACH LAYER HAVING A MAXIMUM THICKNESS OF 4

SOURCE: VHB

DRAINAGE TRENCH DETAIL

SCALE: N.T.S.

STILLING BASIN

TIMES THE NOMINAL MAXIMUM AGGREGATE SIZE (EX. SIC-19.0 NO GREATER THAN 3 INCH

DATE: AUGUST 25 2015

PAVEMENT FINE MILLING WITH 1.75" OVERLAY SUPERPAVE SURFACE COURSE-12.5 POLYMER -**TYPICAL** SAWCUT -1.75" HMA FOR 1.75" SUPERPAVE PATCHING INTERMEDIATE 4" SUPERPAVE BASE COURSE-12.5 COURSE-37.5 POLYMER -8" GRAVEL BORROW 4" DENSE GRADED CRUSHED STONE — ಂಂ ORDINARY BORROW

NOTES

- 1. HMA SHALL BE PLACED IN LAYERS WITH EACH LAYER HAVING A MAXIMUM THICKNESS OF 4 TIMES THE NOMINAL MAXIMUM AGGREGATE SIZE (EX. SIC-19.0 NO GREATER THAN 3 INCH
- 2. IN AREAS OF FINE MILLING AND OVERLAY, UTILIZE 1.75"SUPERPAVE SURFACE COURSE- 12.5
- 3. IN AREAS OF FULL DEPTH PAVEMENT, UTILIZE PAVEMENT STRUCTURE SHOWN IN DETAIL. 4. THE CONTRACTOR SHALL COORDINATE THE TIMING OF THE MILL AND OVERLAY WITH THE ENGINEER PRIOR TO CONSTRUCTION
- 5. CONTRACT TO COORDINATE LOCATION AND REMOVAL AS NEEDED OF EXISTING REINFORCED CONCRETE SUBBASE USING GROUND PENETRATING RADAR, SEE SPECIFICATION ITEM 999.1 FOR DETAILS.

PAVEMENT REPAIR FOR WIDE TRENCH DETAIL

SCALE: N.T.S. SOURCE: VHB DATE: AUGUST 25 2015

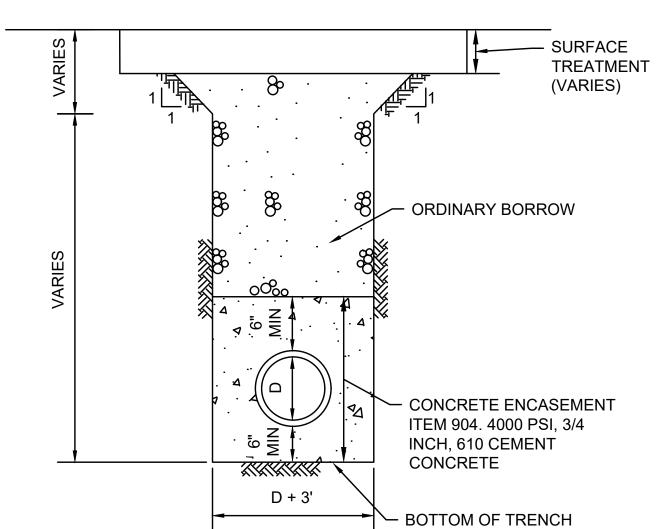
PAVEMENT FOR REPAIR WITH 8" HMA FOR PATCHING UNDERLAIN **TYPICAL** WITH 12" GRAVEL BASE COURSE SAWCUT - SURFACE **TREATMENT** (VARIES) - ORDINARY BORROW COMPACTED IN 12" LIFTS MAX DUCTILE IRON OR PVC PIPE - CRUSHED STONE - M2.01.4 FOR SEWER PVC PIPE XXXXXXX D + 3' BOTTOM OF TRENCH NOTES

FOR TRENCHES IN EXISTING

- 1. FOR LOCATIONS WHERE LEDGE IS NOT ENCOUNTERED IN TRENCH, PIPE CAN LAY ON UNDISTURBED EARTH, OR ON SAND BEDDING CONSISTENT WITH AWWA GUIDELINES. 2. FILL MATERIAL SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
- 3. FOR LOCATIONS WHERE LEDGE IS ENCOUNTERED, SAND BEDDING SHALL BE MINIMUM OF
- 4. PIPE SHALL BE INSULATION IN LOCATIONS WITH LESS THAN 4 FEET OF COVER FOR SEWER
- 5. HMA SHALL BE PLACED IN LAYERS WITH EACH LAYER HAVING A MAXIMUM THICKNESS OF 4 TIMES THE NOMINAL MAXIMUM AGGREGATE SIZE (EX. SIC-19.0 NO GREATER THAN 3 INCH

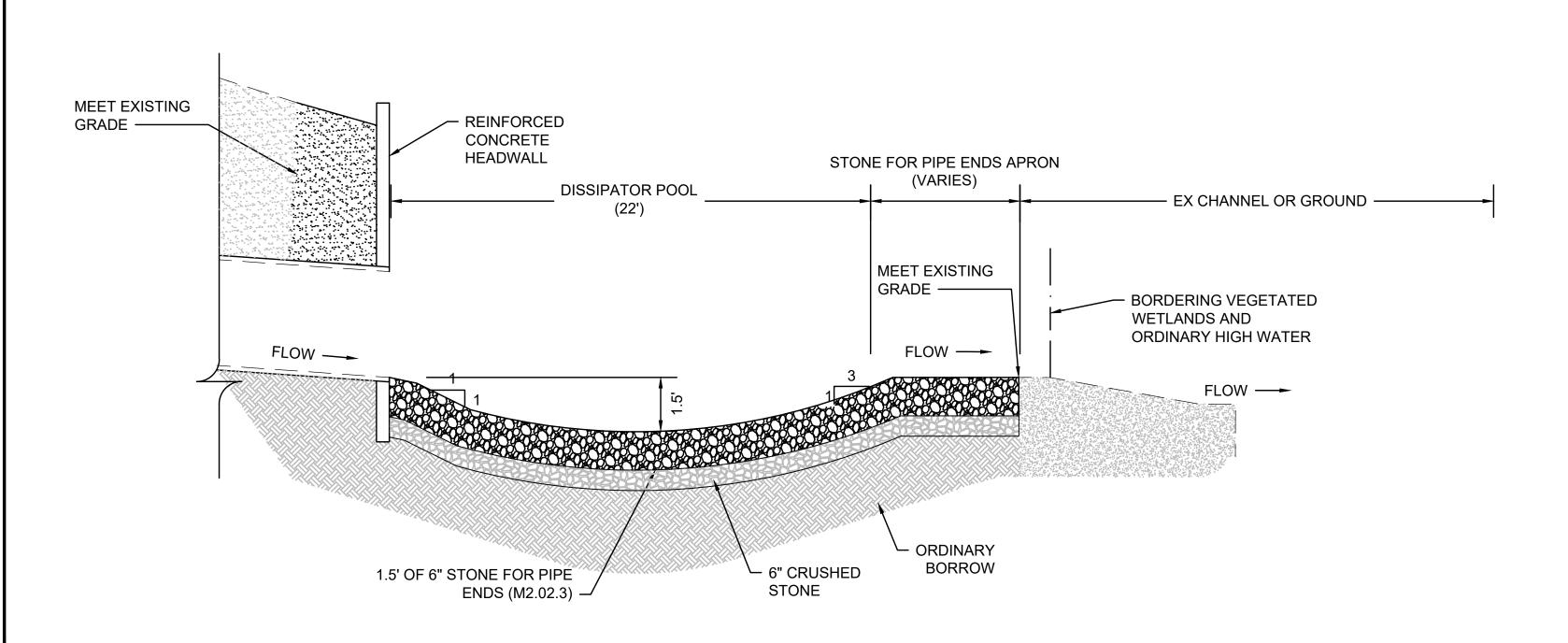
WATER AND SEWER TRENCH DETAIL

DATE: APRIL 2021 SCALE: N.T.S. SOURCES: VHB



CONCRETE UTILITY ENCASEMENT DETAIL

SCALE: N.T.S. SOURCE: VHB DATE: AUGUST 25 2015



SURFACE TREATMENT VARIES — - CAST- IN-PLACE 2" THICK JACKET 3000 PSI CONCRETE POLYURETHANE (TYPE-I) ENCASEMENT (SEE NOTE) INSULATION CUT AND WIRED IN PLACE SEE PLAN FOR AROUND PIPE -PIPE SIZE COMPACTED SUBGRADE SEE UTILITY TRENCH DETAIL FOR EMBEDMENT MATERIALS

<u>NOTES</u>

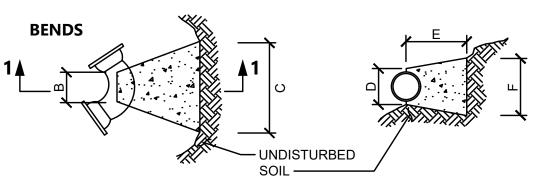
- 1. SEWER PIPE SHALL BE INSULATED WHEN COVER IS LESS THAN FOUR (4) FEET
- UNLESS INDICATED OTHERWISE ON PLANS. 2. WATER MAIN SHALL BE INSULATED WHEN COVER IS LESS THAN FIVE (5) FEET
- UNLESS INDICATED OTHERWISE ON PLANS. 3. PROVIDE CONCRETE ENCASEMENT FOR WATER OR SEWER IN VEHICULAR AREAS WHEN COVER OVER PIPE INSULATION IS LESS THAN THREE (3) FEET.

DATE: JANUARY 2016

SEWER AND WATER PIPE INSULATION

DATE: AUGUST 7 2015 SCALE: N.T.S. SCALE: N.T.S. SOURCE: VHB SOURCE: VHB

BENDS B C D E F BENDS B C D E F



TEES TEES 6"X6"X6" 12"X12"X8" 12"X12"X12" 8"X8"X8"

NOTES

- VALVES, AND VERTICAL BENDS (SAME SIZE AS REQUIRED FOR TEES). PROVIDE ANCHOR RODS AT VERTICAL BENDS AND GATE
- 2. CONCRETE SHALL NOT BE PLACED AGAINST PIPE BEYOND
- 3. CONCRETE SHALL BE 3,000 PSI-TYPE I.

Concrete Thrust Block		1/16
N.T.S.	Source: VHB	LD 260

SHEET TOTAL NO. SHEETS

612608

CONSTRUCTION DETAILS

PROJECT FILE NO.

FED. AID PROJ. NO.

WORCESTER/SHREWSBURY **ROUTE 20**

MA | PRC(FDG90)/PRC(PRC90)-0033(043) | 40 | 45

12" THICK UNDER PIPE (FOR WATER). AND LESS THAN 5 FEET OF COVER FOR WATER.

LAYERS).

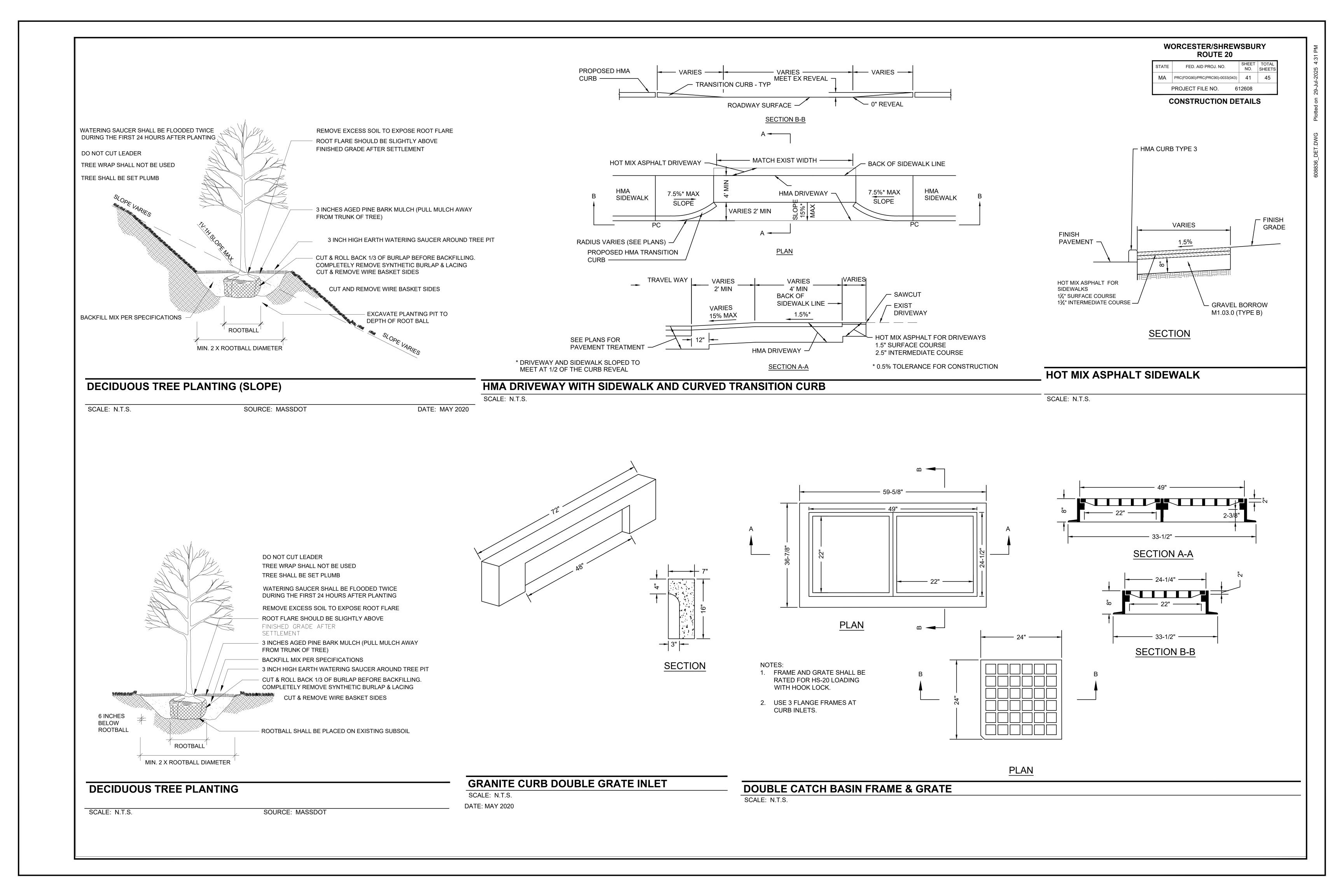
TABLE OF DIMENSIONS

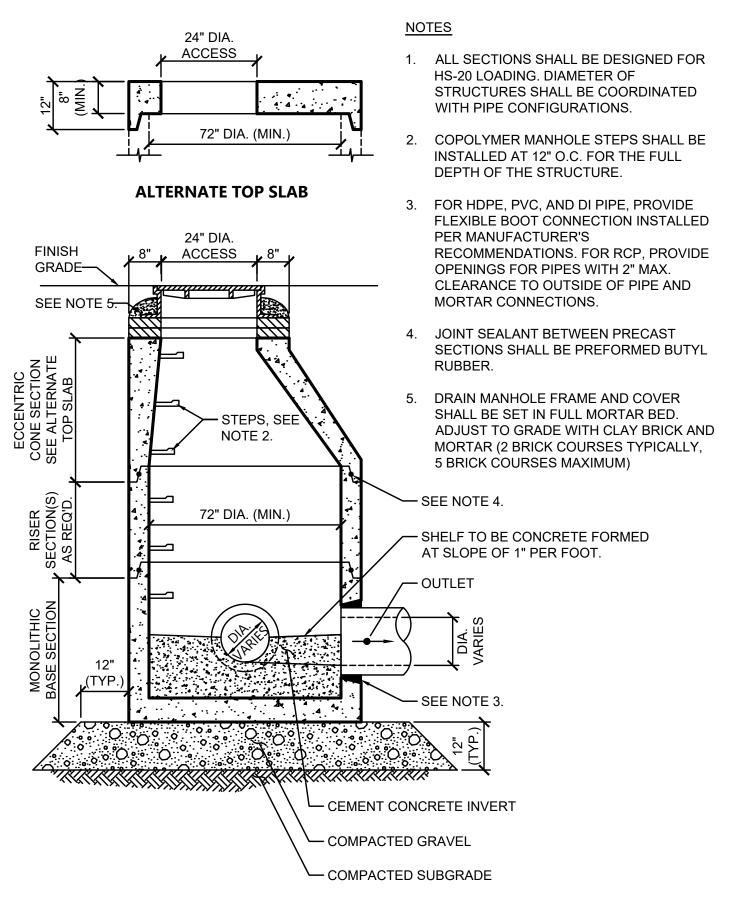
SECTION 2-2

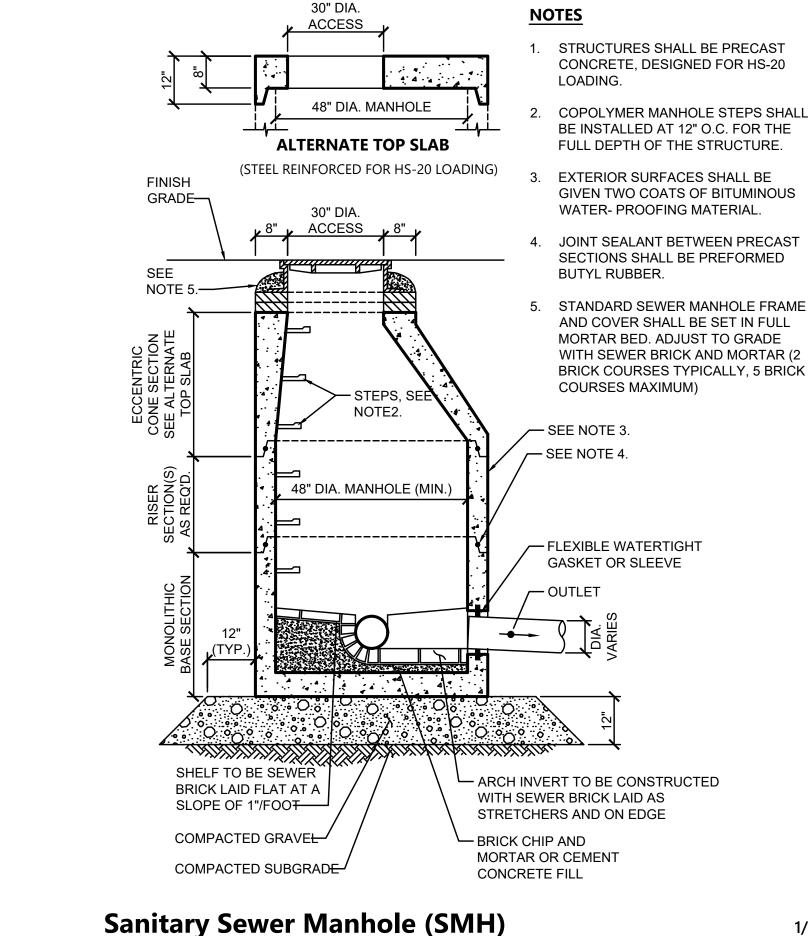
SECTION 1-1 **TABLE OF DIMENSIONS**

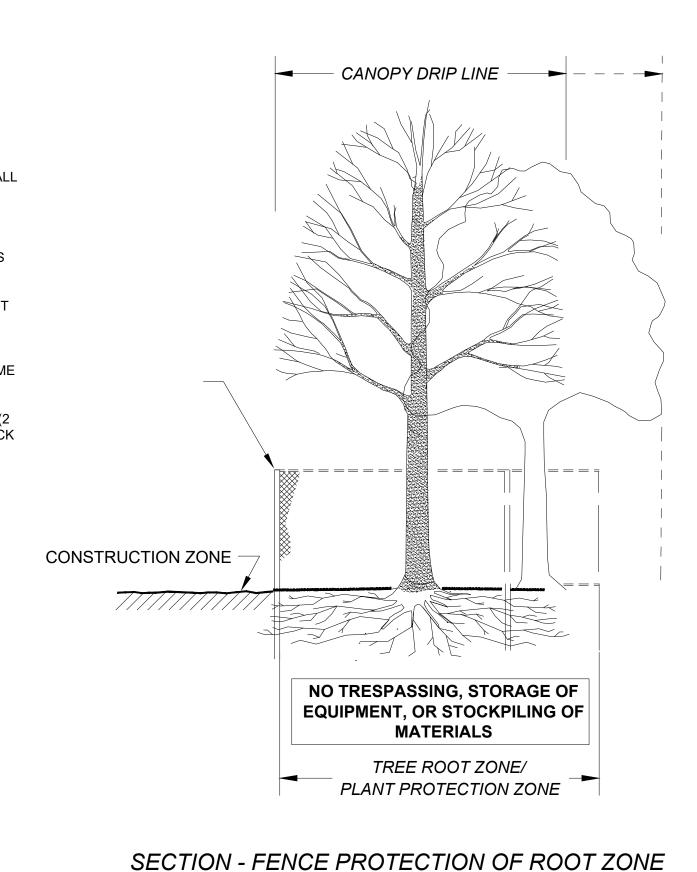
PLAN

PROVIDE BLOCKS FOR TAPPING SLEEVES, DEAD ENDS, GATE









MA | PRC(FDG90)/PRC(PRC90)-0033(043) | 42 | 45 PROJECT FILE NO. **CONSTRUCTION DETAILS** PLACE FENCE AS SHOWN ON PLANS AND AS CLOSE TO CONSTRUCTION LIMITS (AS FAR FROM TRUNK) AS POSSIBLE **EXISTING** TREES LIMIT CANOPY/ROOT ZONE NO TRESPASSING, STORAGE OF EQUIPMENT, OR STOCKPILING OF MATERIALS IN ROOT ZONE TREE ROOT ZONE/ PLANT PROTECTION ZONE PLAN VIEW - FENCE PROTECTION OF ROOT ZONE

WORCESTER/SHREWSBURY **ROUTE 20**

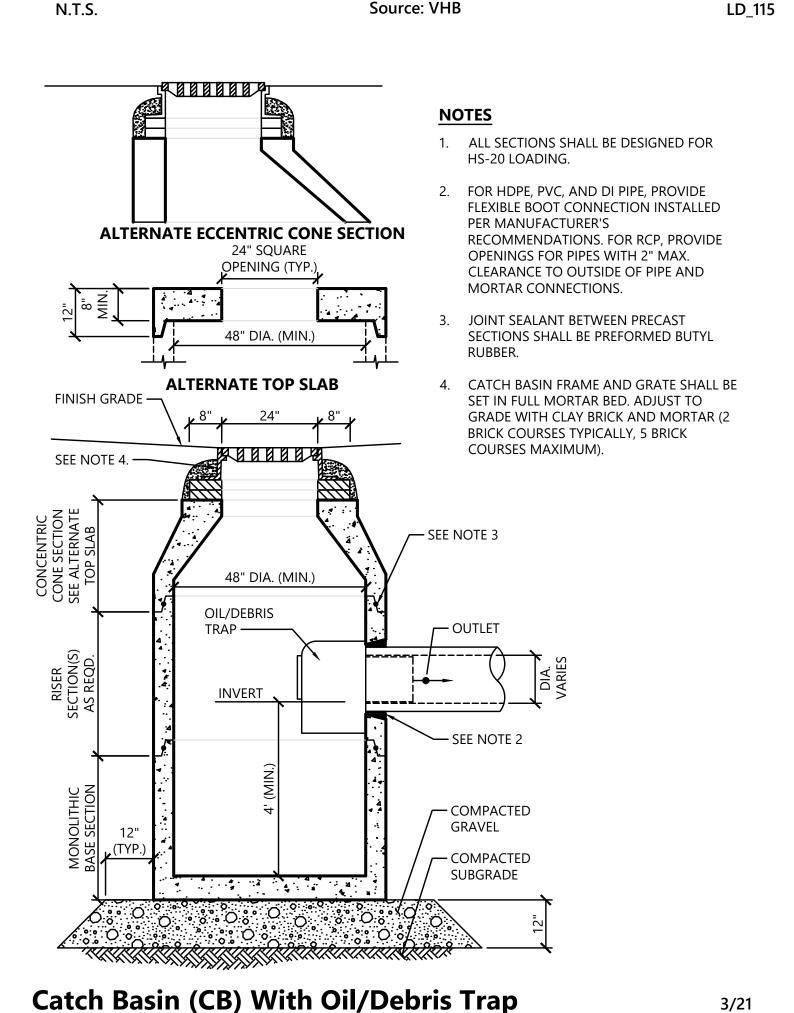
FED. AID PROJ. NO.

TREE PROTECTION - ROOT ZONE

SCALE: N.T.S.

1/16

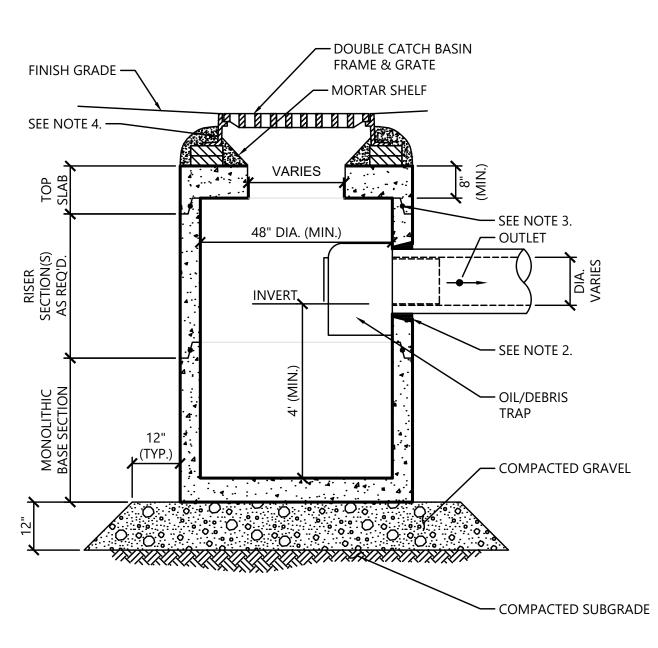
LD_200



Source: VHB

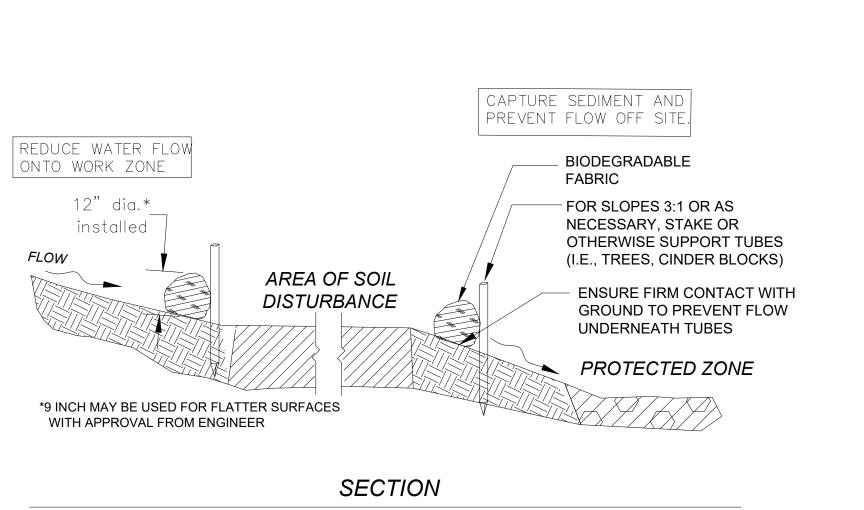
Special Manhole (DMH)

N.T.S.



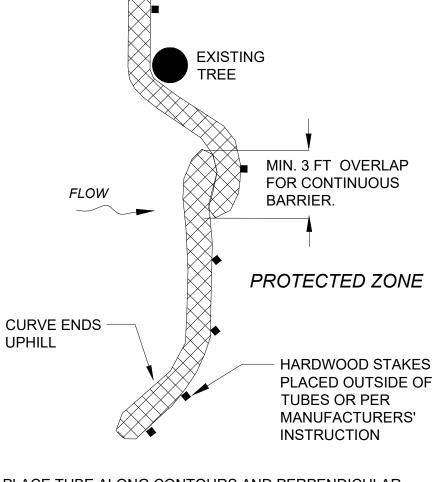
- INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. FOR RCP, PROVIDE OPENINGS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE AND MORTAR CONNECTIONS.
- 3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
- 4. DOUBLE CATCH BASIN FRAME AND GRATE SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICKS TYPICALLY, 5 BRICK COURSES MAXIMUM).

Double Grate Catch Basin (DCB) with Oil/Debris Trap 11/19 N.T.S. Source: VHB



SEDIMENT BARRIERS - COMPOST FILTER TUBES

NOT TO SCALE



PLACE TUBE ALONG CONTOURS AND PERPENDICULAR TO FLOW.

PLACE AS CLOSE TO LIMIT OF SOIL DISTURBANCE AS POSSIBLE

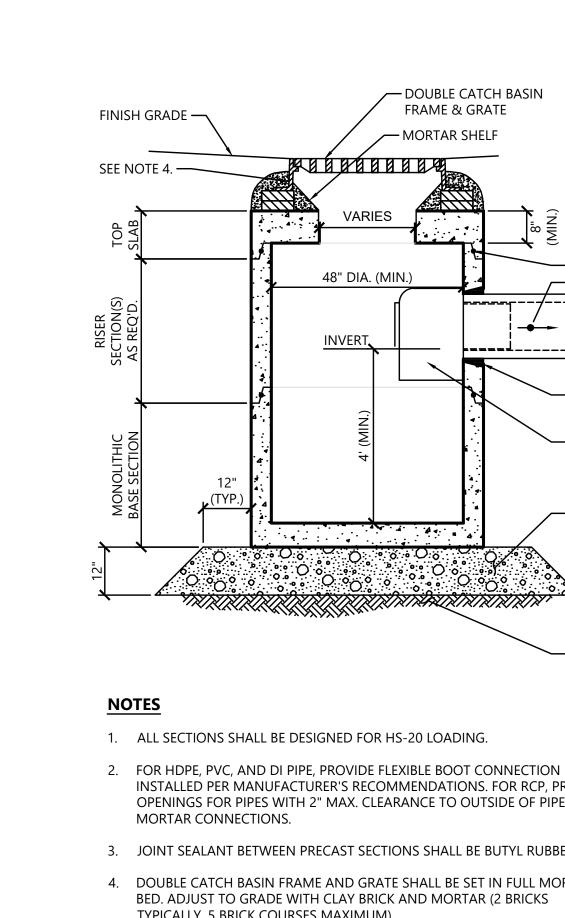
ADJUST LOCATION AS REQUIRED FOR OPTIMUM EFFECTIVENESS. DO NOT INSTALL IN WATERWAYS.

PLACE STAKES AS NEEDED TO SECURE TUBES IN PLACE.

PLAN VIEW

SEDIMENT BARRIERS

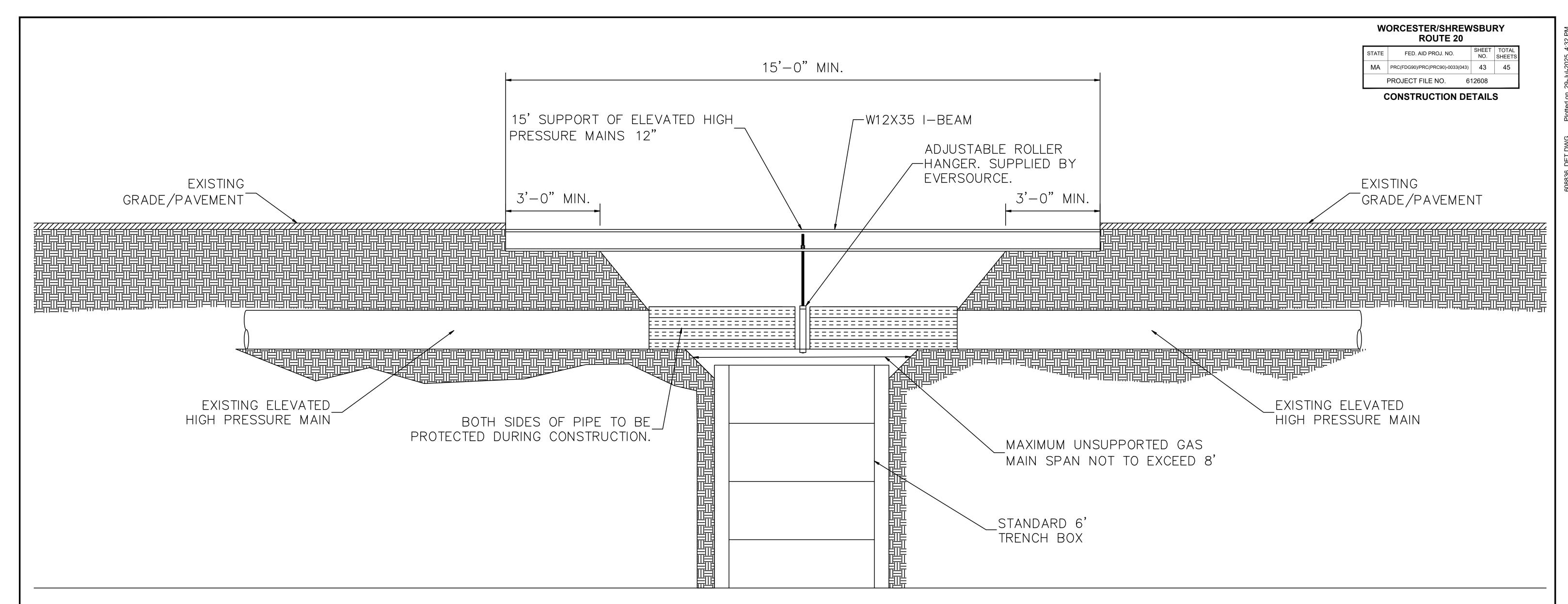
NOT TO SCALE



11/19

LD_101

N.T.S.



ELEVATED EVERSOURCE HIGH PRESSURE MAINS TEMPORARY SUPPORT 12"

SCALE: N.T.S.

BILL OF MATERIALS			
QTY	SIZE	DESCRIPTION	
15FT	W12 X 35	BEAM, ASTM A36	
1	16"	LBA 4B PIPE HANGAR WITH NONCONDUCTIVE ROLLERS FOR 16" PIPE	
1	12"	LBA 4B PIPE HANGAR WITH NONCONDUCTIVE ROLLERS FOR 12" PIPE	
1	7/8"	BEAM CLAMP, %" ROD FOR 12" PIPE, CARPENTER AND PATTERSON FIGURE 702 OR EQUIVALENT	
1	1"	BEAM CLAMP, 1" ROD FOR 16" PIPE, CARPENTER AND PATTERSON FIGURE 702 OR EQUIVALENT	
AS NEEDED	7/8"	½" THREADED ROD FOR 12" PIPE, ASTM A307	
AS NEEDED	1"	1" THREADED ROD FOR 16" PIPE, ASTM A307	

NOTES:

- 1. THE DRAWING SHOWN ON THIS PLAN IS A STANDARD DETAIL AND DO NOT REPRESENT SITE—SPECIFIC LOCATIONS. AN EXISTING CONDITIONS SURVEY OF EACH LOCATION WAS NOT COMPLETED FOR THIS EFFORT.
- CONTRACTOR SHALL ENSURE THAT BEAM PLACEMENT IS IN COMPLIANCE WITH ALLOWABLE WORK AREAS AND ALL PROJECT PERMITS.
 CONTRACTOR SHALL ENSURE THAT BEAMS ARE PLACED ON LEVEL, WELL COMPACTED, STABLE, AND EVENLY SUPPORTED GROUND SURFACE.
- 4. CONTRACTOR SHALL ENSURE THAT BEAMS ARE PLACED IN AN UPLAND (DRY) AREA AND ON SOIL WITH A BEARING CAPACITY OF AT LEAST 2,000 PSF.
- 5. THE EXISTING GAS MAIN OPEN SPAN OF 8-FT AS SHOWN ON THE DRAWING CANNOT BE EXCEEDED. IF CONDITIONS WARRANT A LONGER SPAN, CONTACT EVERSOURCE ENERGY.
- 6. THE BEAM LENGTH SHOWN ON THIS PLAN CANNOT BE EXCEEDED. IF CONDITIONS WARRANT A LONGER SPAN, CONTACT EVERSOURCE ENERGY.
 7. THE BEAM SHOWN ON THIS DRAWING HAS BEEN DESIGNED FOR THE PURPOSE SHOWN ONLY. IF CONDITIONS OR LOADS CHANGE CONTACT EVERSOURCE
- 8. CONSTRUCTION SHALL BE IN COMPLIANCE WITH EVERSOURCE ENERGY CONSTRUCTION AND ENGINEERING STANDARDS.
- 9. EXCAVATION NEAR LIVE GAS MAINS SHALL BE DONE IN ACCORDANCE WITH EVERSOURCE STANDARDS.
- 10. EXPOSED LENGTH OF GAS MAIN TO BE PROTECTED WITH ROC SHIELD OR EQUIVALENT FOR DURATION OF CONSTRUCTION.
 11. EVERSOURCE GAS PERSONNEL MUST BE PRESENT WHEN WORKING AROUND THE HIGH PRESSURE GAS MAIN.

