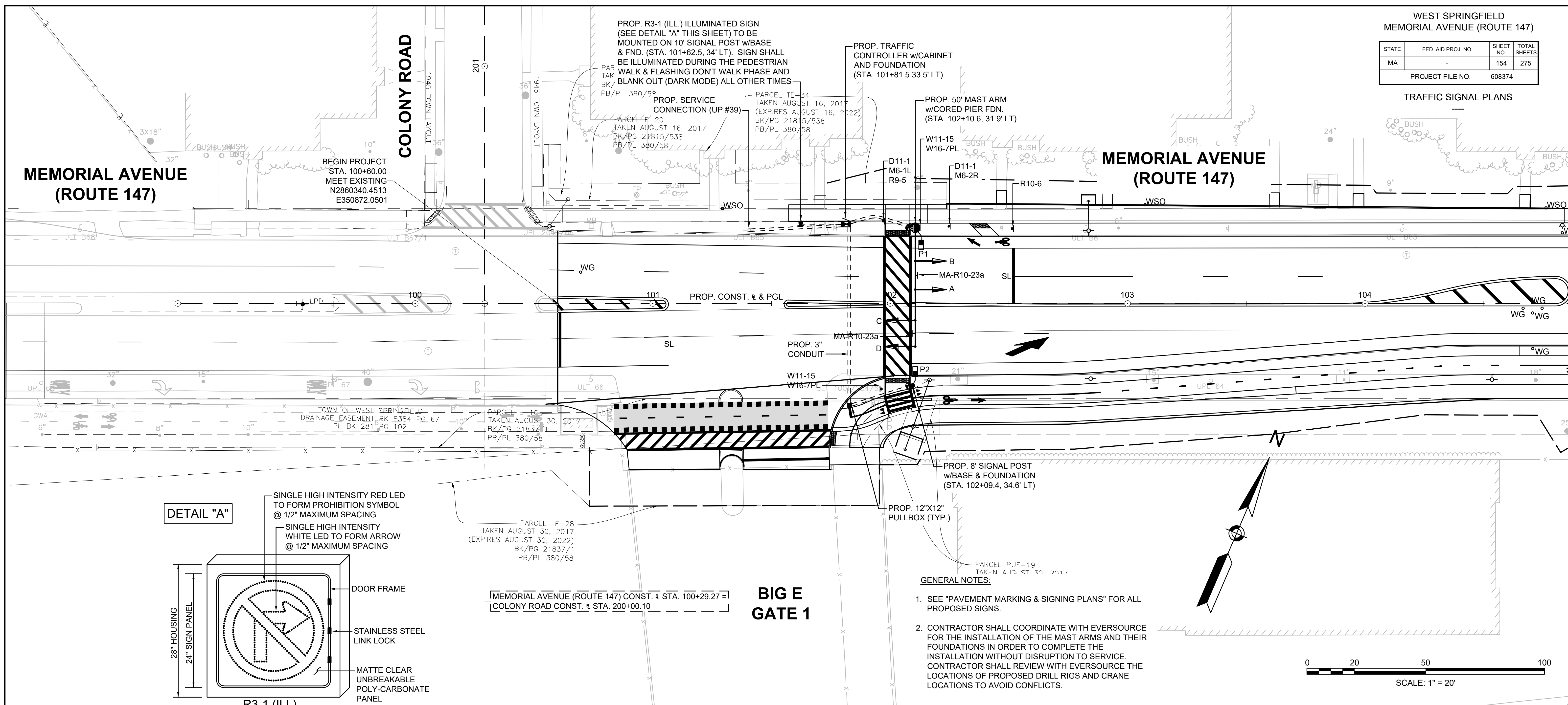
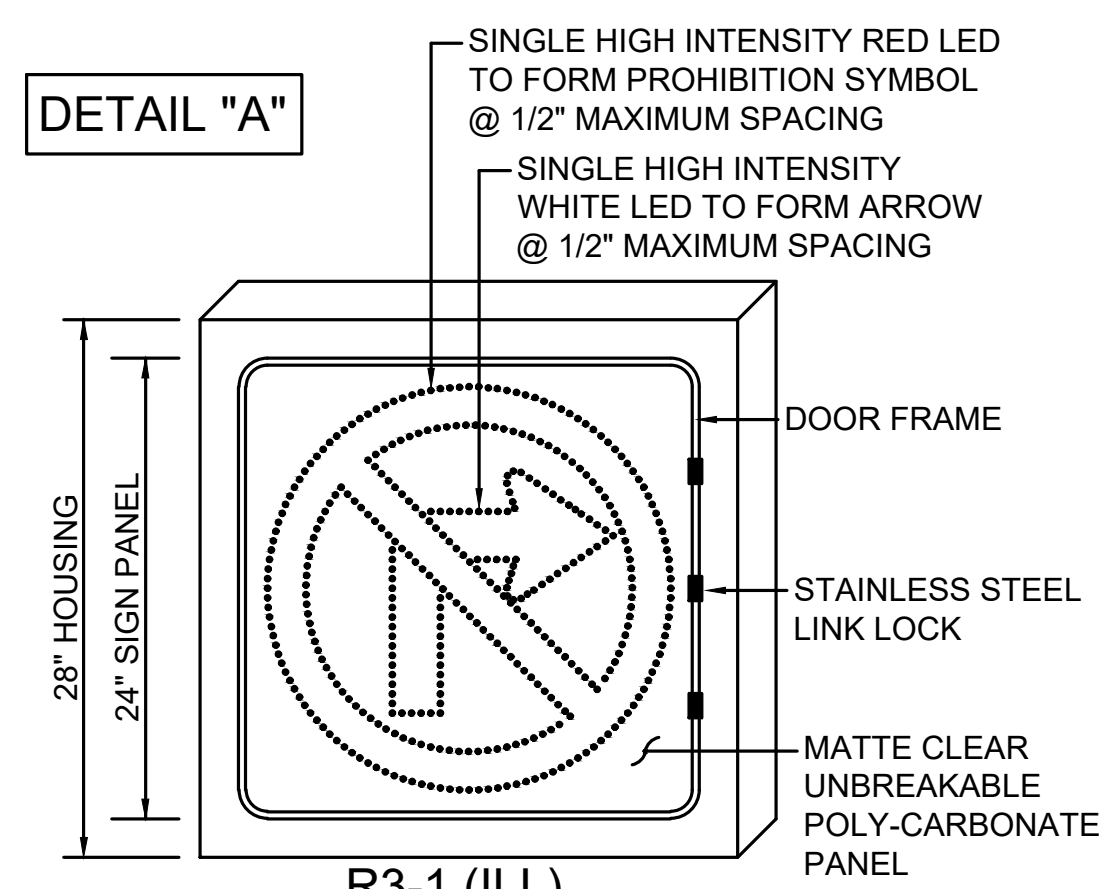


STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA		154	275
PROJECT FILE NO.		608374	

TRAFFIC SIGNAL PLANS



DETAIL "A"



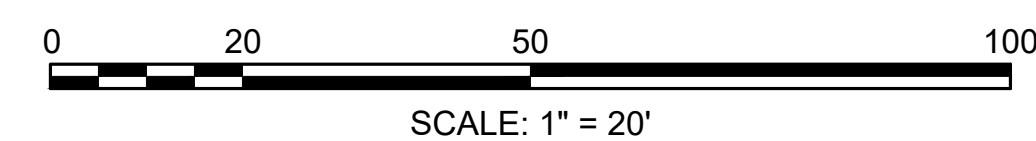
R3-1 (ILL)
ILLUMINATED SIGN

NOTES:

- SIGN SHALL BE ILLUMINATED DURING THE PEDESTRIAN PHASE AND BLANK OUT ALL OTHER TIMES.
- SEE ITEM 824.63 IN THE SPECIAL PROVISIONS FOR DETAILS.

GENERAL NOTES:

- SEE "PAVEMENT MARKING & SIGNING PLANS" FOR ALL PROPOSED SIGNS.
- CONTRACTOR SHALL COORDINATE WITH EVERSOURCE FOR THE INSTALLATION OF THE MAST ARMS AND THEIR FOUNDATIONS IN ORDER TO COMPLETE THE INSTALLATION WITHOUT DISRUPTION TO SERVICE. CONTRACTOR SHALL REVIEW WITH EVERSOURCE THE LOCATIONS OF PROPOSED DRILL RIGS AND CRANE LOCATIONS TO AVOID CONFLICTS.



MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	ADVANCE TRAFFIC CONTROLLER (ATC) AND NEMA TS2 CABINET WITH FOUNDATION AND CONC. PAD
1	SERVICE CONNECTION (OVERHEAD FROM UTILITY POLE #B65)
1	8' SIGNAL POST, BASE & FDN.
1	50' MAST ARM ASSEMBLY, BASE & FDN.
4	SIGNAL HEAD, 3 SECTION (HYBRID BEACON: RED-RED-YELLOW)
2	PEDESTRIAN HOUSING GRAPHIC LED WITH COUNTDOWN TIMER
2	AUDIBLE & VIBRO-TACTILE PEDESTRIAN PUSH BUTTON (APS TYPE) INTEGRATED R10-3e SIGN & SADDLE W/LED CONFIRMATION LIGHT
2	EXTENSION BRACKET MOUNT FOR PEDESTRIAN PUSH BUTTON (SEE NOTE ①)
1	24" x 24" ILLUMINATED R3-1(ILL.) SIGN (NO RIGHT TURN GRAPHIC) (SEE DETAIL "A" AND SPECIAL PROVISIONS)
1	PULL BOX 12"x12" - SD2.031 (PAY SEPARATELY UNDER ITEM 811.31)
190'	3" ELECTRICAL CONDUIT TYPE NM - PLASTIC (UL) (SCHEDULE 80) (PAY SEPARATELY UNDER ITEM 804.3)

PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL.
① FOR PEDESTRIAN PUSH BUTTON P1 AND P2, AN EXTENSION BRACKET IS REQUIRED FOR MAXIMUM SIDE REACH OF 10" AS PER ADA ACCESSIBILITY GUIDELINES (ADAAG).

OPERATION OF PEDESTRIAN HYBRID BEACONS

- PEDESTRIAN HYBRID BEACON INDICATIONS SHALL BE DARK (NOT ILLUMINATED) DURING PERIODS BETWEEN ACTUATIONS.
- UPON ACTUATION BY A PEDESTRIAN PUSH BUTTON, A PEDESTRIAN HYBRID BEACON FACE SHALL DISPLAY A FLASHING CIRCULAR YELLOW SIGNAL INDICATION, FOLLOWED BY A STEADY CIRCULAR YELLOW SIGNAL INDICATION DURING THE PEDESTRIAN WALK INTERVAL, FOLLOWED BY ALTERNATING FLASHING CIRCULAR RED SIGNAL INDICATIONS DURING THE PEDESTRIAN CLEARANCE INTERVAL. UPON TERMINATION OF THE PEDESTRIAN CLEARANCE INTERVAL, THE PEDESTRIAN HYBRID BEACON FACES SHALL REVERT TO A DARK (NOT ILLUMINATED) CONDITION.
- THE PEDESTRIAN SIGNAL HEADS SHALL CONTINUE TO DISPLAY A STEADY UPRAISED HAND (SYMBOLIZING DON'T WALK) SIGNAL INDICATION WHEN THE PEDESTRIAN HYBRID BEACONS FACES ARE EITHER DARK OR DISPLAYING FLASHING OR STEADY CIRCULAR YELLOW SIGNAL INDICATIONS. THE PEDESTRIAN SIGNAL HEADS SHALL DISPLAY A WALKING PERSON (SYMBOLIZING WALK) SIGNAL INDICATION WHEN THE PEDESTRIAN HYBRID BEACON FACES ARE DISPLAYING STEADY CIRCULAR RED SIGNAL INDICATIONS. THE PEDESTRIAN SIGNAL HEADS SHALL DISPLAY A FLASHING UPRAISED HAND SIGNAL INDICATION WHEN THE PEDESTRIAN HYBRID BEACON FACES ARE DISPLAYING ALTERNATING FLASHING CIRCULAR RED SIGNAL INDICATIONS. UPON TERMINATION OF THE PEDESTRIAN CLEARANCE INTERVAL, THE PEDESTRIAN SIGNAL HEADS SHALL REVERT TO A STEADY UPRAISED HAND SIGNAL INDICATION.

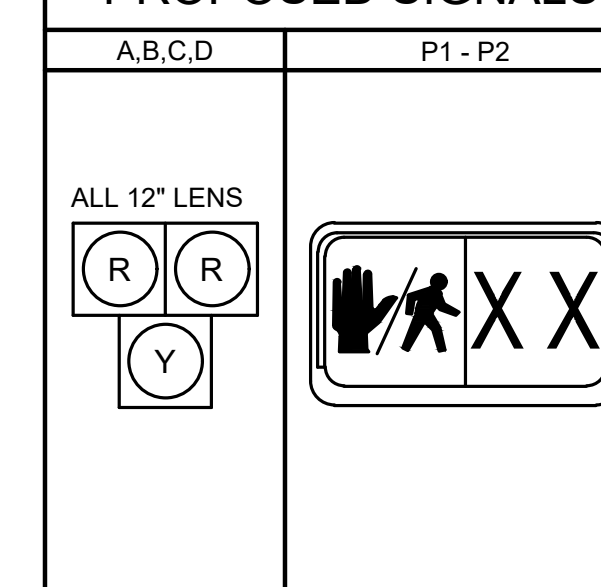
FULLY-ACTUATED	<input type="checkbox"/>	ISOLATED	<input checked="" type="checkbox"/>	Ø1	* PED Ø	
SEMI-ACTUATED	<input checked="" type="checkbox"/>	COORDINATED	<input type="checkbox"/>			
PRE-TIMED	<input type="checkbox"/>	WIRE	<input type="checkbox"/>	TBCU	<input type="checkbox"/>	

SEQUENCE AND TIMING								
STREET	DIRECTION	HOUSINGS	1	2	3	4	5	FLASH OPER.
MEMORIAL AVENUE	EB	A,B	BLANK OUT	FY	SY	SR	FR	BLANK OUT
MEMORIAL AVENUE	WB	C,D	BLANK OUT	FY	SY	SR	FR	BLANK OUT
PEDESTRIAN		P1-P2	DW	DW	DW	W	FDW	BLANK OUT

TIMING IN SECONDS								
MINIMUM INITIAL PASSAGE	90							
MAXIMUM 1								
MAXIMUM 2								
CHANGE			5	4	7	17		
PEDESTRIAN						7	17	
RECALL							OFF	
MEMORY							LOCKING	

- LEGEND
- SY - STEADY YELLOW
 - FY - FLASHING YELLOW
 - SR - STEADY RED
 - FR - FLASHING RED (ALTERNATING)

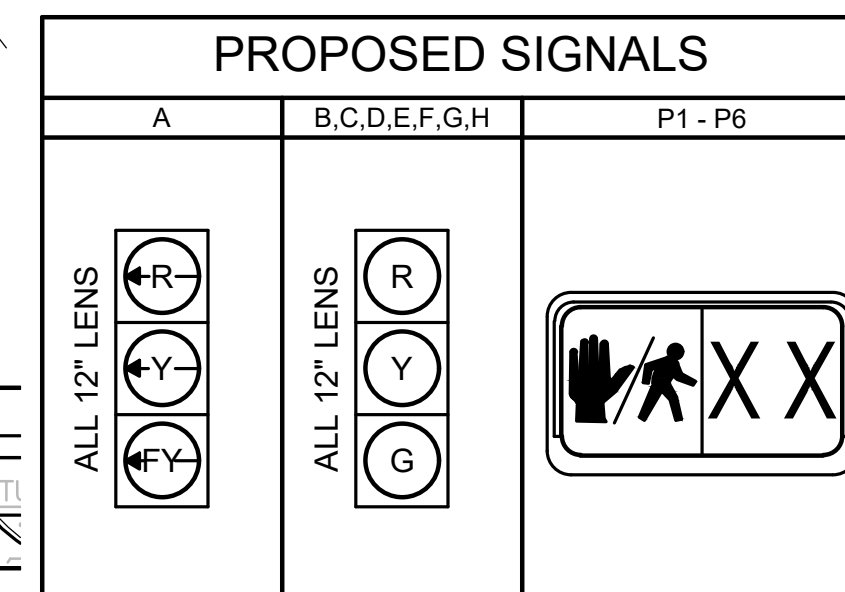
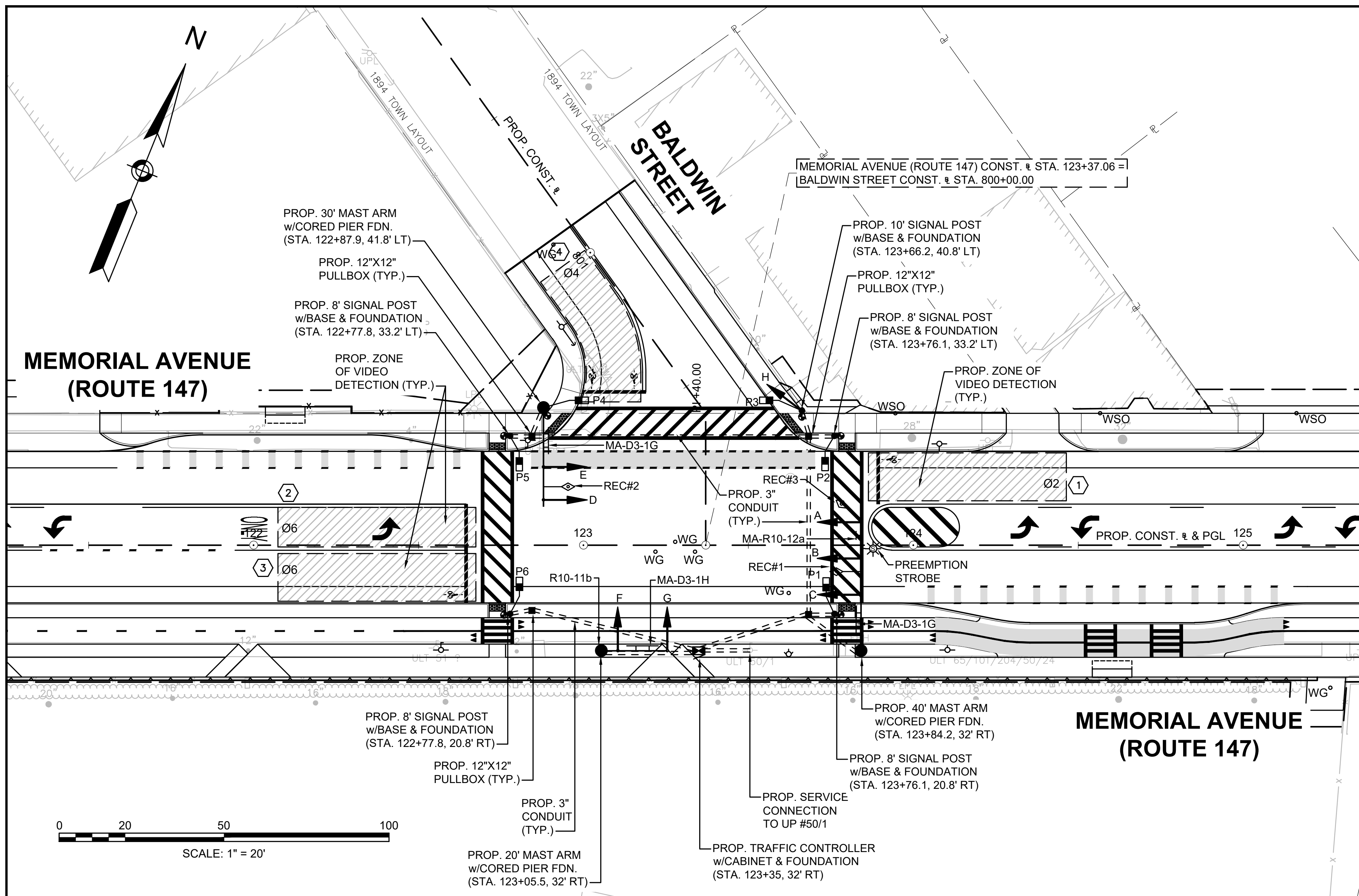
PROPOSED SIGNALS



- NOTES:
- ALL INDICATIONS SHALL BE "LED" TYPE LENS IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
 - ALL OVERHEAD SIGNALS SHALL BE RIGIDLY MOUNTED. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH CUT TUNNEL VISORS AND 5" LOUVERED BACK PLATES.
 - ALL VEHICLE SIGNAL HEAD BACK PLATES SHALL INCLUDE 2" RETRO-REFLECTIVE BORDER IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
 - ALL PEDESTRIAN DISPLAY SHALL BE "FULL" DISPLAYS. NO OUTLINE SYMBOL SHALL BE PERMITTED.

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	155	275
PROJECT FILE NO.		608374	

TRAFFIC SIGNAL PLANS



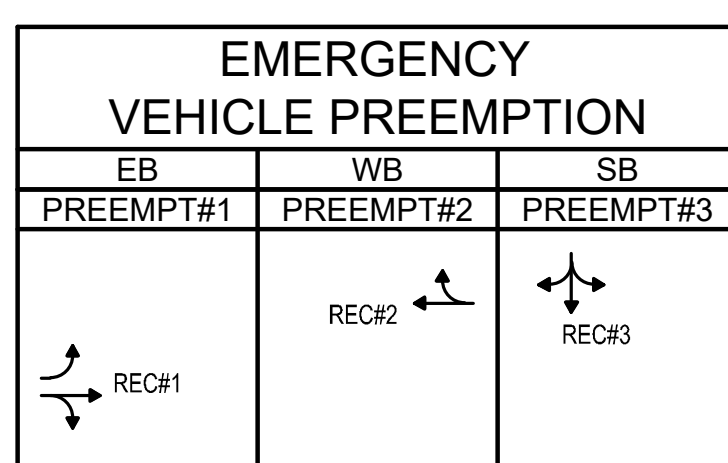
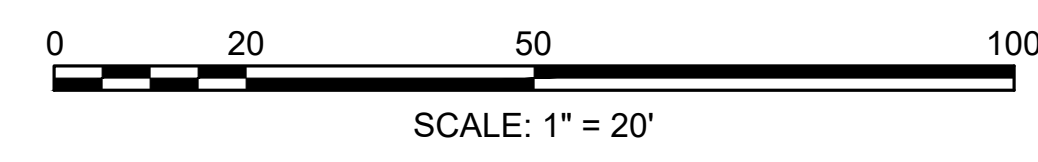
- NOTES:
1. ALL INDICATIONS SHALL BE "LED" TYPE LENS IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
 2. ALL OVERHEAD SIGNALS SHALL BE RIGIDLY MOUNTED. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH CUT TUNNEL VISORS AND 5" SOLID BACKPLATES.
 3. ALL VEHICLE SIGNAL HEAD BACKPLATES SHALL INCLUDE A 3" RETRO-REFLECTIVE BORDER IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
 4. ALL PEDESTRIAN DISPLAY SHALL BE "FULL" DISPLAYS. NO OUTLINE SYMBOL SHALL BE PERMITTED.

MAJOR ITEMS REQUIRED	
QUANTITY	DESCRIPTION
1	TRAFFIC CONTROLLER & CABINET NEMA TS2-TYPE 1 w/FOUNDATION
1	SERVICE CONNECTION (OVERHEAD FROM UTILITY POLE #50/1)
1	20' MAST ARM ASSEMBLY, BASE & FDN.
1	30' MAST ARM ASSEMBLY, BASE & FDN.
1	40' MAST ARM ASSEMBLY, BASE & FDN.
1	30' MAST ARM ASSEMBLY, BASE & FDN. (NOTE: TO BE INSTALLED AT THE BEGINNING OF TWO WAY LEFT TURN LANE AT STA. 105+80, 32' LT)
4	8' SIGNAL POST, BASE & FDN.
1	10' SIGNAL POST, BASE & FDN.
8	SIGNAL HEAD, 3 SECTION
6	PEDESTRIAN HOUSING GRAPHIC LED WITH COUNTDOWN TIMER
6	AUDIBLE & VIBRO-TACTILE PEDESTRIAN PUSH BUTTON (APS TYPE) INTEGRATED R10-3e SIGN & SADDLE w/LED CONFIRMATION LIGHT
3	EXTENSION BRACKET MOUNT FOR PEDESTRIAN PUSH BUTTON (SEE NOTE ①)
1	VIDEO DETECTION SYSTEM INCLUDING CAMERA(S) AND PROCESSORS (SEE SPECIAL PROVISIONS)
4	PULL BOX 12"x12" - SD2.031 (PAY SEPARATELY UNDER ITEM 811.31)
310	3" ELECTRICAL CONDUIT TYPE NM - PLASTIC (UL) (SCHEDULE 80) (PAY SEPARATELY UNDER ITEM 804.3)
3	UNIDIRECTIONAL SINGLE CHANNEL OPTICAL DETECTOR (RECEIVER)
2	PREEMPTION 2-CHANNEL PHASE SELECTOR
1	PREEMPTION CONFIRMATION STROBE (CLEAR)

PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL.

① FOR PEDESTRIAN PUSH BUTTON P1, P4 AND P6, AN EXTENSION BRACKET IS REQUIRED FOR MAXIMUM SIDE REACH OF 10" AS PER ADA ACCESSIBILITY GUIDELINES (ADAAG).

TRAFFIC CONTROLLER DATA	
PARAMETER	SELECTION
PHASE ASSIGNMENTS	STD. NEMA
OVERLAPS	STD. NEMA
RINGS	DUAL
DUAL ENTRY	ON (Ø2 & Ø6)
SIMULTANEOUS GAP OUT DISABLED	YES (Ø2 & Ø6)
MINIMUM YELLOW IN SECONDS	3
MAX II BY INTERNAL CLOCK	YES
NIGHT TIME FLASH BY INTERNAL CLOCK	NOT USED



EMERGENCY VEHICLE PREEMPTION OPERATION

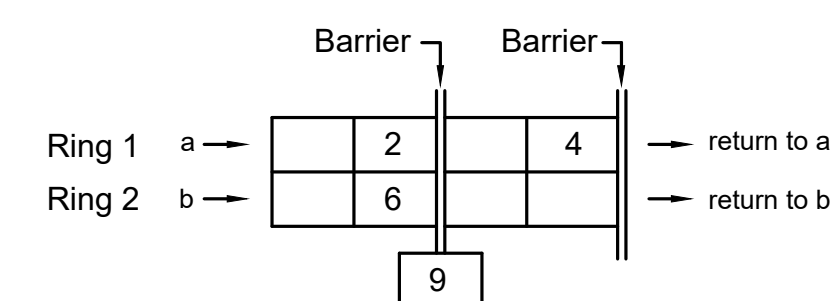
1. EMERGENCY VEHICLE PREEMPTION SIGNAL SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS (RECEIVERS) LOCATED AT THE INTERSECTION.
2. PREEMPTION SIGNALS SHALL BE SERVICED ON A FIRST COME FIRST SERVED BASIS. IN CASE WHERE TWO OR MORE CALLS ARE COMING IN AT THE SAME TIME, PREEMPTION SHALL BE PRIORITIZED WITH PREEMPT #1 (ROUTE 147 EB) FIRST, THEN FOLLOW BY PREEMPT #2 (ROUTE 147 WB), THEN PREEMPT #3 (BRESNAHAN STREET) AND PREEMPT #4 (COMMERCIAL DRIVEWAY).
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED BY OPTICAL DETECTOR REC#1 (OR REC#2, REC#3, REC#4), THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PREEMPTION SIGNAL #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME THE RELEVANT CLEARANCE INTERVALS AND SERVICE THE SUBSEQUENT EMERGENCY VEHICLE PREEMPTION SIGNAL IF NECESSARY. NORMAL SIGNAL OPERATION SHALL RESUME PROVIDED THAT ALL PREEMPTION SIGNALS HAVE CEASED.
4. NORMAL VEHICLE CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.
5. PREEMPTION STROBE SHALL BE ILLUMINATED ONLY WHEN THE PREEMPTION PHASE IS ON GREEN.

GENERAL NOTES:

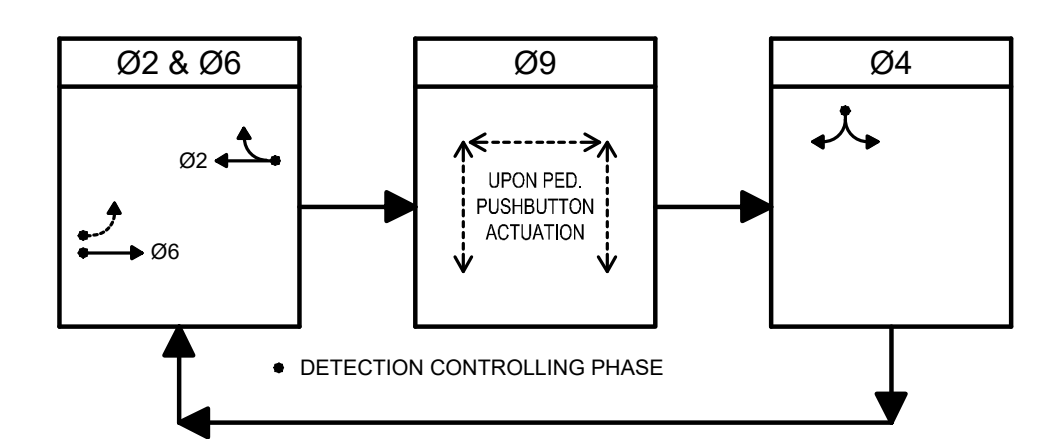
1. OPTICAL RECEIVERS MAY BE RELOCATED BY THE SIGNAL CONTRACTOR FOR OPTIMUM LINE OF SIGHT DETECTION. CHANGES SHALL BE VERIFIED BY THE ENGINEER.
2. THE DETECTION CAMERAS SHOWN ON THE PLAN ARE NOT FINAL. CONTRACTOR HAS THE OPTION TO INSTALL A SINGLE 360° CAMERA AND/OR MULTIPLE CAMERAS PER APPROACH TO ACHIEVE THE REQUIRED DETECTION ZONES AS SHOWN. CONTRACTOR SHALL ENSURE THE LOADING OF THE CAMERA(S) IS INCLUDED IN THE CALCULATION OF THE MAST ARM.
3. SEE "TRAFFIC SIGN & PAVEMENT MARKING PLANS" FOR ALL PROPOSED SIGNS AND EXISTING SIGNS.
4. CONTRACTOR SHALL COORDINATE WITH EVERSOURCE FOR THE INSTALLATION OF THE MAST ARMS AND THEIR FOUNDATIONS IN ORDER TO COMPLETE THE INSTALLATION WITHOUT DISRUPTION TO SERVICE. CONTRACTOR SHALL REVIEW WITH EVERSOURCE THE LOCATIONS OF PROPOSED DRILL RIGS AND CRANE LOCATIONS TO AVOID CONFLICTS.
4. REMOVE & STACK ALL EXISTING TRAFFIC SIGNAL EQUIPMENT COMPLETE. ABANDON ALL PULL BOXES AND HANDHOLES (R&S FRAMES & COVERS).

DETECTION DATA						
DETECTION ZONE NO.	LOCATION	Ø CALLED	Ø EXT.	MODE A=PULSE B=PRES.	DELAY TIME	EXT. TIME
①	MEMORIAL AVENUE WB THRU/RIGHT	2	2	B	-	-
②	MEMORIAL AVENUE EB LEFT	6	6	B	-	-
③	MEMORIAL AVENUE EB THRU	6	6	B	-	-
④	BALDWIN STREET SB LEFT/RIGHT	4	4	B	-	-

RING STRUCTURE



PREFERENTIAL PHASE SEQUENCE



FULLY-ACTUATED	<input checked="" type="checkbox"/>	ISOLATED	<input checked="" type="checkbox"/>
SEMI-ACTUATED	<input type="checkbox"/>	COORDINATED	<input type="checkbox"/>
PRE-TIMED	<input type="checkbox"/>	WIRE	<input type="checkbox"/>
		TBCU	<input type="checkbox"/>

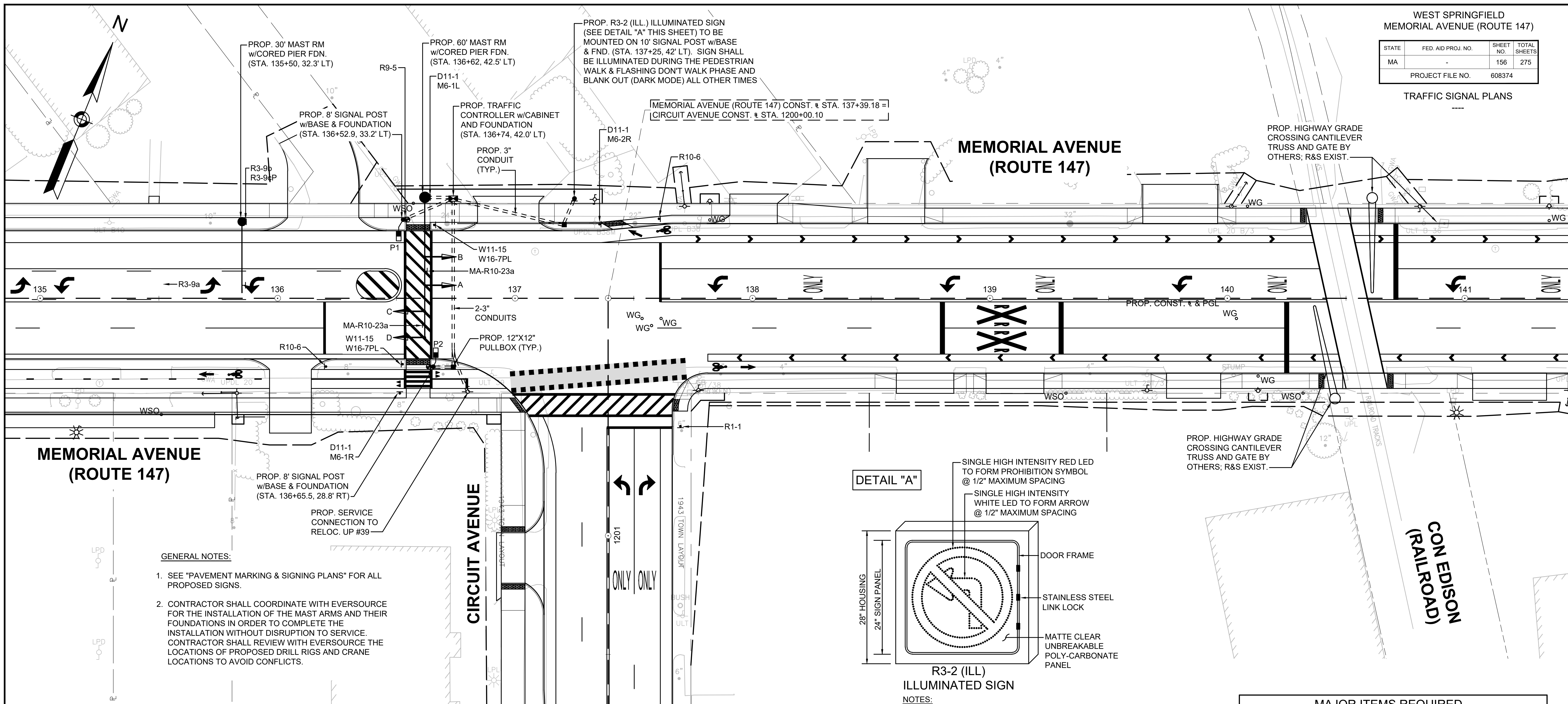
SEQUENCE AND TIMING

STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	10	11	12	FLASH OPER.
MEMORIAL AVENUE (ROUTE 147)	EB	A	RL	RL	RL	RL	RL	RL	FYL	YL	RL	RL	RL	RL	FYL
MEMORIAL AVENUE (ROUTE 147)	EB	B,C	R	R	R	R	R	R	R	R	R	R	R	R	FY
MEMORIAL AVENUE (ROUTE 147)	WB	D,E	G	Y	R	R	R	R	R	R	R	R	R	R	FY
BALDWIN STREET	SB	F,G,H	R	R	R	G	Y	R	R	R	R	R	R	R	FR
PEDESTRIAN	ALL	P1-P6	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT

TIMING IN SECONDS		EMERGENCY							
MINIMUM INITIAL	10								
PASSAGE	3								
MAXIMUM 1	42								
MAXIMUM 2	50								
CHANGE	4.0	2.0	3.5	3.0	4.0	2.0	7.0	16.0	4.0
PEDESTRIAN									
RECALL	SOFT	OFF	SOFT	OFF					
MEMORY	NON-LOCKING	NON-LOCKING	NON-LOCKING	LOCKING					

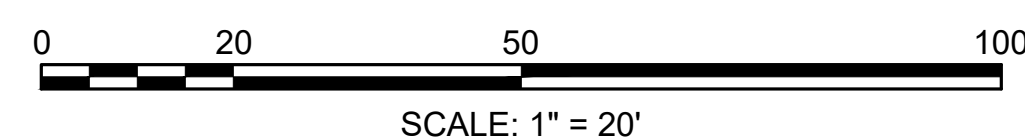
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA		156	275
PROJECT FILE NO.		608374	

TRAFFIC SIGNAL PLANS

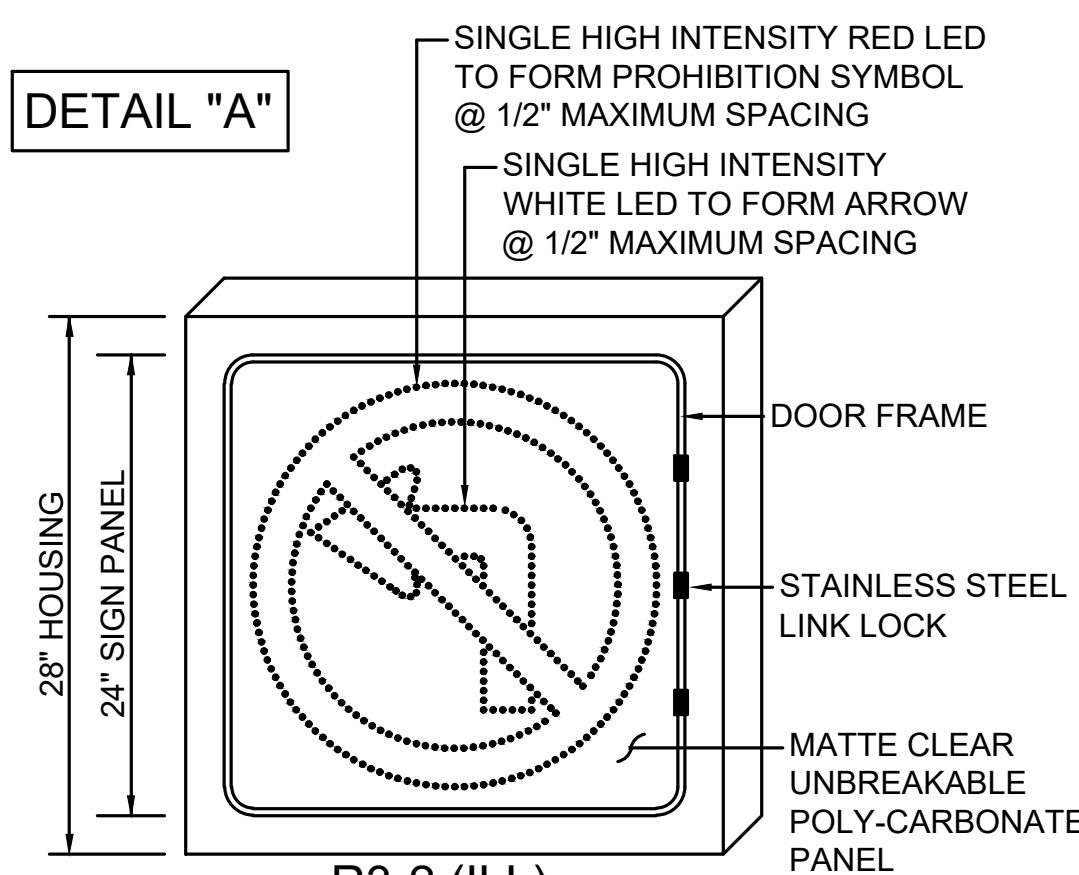


GENERAL NOTES:

- SEE "PAVEMENT MARKING & SIGNING PLANS" FOR ALL PROPOSED SIGNS.
- CONTRACTOR SHALL COORDINATE WITH EVERSOURCE FOR THE INSTALLATION OF THE MAST ARMS AND THEIR FOUNDATIONS IN ORDER TO COMPLETE THE INSTALLATION WITHOUT DISRUPTION TO SERVICE. CONTRACTOR SHALL REVIEW WITH EVERSOURCE THE LOCATIONS OF PROPOSED DRILL RIGS AND CRANE LOCATIONS TO AVOID CONFLICTS.



DETAIL "A"



R3-2 (ILL)
ILLUMINATED SIGN

- NOTES:
- SIGN SHALL BE ILLUMINATED DURING THE PEDESTRIAN PHASE AND BLANK OUT ALL OTHER TIMES.
 - SEE ITEM 824 63 IN THE SPECIAL PROVISIONS FOR DETAILS.

MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	ADVANCE TRAFFIC CONTROLLER (ATC) AND NEMA TS2 CABINET WITH FOUNDATION AND CONC. PAD
1	SERVICE CONNECTION (OVERHEAD FROM UTILITY POLE #39)
2	8' SIGNAL POST, BASE & FDN.
1	60' MAST ARM ASSEMBLY, BASE & FDN.
1	30' MAST ARM ASSEMBLY, BASE & FDN.
4	SIGNAL HEAD, 3 SECTION (HYBRID BEACON: RED-RED-YELLOW)
2	PEDESTRIAN HOUSING GRAPHIC LED WITH COUNTDOWN TIMER
2	AUDIBLE & VIBRO-TACTILE PEDESTRIAN PUSH BUTTON (APS TYPE) INTEGRATED R10-3e SIGN & SADDLE w/LED CONFIRMATION LIGHT
2	EXTENSION BRACKET MOUNT FOR PEDESTRIAN PUSH BUTTON (SEE NOTE 1)
1	24" x 24" ILLUMINATED R3-2(ILL.) SIGN (NO LEFT TURN GRAPHIC) (SEE DETAIL "A" AND SPECIAL PROVISIONS)
2	PULL BOX 12"x12" - SD2.031 (PAY SEPARATELY UNDER ITEM 811.31)
250	3" ELECTRICAL CONDUIT TYPE NM - PLASTIC (UL) (SCHEDULE 80) (PAY SEPARATELY UNDER ITEM 804.3)

1 FOR PEDESTRIAN PUSH BUTTON P1 AND P2, AN EXTENSION BRACKET IS REQUIRED FOR MAXIMUM SIDE REACH OF 10" AS PER ADA ACCESSIBILITY GUIDELINES (ADAAG).

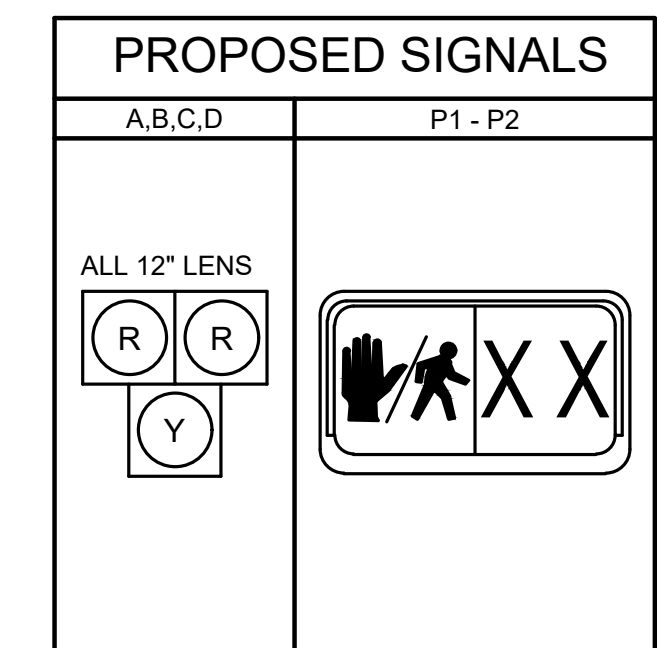
OPERATION OF PEDESTRIAN HYBRID BEACONS

- PEDESTRIAN HYBRID BEACON INDICATIONS SHALL BE DARK (NOT ILLUMINATED) DURING PERIODS BETWEEN ACTUATIONS.
- UPON ACTUATION BY A PEDESTRIAN PUSH BUTTON, A PEDESTRIAN HYBRID BEACON FACE SHALL DISPLAY A FLASHING CIRCULAR YELLOW SIGNAL INDICATION, FOLLOWED BY A STEADY CIRCULAR YELLOW SIGNAL INDICATION, FOLLOWED BY BOTH STEADY CIRCULAR RED SIGNAL INDICATIONS DURING THE PEDESTRIAN WALK INTERVAL, FOLLOWED BY ALTERNATING FLASHING CIRCULAR RED SIGNAL INDICATIONS DURING THE PEDESTRIAN CLEARANCE INTERVAL. UPON TERMINATION OF THE PEDESTRIAN CLEARANCE INTERVAL, THE PEDESTRIAN HYBRID BEACON FACES SHALL REVERT TO A DARK (NOT ILLUMINATED) CONDITION.
- THE PEDESTRIAN SIGNAL HEADS SHALL CONTINUE TO DISPLAY A STEADY UPRAISED HAND (SYMBOLIZING DON'T WALK) SIGNAL INDICATION WHEN THE PEDESTRIAN HYBRID BEACONS FACES ARE EITHER DARK OR DISPLAYING FLASHING OR STEADY CIRCULAR YELLOW SIGNAL INDICATIONS. THE PEDESTRIAN SIGNAL HEADS SHALL DISPLAY A WALKING PERSON (SYMBOLIZING WALK) SIGNAL INDICATION WHEN THE PEDESTRIAN HYBRID BEACON FACES ARE DISPLAYING STEADY CIRCULAR RED SIGNAL INDICATIONS. THE PEDESTRIAN SIGNAL HEADS SHALL DISPLAY A FLASHING UPRAISED HAND SIGNAL INDICATION WHEN THE PEDESTRIAN HYBRID BEACON FACES ARE DISPLAYING ALTERNATING FLASHING CIRCULAR RED SIGNAL INDICATIONS. UPON TERMINATION OF THE PEDESTRIAN CLEARANCE INTERVAL, THE PEDESTRIAN SIGNAL HEADS SHALL REVERT TO A STEADY UPRAISED HAND SIGNAL INDICATION.

FULLY-ACTUATED	<input type="checkbox"/>	ISOLATED	<input checked="" type="checkbox"/>	Ø1	* PED Ø	
SEMI-ACTUATED	<input checked="" type="checkbox"/>	COORDINATED	<input type="checkbox"/>			
PRE-TIMED	<input type="checkbox"/>	WIRE	<input type="checkbox"/>	TBCU	<input type="checkbox"/>	

SEQUENCE AND TIMING								
STREET	DIRECTION	HOUSINGS	1	2	3	4	5	FLASH OPER.
MEMORIAL AVENUE	WB	A,B	BLANK OUT	FY	SY	SR	FR	BLANK OUT
MEMORIAL AVENUE	EB	C,D	BLANK OUT	FY	SY	SR	FR	BLANK OUT
PEDESTRIAN		P1-P2	DW	DW	DW	W	FDW	BLANK OUT

TIMING IN SECONDS					EMERGENCY
MINIMUM INITIAL	90				
PASSAGE					
MAXIMUM 1					
MAXIMUM 2					
CHANGE	5	4	7	16	
PEDESTRIAN			7	16	
RECALL	OFF				
MEMORY	LOCKING				



- NOTES:
- ALL INDICATIONS SHALL BE "LED" TYPE LENS IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
 - ALL OVERHEAD SIGNALS SHALL BE RIGIDLY MOUNTED. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH CUT TUNNEL VISORS AND 5" LOUVERED BACK PLATES.
 - ALL VEHICLE SIGNAL HEAD BACK PLATES SHALL INCLUDE 2" RETRO-REFLECTIVE BORDER IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
 - ALL PEDESTRIAN DISPLAY SHALL BE "FULL" DISPLAYS. NO OUTLINE SYMBOL SHALL BE PERMITTED.

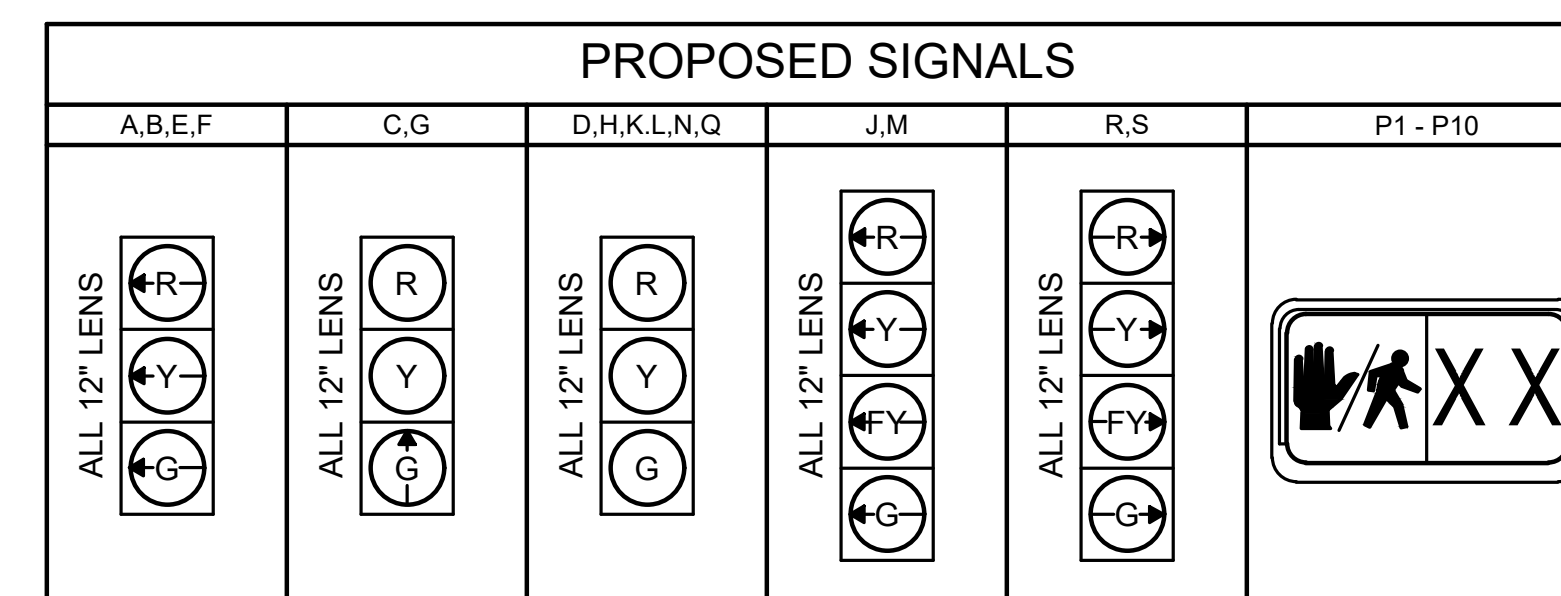
- LEGEND
- SY - STEADY YELLOW
 - FY - FLASHING YELLOW
 - SR - STEADY RED
 - FR - FLASHING RED (ALTERNATING)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA		157	275
PROJECT FILE NO.		608374	

TRAFFIC SIGNAL PLANS

GENERAL NOTES:

- OPTICAL RECEIVERS MAY BE RELOCATED BY THE SIGNAL CONTRACTOR FOR OPTIMUM LINE OF SIGHT DETECTION. CHANGES SHALL BE VERIFIED BY THE ENGINEER.
- THE DETECTION CAMERAS SHOWN ON THE PLAN ARE NOT FINAL. CONTRACTOR HAS THE OPTION TO INSTALL A SINGLE 360° CAMERA AND/OR MULTIPLE CAMERAS PER APPROACH TO ACHIEVE THE REQUIRED DETECTION ZONES AS SHOWN. CONTRACTOR SHALL ENSURE THE LOADING OF THE CAMERA(S) IS INCLUDED IN THE CALCULATION OF THE MAST ARM.
- SEE "TRAFFIC SIGN & PAVEMENT MARKING PLANS" FOR ALL PROPOSED SIGNS AND EXISTING SIGNS.
- REMOVE & STACK ALL EXISTING TRAFFIC SIGNAL EQUIPMENT COMPLETE. ABANDON ALL PULL BOXES AND HANDHOLES (R&S FRAMES & COVERS).



NOTES: 1. ALL INDICATIONS SHALL BE "LED" TYPE LENS IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

- ALL OVERHEAD SIGNALS SHALL BE RIGIDLY MOUNTED. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH CUT TUNNEL VISORS AND 5" SOLID BACKPLATES.
- ALL VEHICLE SIGNAL HEAD BACKPLATES SHALL INCLUDE A 3" RETRO-REFLECTIVE BORDER IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
- ALL PEDESTRIAN DISPLAY SHALL BE "FULL" DISPLAYS. NO OUTLINE SYMBOL SHALL BE PERMITTED.

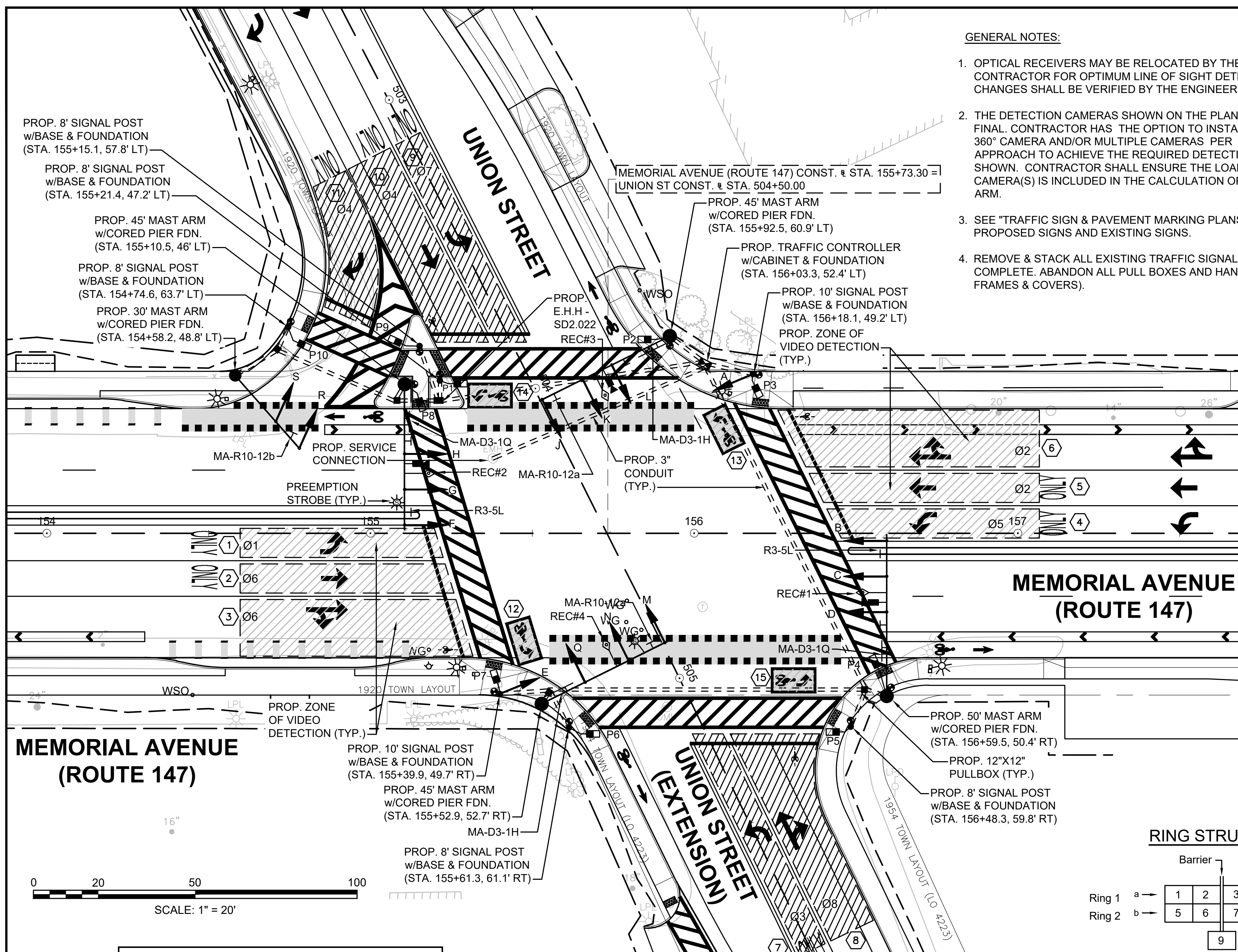
TRAFFIC CONTROLLER DATA

PARAMETER	SELECTION
PHASE ASSIGNMENTS	STD. NEMA
OVERLAPS	STD. NEMA
RINGS	DUAL
DUAL ENTRY	ON (Ø2 & Ø6) (Ø4 & Ø8)
SIMULTANEOUS GAP OUT DISABLED	YES (Ø2 & Ø6) (Ø4 & Ø8)
MINIMUM YELLOW IN SECONDS	3
MAX II BY INTERNAL CLOCK	YES
NIGHT TIME FLASH BY INTERNAL CLOCK	NOT USED

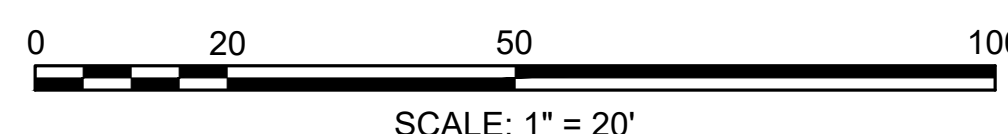
MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	TRAFFIC CONTROLLER & CABINET NEMA TS2-TYPE 1 w/FOUNDATION
1	SERVICE CONNECTION (UNDERGROUND FROM ELECTRIC MANHOLE)
1	30' MAST ARM ASSEMBLY, BASE & FDN.
3	45' MAST ARM ASSEMBLY, BASE & FDN.
1	50' MAST ARM ASSEMBLY, BASE & FDN.
5	8' SIGNAL POST, BASE & FDN.
2	10' SIGNAL POST, BASE & FDN.
12	SIGNAL HEAD, 3 SECTION
4	SIGNAL HEAD, 4 SECTION
10	PEDESTRIAN HOUSING GRAPHIC LED WITH COUNTDOWN TIMER
10	AUDIBLE & VIBRO-TACTILE PEDESTRIAN PUSH BUTTON (APS TYPE) INTEGRATED R10-3e SIGN & SADDLE w/LED CONFIRMATION LIGHT
5	EXTENSION BRACKET MOUNT FOR PEDESTRIAN PUSH BUTTON (SEE NOTE ①)
1	VIDEO DETECTION SYSTEM INCLUDING CAMERA(S) AND PROCESSORS (SEE SPECIAL PROVISIONS)
4	PULL BOX 12"x12" - SD2.031 (PAY SEPARATELY UNDER ITEM 811.31)
1	ELECTRIC HANDHOLE - SD2.022 (PAY SEPARATELY UNDER ITEM 811.22)
540	3" ELECTRICAL CONDUIT TYPE NM - PLASTIC (UL) (SCHEDULE 80) (PAY SEPARATELY UNDER ITEM 804.3)
4	UNIDIRECTIONAL SINGLE CHANNEL OPTICAL DETECTOR (RECEIVER)
2	PREEMPTION 2-CHANNEL PHASE SELECTOR
2	PREEMPTION CONFIRMATION STROBE (CLEAR)

① PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL.
① FOR PEDESTRIAN PUSH BUTTON P1, P2, P4, P8 & P9, AN EXTENSION BRACKET IS REQUIRED FOR MAXIMUM SIDE REACH OF 10" AS PER ADA ACCESSIBILITY GUIDELINES (ADAAG).



MEMORIAL AVENUE (ROUTE 147)



EMERGENCY VEHICLE PREEMPTION			
EB	WB	NB	SB
PREEMPT#1	PREEMPT#2	PREEMPT#3	PREEMPT#4

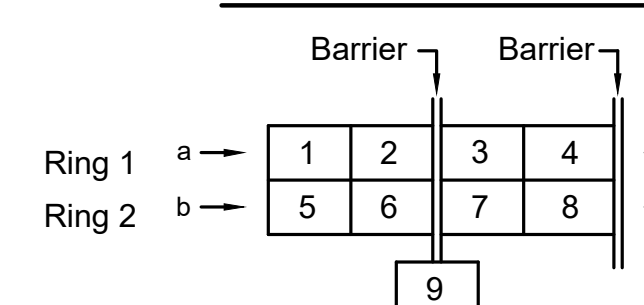
EMERGENCY VEHICLE PREEMPTION OPERATION

- EMERGENCY VEHICLE PREEMPTION SIGNAL SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS (RECEIVERS) LOCATED AT THE INTERSECTION.
- PREEMPTION SIGNALS SHALL BE SERVICED ON A FIRST COME FIRST SERVED BASIS. IN CASE WHERE TWO OR MORE CALLS ARE COMING IN AT THE SAME TIME, PREEMPTION SHALL BE PRIORITIZED WITH PREEMPT #1 (ROUTE 147 EB) FIRST, THEN FOLLOW BY PREEMPT #2 (ROUTE 147 WB), THEN PREEMPT #3 (UNION STREET NB) AND PREEMPT #4 (UNION STREET SB).
- IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED BY OPTICAL DETECTOR REC#1 (OR REC#2, REC#3, REC#4), THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PREEMPTION SIGNAL #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME THE RELEVANT CLEARANCE INTERVALS AND SERVICE THE SUBSEQUENT EMERGENCY VEHICLE PREEMPTION SIGNAL IF NECESSARY. NORMAL SIGNAL OPERATION SHALL RESUME PROVIDED THAT ALL PREEMPTION SIGNALS HAVE CEASED.
- NORMAL VEHICLE CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.
- PREEMPTION STROBE SHALL BE ILLUMINATED ONLY WHEN THE PREEMPTION PHASE IS ON GREEN.

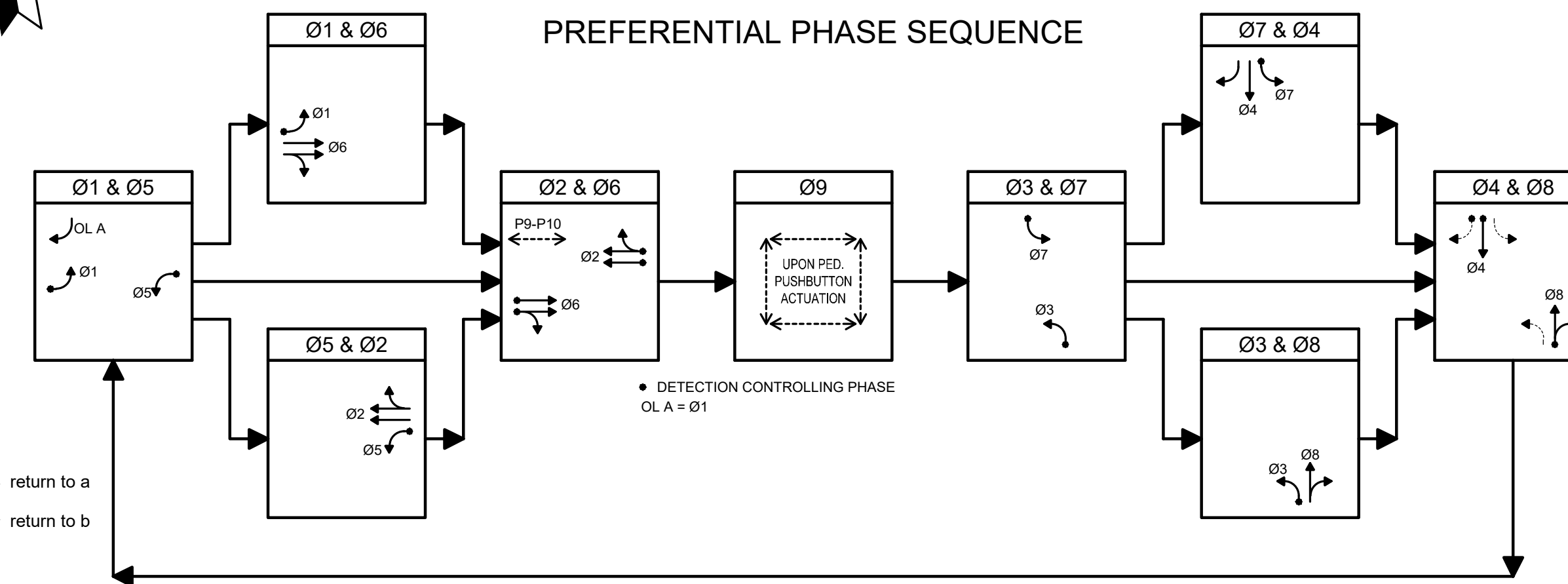
DETECTION DATA

DETECTION ZONE NO.	LOCATION	Ø CALLED	Ø EXT.	MODE A=PULSE B=PRES.	DELAY TIME	EXT. TIME
1	MEMORIAL AVENUE EB LEFT	1	1	B	-	-
2	MEMORIAL AVENUE EB THRU	6	6	B	-	-
3	MEMORIAL AVENUE EB THRU/RIGHT	6	6	B	-	-
4	MEMORIAL AVENUE WB LEFT	5	5	B	-	-
5	MEMORIAL AVENUE WB THRU	2	2	B	-	-
6	MEMORIAL AVENUE WB THRU/RIGHT	2	2	B	-	-
7	UNION ST (EXTENSION) NB LEFT	3	3 & 8	B	-	-
8	UNION ST (EXTENSION) NB THRU/RIGHT	8	8	B	-	-
9	UNION STREET SB LEFT	7	7 & 4	B	-	-
10	UNION STREET SB THRU	4	4	B	-	-
11	UNION STREET SB RIGHT	4	4	B	-	-
12	MEMORIAL AVENUE EB BIKE BOX	6	6	B	-	-
13	MEMORIAL AVENUE WB BIKE BOX	2	2	B	-	-
14	UNION STREET SB BIKE BOX	4	4	B	-	-
15	UNION STREET NB BIKE BOX	8	8	B	-	-

RING STRUCTURE



PREFERENTIAL PHASE SEQUENCE



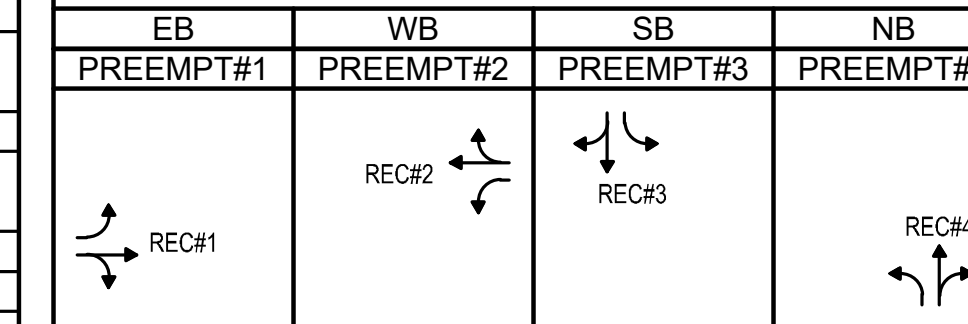
SEQUENCE AND TIMING

STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	FLASH OPER.	
MEMORIAL AVENUE (ROUTE 147)	EB	A,B	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FRL	
MEMORIAL AVENUE (ROUTE 147)	EB	C	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	GV	Y	R	R	R	R	R	R	R	R	R	R	FY	
MEMORIAL AVENUE (ROUTE 147)	EB	D	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FY	
MEMORIAL AVENUE (ROUTE 147)	WB	E,F	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FRL	
MEMORIAL AVENUE (ROUTE 147)	WB	G	R	R	R	GV	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	
MEMORIAL AVENUE (ROUTE 147)	WB	H	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	
UNION STREET (EXTENSION)	NB	J	RL	RL	RL	RL	RL	RL	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FRL	
UNION STREET (EXTENSION)	NB	K,L	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FR	
UNION STREET	SB	M	RL	RL	RL	RL	RL	RL	RL	RL	FYL	YL	RL	RL	RL	RL	RL	RL	RL	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	FRL	
UNION STREET	SB	N,Q	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FR	
UNION STREET	SB	R,S	GR	YR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	FRR	
PEDESTRIAN	ALL	P1-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT		
PEDESTRIAN	E-W	P9-10	DW	DW	DW	W/FW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT		
TIMING IN SECONDS																															
MINIMUM INITIAL PASSAGE	6	10																													
MAXIMUM 1	2	3																													
MAXIMUM 2	10	12																													
MAXIMUM 3	15	32																													
CHANGE	21	36																													
PEDESTRIAN			3.0	2.5		4.0	1.5		4.0	2.0		4.0	2.0		3.0	2.5		4.0	1.5		4.0	2.0		4.0	2.0		7.0	22.0	4.0		
RECALL	OFF	SOFT																													
MEMORY	NON-LOCKING	NON-LOCKING																													

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	158	275
PROJECT FILE NO.		608374	

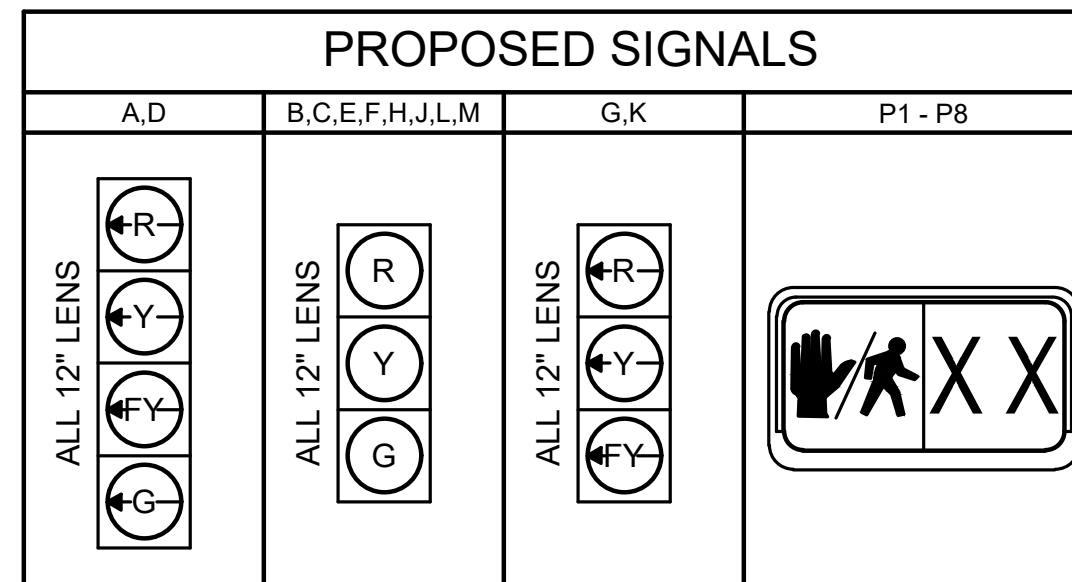
TRAFFIC SIGNAL PLANS

EMERGENCY VEHICLE PREEMPTION



EMERGENCY VEHICLE PREEMPTION OPERATION

- EMERGENCY VEHICLE PREEMPTION SIGNAL SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS (RECEIVERS) LOCATED AT THE INTERSECTION.
- PREEMPTION SIGNALS SHALL BE SERVICED ON A FIRST COME FIRST SERVED BASIS. IN CASE WHERE TWO OR MORE CALLS ARE COMING IN AT THE SAME TIME, PREEMPTION SHALL BE PRIORITIZED WITH PREEMPT #1 (ROUTE 147 EB) FIRST, THEN FOLLOW BY PREEMPT #2 (ROUTE 147 WB), THEN PREEMPT #3 (BRESNAHAN STREET) AND PREEMPT #4 (COMMERCIAL DRIVEWAY).
- IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED BY OPTICAL DETECTOR REC#1 (OR REC#2, REC#3, REC#4), THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PREEMPTION SIGNAL #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME THE RELEVANT CLEARANCE INTERVALS AND SERVICE THE SUBSEQUENT EMERGENCY VEHICLE PREEMPTION SIGNAL IF NECESSARY. NORMAL SIGNAL OPERATION SHALL RESUME PROVIDED THAT ALL PREEMPTION SIGNALS HAVE CEASED.
- NORMAL VEHICLE CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.
- PREEMPTION STROBE SHALL BE ILLUMINATED ONLY WHEN THE PREEMPTION PHASE IS ON GREEN.



- NOTES:
- ALL INDICATIONS SHALL BE "LED" TYPE LENS IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
 - ALL OVERHEAD SIGNALS SHALL BE RIGIDLY MOUNTED. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH CUT TUNNEL VISORS AND 5" SOLID BACKPLATES.
 - ALL VEHICLE SIGNAL HEAD BACKPLATES SHALL INCLUDE A 3" RETRO-REFLECTIVE BORDER IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
 - ALL PEDESTRIAN DISPLAY SHALL BE "FULL" DISPLAYS. NO OUTLINE SYMBOL SHALL BE PERMITTED.

QUANTITY	DESCRIPTION
1	TRAFFIC CONTROLLER & CABINET NEMA TS-2 TYPE 1 w/FDN & CONC. PAD
1	SERVICE CONNECTION (UNDERGROUND FROM ELECTRIC MANHOLE)
1	35' MAST ARM ASSEMBLY, BASE & FDN.
2	40' MAST ARM ASSEMBLY, BASE & FDN.
1	45' MAST ARM ASSEMBLY, BASE & FDN.
5	8' SIGNAL POST, BASE & FDN.
10	SIGNAL HEAD, 3 SECTION
2	SIGNAL HEAD, 4 SECTION
8	PEDESTRIAN HOUSING GRAPHIC LED WITH COUNTDOWN TIMER
8	AUDIBLE & VIBRO-TACTILE PEDESTRIAN PUSH BUTTON (APS TYPE) INTEGRATED R10-3e SIGN & SADDLE w/LED CONFIRMATION LIGHT
2	EXTENSION BRACKET MOUNT FOR PEDESTRIAN PUSH BUTTON (SEE NOTE 1)
1	VIDEO DETECTION SYSTEM INCLUDING CAMERA(S) AND PROCESSORS (SEE SPECIAL PROVISIONS)
3	PULL BOX 12"x12" - SD2.031 (PAY SEPARATELY UNDER ITEM 811.31)
430	3" ELECTRICAL CONDUIT TYPE NM - PLASTIC (UL) (SCHEDULE 80) (PAY SEPARATELY UNDER ITEM 804.3)
4	UNIDIRECTIONAL SINGLE CHANNEL OPTICAL DETECTOR (RECEIVER)
2	PREEMPTION 2-CHANNEL PHASE SELECTOR
2	PREEMPTION CONFIRMATION STROBE (CLEAR)

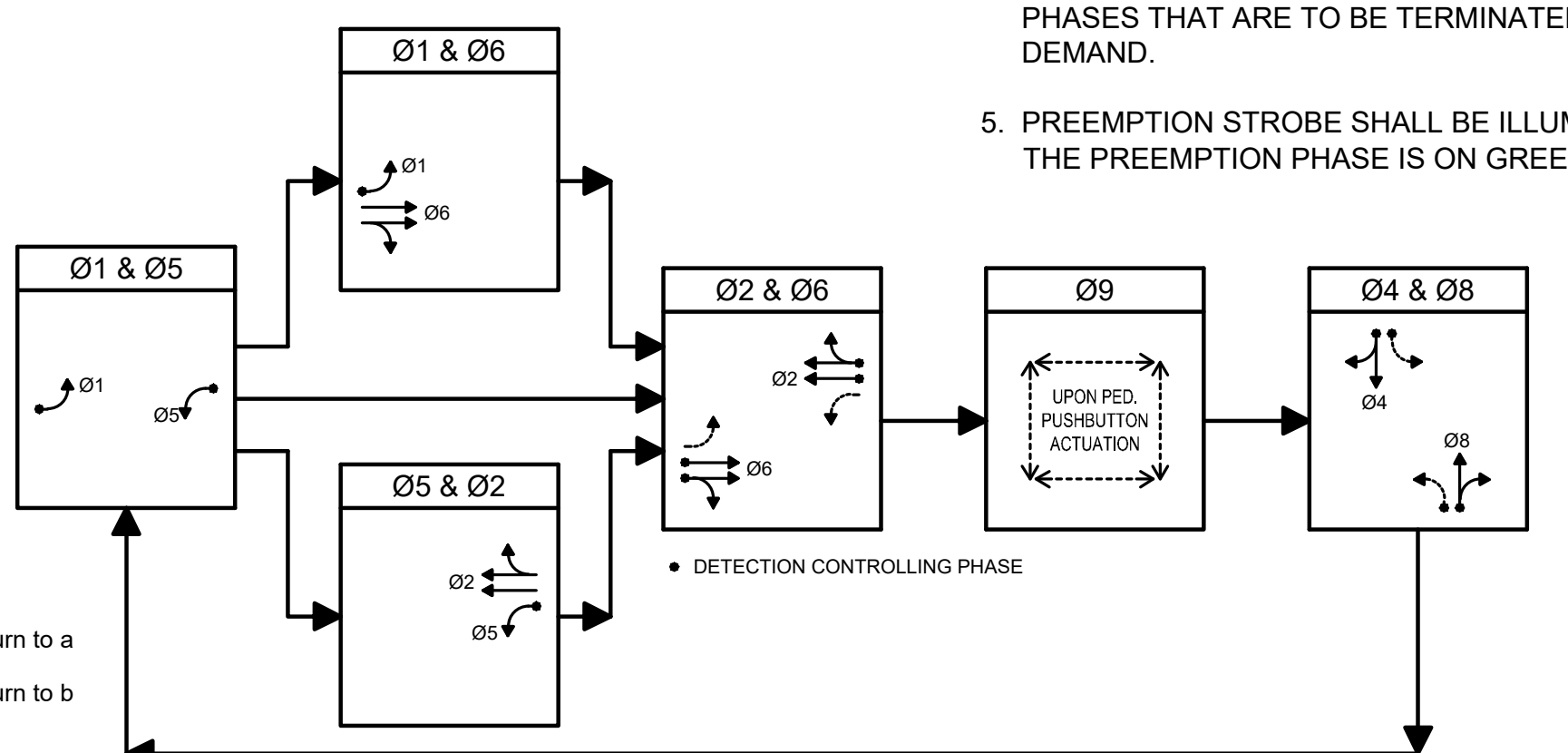
PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL.

1 FOR PEDESTRIAN PUSH BUTTON P1 AND P6, AN EXTENSION BRACKET IS REQUIRED FOR MAXIMUM SIDE REACH OF 10" AS PER ADA ACCESSIBILITY GUIDELINES (ADAAG).

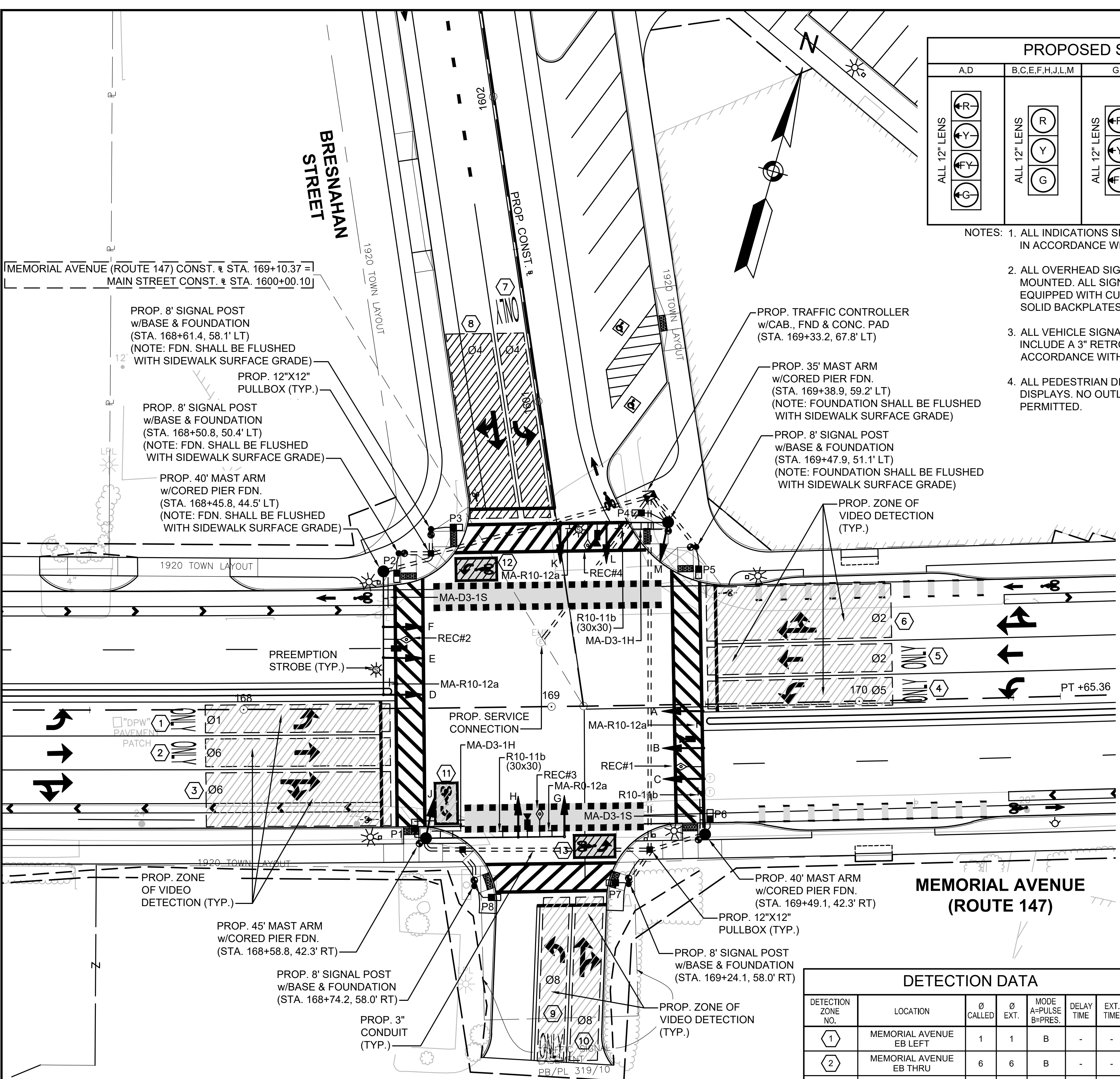
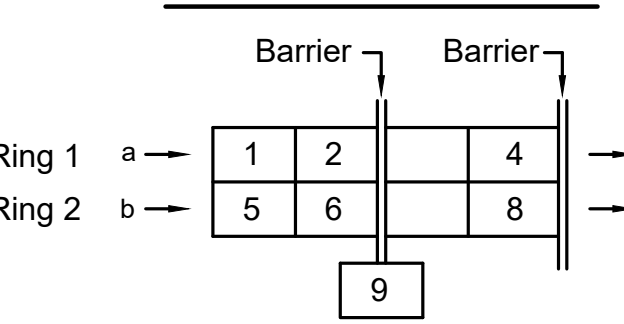
GENERAL NOTES:

- OPTICAL RECEIVERS MAY BE RELOCATED BY THE SIGNAL CONTRACTOR FOR OPTIMUM LINE OF SIGHT DETECTION. CHANGES SHALL BE VERIFIED BY THE ENGINEER.
- THE DETECTION CAMERAS SHOWN ON THE PLAN ARE NOT FINAL. CONTRACTOR HAS THE OPTION TO INSTALL A SINGLE 360° CAMERA AND/OR MULTIPLE CAMERAS PER APPROACH TO ACHIEVE THE REQUIRED DETECTION ZONES AS SHOWN. CONTRACTOR SHALL ENSURE THE LOADING OF THE CAMERA(S) IS INCLUDED IN THE CALCULATION OF THE MAST ARM.
- SEE "TRAFFIC SIGN & PAVEMENT MARKING PLANS" FOR ALL PROPOSED SIGNS AND EXISTING SIGNS.
- REMOVE & STACK ALL EXISTING TRAFFIC SIGNAL EQUIPMENT COMPLETE. ABANDON ALL PULL BOXES AND HANDHOLES (R&S FRAMES & COVERS).

PREFERENTIAL PHASE SEQUENCE



RING STRUCTURE



DETECTION DATA						
DETECTION ZONE NO.	LOCATION	Ø CALLED	Ø EXT.	MODE A=PULSE B=PRES.	DELAY TIME	EXT. TIME
1	MEMORIAL AVENUE EB LEFT	1	1	B	-	-
2	MEMORIAL AVENUE EB THRU	6	6	B	-	-
3	MEMORIAL AVENUE EB THRU/RIGHT	6	6	B	-	-
4	MEMORIAL AVENUE WB LEFT	2	2	B	-	-
5	MEMORIAL AVENUE WB THRU	2	2	B	-	-
6	MEMORIAL AVENUE WB THRU/RIGHT	2	2	B	-	-
7	BRESNAHAN STREET SB LEFT	4	4	B	-	-
8	BRESNAHAN STREET SB THRU/RIGHT	4	4	B	-	-
9	CENTURY CENTER NB LEFT	8	8	B	-	-
10	CENTURY CENTER NB THRU/RIGHT	8	8	B	-	-
11	MEMORIAL AVE EB BIKE BOX	8	8	B	-	-
12	BRESNAHAN STREET SB BIKE BOX	8	8	B	-	-
13	CENTURY CENTER NB BIKE BOX	8	8	B	-	-

TRAFFIC CONTROLLER DATA	
PARAMETER	SELECTION
PHASE ASSIGNMENTS	STD. NEMA
OVERLAPS	STD. NEMA
RINGS	DUAL
DUAL ENTRY	ON (Ø2 & Ø6) (Ø4 & Ø8)
SIMULTANEOUS GAP OUT DISABLED	YES (Ø2 & Ø6) (Ø4 & Ø8)
MINIMUM YELLOW IN SECONDS	3
MAX II BY INTERNAL CLOCK	YES
NIGHT TIME FLASH BY INTERNAL CLOCK	NOT USED

FULLY-ACTUATED	<input checked="" type="checkbox"/>	ISOLATED	<input checked="" type="checkbox"/>
SEMI-ACTUATED	<input type="checkbox"/>	COORDINATED	<input type="checkbox"/>
PRE-TIMED	<input type="checkbox"/>	WIRE	<input type="checkbox"/>
		TBCU	<input type="checkbox"/>

SEQUENCE AND TIMING																								
STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	FLASH OPER.
MEMORIAL AVENUE (ROUTE 147)	EB	A	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FYL
MEMORIAL AVENUE (ROUTE 147)	WB	D	RL	RL	RL	FYL	YL	RL	RL	RL	GL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FYL
MEMORIAL AVENUE (ROUTE 147)	WB	E,F	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FYL
BRESNAHAN STREET	SB	G	RL	RL	RL	RL	RL	RL	FYL	YL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FRL
BRESNAHAN STREET	SB	H,J	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
CENTURY CENTER	NB	K	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	RL	FYL	YL	RL	RL	RL	FRL
CENTURY CENTER	NB	L,M	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	FR
PEDESTRIAN	ALL	P1-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT	
TIMING IN SECONDS																								
MINIMUM INITIAL	6																							
PASSAGE	2																							
MAXIMUM 1	17																							
MAXIMUM 2	6																							
MAXIMUM 3	6																							
CHANGE	3.0 3.0 4.0 1.0 3.0 3.0 3.0 3.0 4.0 1.0 3.0 3.0 4.0 1.0 3.0 3.0																							
PEDESTRIAN	7.0 19.0 4.0																							
RECALL	OFF																							
MEMORY	NON-LOCKING NON-LOCKING NON-LOCKING NON-LOCKING NON-LOCKING NON-LOCKING LOCKING																							

