PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE RECONSTRUCTION OF THE EXISTING FULL-COLOR TRAFFIC SIGNAL AT THE INTERSECTION OF US 40 (W. PATRICK ST) AT WILLOWDALE DR. THE INSTALLATION INCLUDES LED SIGNAL HEADS, LED COUNTDOWN PEDESTRIAN SIGNAL HEADS, APS PUSHBUTTONS AND SIGNS AND IP-BASED VIDEO DETECTION CAMERAS.
US 40 IS ASSUMED TO RUN IN AN EAST-WEST DIRECTION.

INTERSECTION OPERATION

THE INTERSECTION WILL OPERATE IN A NEMA SIX-PHASE FULL-TRAFFIC-ACTUATED MODE WITH AN ALTERNATE PHASE FOR THE WEST LEG AND CONCURRENT PEDESTRIAN PHASES FOR THE NORTH AND SOUTH LEGS OF THE INTERSECTION. THE US 40 EASTBOUND AND WESTBOUND LEFT TURNS OPERATE IN EXCLUSIVE PHASING. THE WILLOWDALE DR AND ENTRANCE APPROACHES OPERATE IN SPLIT PHASING. US 40 MAINLINE LEFT TURNS OPERATE WITH LEAD-LAG PHASING WITH US 40 EASTBOUND LEFT TURNS LAGGING.

CONTROLLER REQUIREMENTS

THE EXISTING BASE MOUNTED CABINET SHALL BE REMOVED. THE EXISTING CONTROLLER SHALL BE RETURNED TO SHA. A NEW FULL-TRAFFIC-ACTUATED EIGHT-PHASE TRAFFIC SIGNAL CONTROLLER HOUSED IN A BASE MOUNTED CABINET SHALL BE FURNISHED BY SHA AND INSTALLED BY THE CONTRACTOR. A 2-WIRE APS CENTRAL CONTROL UNIT SHALL BE FURNISHED BY THE CONTRACTOR AND INSTALLED BY SHA. IP-BASED VIDEO DETECTION INTERFACE EQUIPMENT, 4-CHANNEL DETECTOR AMPLIFIERS AND UPS BATTERY BACKUP SHALL BE FURNISHED AND INSTALLED BY SHA.

SPECIAL NOTES

APS WILL FUNCTION AS FOLLOWS:

TO CROSS US 40 (W. PATRICK ST):

A. WHEN PEDESTRIAN LOCATES AND PRESSES PUSHBUTTON FOR AN EXTENDED TIME, THE PUSHBUTTON UNIT MESSAGE WILL BE "WAIT TO CROSS WEST PATRICK AT WILLOWDALE. WAIT."

B. WHEN WALK PHASE BEGINS, THE MESSAGE WILL BE A RAPID TICK WHICH WILL LAST FOR THE DURATION OF THE WALK PHASE.

TO CROSS WILLOWDALE DR:

A. WHEN PEDESTRIAN LOCATES AND PRESSES PUSHBUTTON FOR AN EXTENDED TIME, THE PUSHBUTTON UNIT MESSAGE WILL BE "WAIT TO CROSS WILLOWDALE AT WEST PATRICK. WAIT."

B. WHEN WALK PHASE BEGINS, THE MESSAGE WILL BE A RAPID TICK WHICH WILL LAST FOR THE DURATION OF THE WALK PHASE.

TO CROSS ENTRANCE:

A. WHEN PEDESTRIAN LOCATES AND PRESSES PUSHBUTTON FOR AN EXTENDED TIME, THE PUSHBUTTON UNIT MESSAGE WILL BE "WAIT TO CROSS ENTRANCE AT WEST PATRICK. WAIT."

B. WHEN WALK PHASE BEGINS, THE MESSAGE WILL BE A RAPID TICK WHICH WILL LAST FOR THE DURATION OF THE WALK PHASE.

GENERAL NOTES

1. THE CONTRACTOR SHALL VERIFY ALL PROPOSED POLE LOCATIONS PRIOR TO INSTALLATION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TERMINATING ALL SIGNAL CABLE TO THE APPROPRIATE TERMINALS AND PROPERLY LABELING EACH CABLE.
3. ALL UNUSED CABLE SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
4. ALL TRAFFIC SIGNAL FOUNDATIONS SHALL BE INSTALLED AT THE FINAL SIDEWALK OR CURB GRADE FOR CLOSED SECTIONS, HIGHEST ROADWAY PROFILE GRADE FOR OPEN SECTIONS, TO MEET CLEARANCES AS SPECIFIED IN MD 816.03, MD 818.01, MD 818.02 AND MD 818.04. THE CONTRACTOR SHALL VERIFY ULTIMATE GRADES PRIOR TO THE INSTALLATION OF ALL SIGNAL EQUIPMENT.
5. UNDERGROUND UTILITIES SHOWN ON THESE PLANS ARE SCHEMATIC ONLY AND MAY NOT BE COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING "MISS UTILITY" PRIOR TO CONSTRUCTION SO THAT ALL UTILITIES MAY BE LOCATED IN THE FIELD. IF THE CONTRACTOR PERCEIVES THAT A CONFLICT BETWEEN THE UTILITIES AND THE TRAFFIC SIGNAL WILL OCCUR, THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER IMMEDIATELY SO THAT THE CONFLICT MAY BE RESOLVED.
6. ALL PEDESTAL FOUNDATION TOPS SHALL BE INSTALLED FLUSH WITH SIDEWALK GRADE.
7. LOCATION OF ACCESSIBLE PEDESTRIAN SIGNAL PUSHBUTTONS MUST MEET LOCATION REQUIREMENTS OF MDMUTCD CHAPTER 4E "PEDESTRIAN CONTROL FEATURES" AND FIGURES 4E-3 AND 4E-4, AND THE LATEST NCHRP PUBLICATION, "ACCESSIBLE PEDESTRIAN SIGNALS GUIDE TO BEST PRACTICE." IF NOT MET, THE CONTRACTOR IS TO STOP WORK ON PUSHBUTTON LOCATIONS UNTIL A DESIGN WAIVER IS OBTAINED, APPROVED BY THE DIRECTOR, OFFICE OF TRAFFIC AND SAFETY.
8. PUSHBUTTONS ARE TO BE LOCATED SO THAT THEY CAN BE ACTIVATED BY A PERSON IN A WHEELCHAIR REACHING LESS THAN 18" FROM A 60" X 60" LEVEL LANDING AREA WITH A CROSS SLOPE OF LESS THAN OR EQUAL TO 2%.
9. THE 10' SEPARATION BETWEEN PUSHBUTTONS IS TO BE MEASURED FROM FACE OF PUSHBUTTON TO FACE OF PUSHBUTTON. NOT CENTER OF POLE TO CENTER OF POLE.
10. PUSHBUTTON ARROWS AND SIGNS ARE TO BE ORIENTED PARALLEL TO THE CROSSING FOR WHICH THEY ARE INTENDED.
11. PROPOSED LUMINAIRES SHALL BE SUPPLIED WITH A PHOTOCELL.
12. VIDEO DETECTION CAMERA ALIGNMENT SHALL BE COORDINATED WITH THE ENGINEER.
13. DURING CONSTRUCTION, PROPOSED SIGNAL EQUIPMENT SHALL NOT BLOCK EXISTING SIGNAL EQUIPMENT.
14. 10 FEET OF SLACK SHALL BE PROVIDED IN EACH HANDHOLE FOR INTERCONNECT CABLE.
15. THE CONTRACTOR SHALL CONTACT ED RODENHIZER AT THE SIGNAL SHOP (410-787-7652) TO DELIVER APS EQUIPMENT FOR TESTING.
16. THE CONTRACTOR SHALL CAP AND ABANDON CONDUITS FEEDING EXISTING SIGNAL EQUIPMENT THAT IS REMOVED.
17. PEDESTRIAN ACCESS SHALL BE MAINTAINED DURING CONSTRUCTION. IF PEDESTRIAN ACCESS CANNOT BE MAINTAIN, A PEDESTRIAN DETOUR SHALL BE PROVIDED BASED ON DISTRICT TRAFFIC APPROVAL.

BY: BJG

EQUIPMENT LIST "A, B & C"

A. EQUIPMENT TO BE SUPPLIED BY SHA.

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
9016	4 CHANNEL DETECTOR AMPLIFIER	EA	2
9104	CONTROLLER CABINET, SIZE "S" W/CTRL, VIDEO INT. 1-8 CAM	EA	1
9110	UPS EQUIPMENT FOR "S" CABINET	EA	1
9570	SHEET ALUMINUM GROUND MOUNTED SIGN 4 - R6-1R 54"X18" 4 - R6-1L 54"X18"	SF	54
9571	SHEET ALUMINUM MAST ARM / POLE MOUNTED SIGN 1 - R3-6(1) 30"X30" 1 - R3-RL 30"X36" 4 - M1-5(4) 78"X36" 4 - D-3(1) (DUAL FACE) 96"X16" 8 - R10-3(1) 9"X15"	SF	143

B. EQUIPMENT TO BE FURNISHED AND/OR INSTALLED BY THE CONTRACTOR.

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
1001	MAINTENANCE OF TRAFFIC	EA	3
2001	CLASS 2 EXCAVATION	CY	4
5003	REMOVAL OF EXISTING PERMANENT PAVEMENT LINE MARKINGS	LF	950
5004	12 INCH WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LINES	LF	950
5005	24 INCH WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LINES	LF	50
5006	WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LEGENDS AND SYMBOLS	SF	41
6001	STANDARD TYPE A COMBINATION CURB AND GUTTER 12 INCH GUTTER PAN 8 INCH DEPTH	LF	407
6002	5 INCH CONCRETE SIDEWALK	SF	1219
6003	DETECTABLE WARNING SURFACE FOR CURB RAMPS	SF	103
8001	12 INCH LED SIGNAL HEAD SECTION	EA	38
8002	2-WIRE CENTRAL CONTROL UNIT	EA	1
8005	ADJUST HANDHOLE TO GRADE WITH NEW FRAME AND COVER	EA	2
8007	ANY SIZE LIGHTING ARM ON SIGNAL POLE WITH 250 WATT HPS LAMP AND LUMINAIRE	EA	2
8008	AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON STATION AND SIGNS	EA	8
8009	BREAKAWAY PEDESTAL POLE (ANY SIZE)	EA	9
8012	EMBEDDED METERED SERVICE PEDESTAL	EA	1
8015	LED 16 INCH COUNTDOWN PEDESTRIAN SIGNAL HEAD	EA	6
8022	NONINVASIVE DETECTOR (ANY LENGTH) LEAD IN CABLE UP TO 1000'	EA	6
8023	REMOVE & DISPOSE OF EQUIPMENT (PER ASSIGNMENT)	EA	1
8025	TWIN MAST ARM POLE & 50'/60' MAST ARMS ANY 'T' DIMENSION	EA	2
8028	VIDEO DETECTION CAMERA AND CABLE ANY LENGTH	EA	4
8031	12-PAIR COMMUNICATION CABLE, SELF- SUPPORTING, JELLY-FILLED/UNDERGROUND	LF	2050
8033	DISCONNECT, PULL-BACK & REROUTE CABLES	LF	250
8034	ELECTRICAL CABLE - 2 CONDUCTOR (NO. 12 AWG) TYPE T/C	LF	445
8036	UP TO 4 INCH SCHEDULE 80 RIGID PVC CONDUIT-BORED	LF	475
8038	UP TO 4 INCH SCHEDULE 80 RIGID PVC CONDUIT-TRENCHED	LF	1570
8039	WOOD SIGN SUPPORTS UP TO 4' X 6'	LF	108
8040	INSTALL OVERHEAD OR GROUND MOUNTED SIGN (INCLUDING ALL HARDWARE)	SF	197
8042	NO. 6 AWG STRANDED BARE COPPER GROUND WIRE	LF	700
8045	ELECTRICAL CABLE 1-CONDUCTOR NO. 8 AWG-THHN/THWN	LF	60
8046	FURNISH AND INSTALL ELECTRICAL HANDHOLE	EA	12
8051	CUT, CLEAN, GALVANIZE AND CAP TRAFFIC SIGNAL STRUCTURE	EA	1
8053	ELECTRICAL CABLE - 2 CONDUCTOR (NO. 14 AWG)	LF	1385
8055	ELECTRICAL CABLE - 5 CONDUCTOR (NO. 14 AWG)	LF	1215
8056	ELECTRICAL CABLE - 7 CONDUCTOR (NO. 14 AWG)	LF	1910
8062	INSTALL CONTROLLER AND CABINET - BASE MOUNT (ANY SIZE)	EA	1
8069-A	F & I LED LUMINAIRE AND LAMPS	EA	2

C. THE EXISTING TRAFFIC SIGNAL CONTROLLER SHALL BE RETURNED TO SHA. ALL OTHER MATERIALS TO BE REMOVED BY THE CONTRACTOR SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

CONTACT PERSONS FOR DISTRICT #7 ARE AS FOLLOWS:

MR. JOHN CONCANNON
ASSISTANT DISTRICT ENGINEER - TRAFFIC
PHONE: 301-624-8140

MR. JOHN HUCHROWSKI
ASSISTANT DISTRICT ENGINEER - CONSTRUCTION
301-624-8200

MS. SUSAN PALMER
ASSISTANT DISTRICT ENGINEER - MAINTENANCE
301-624-8105

CONTACT PERSONS FOR OOTS ARE AS FOLLOWS:

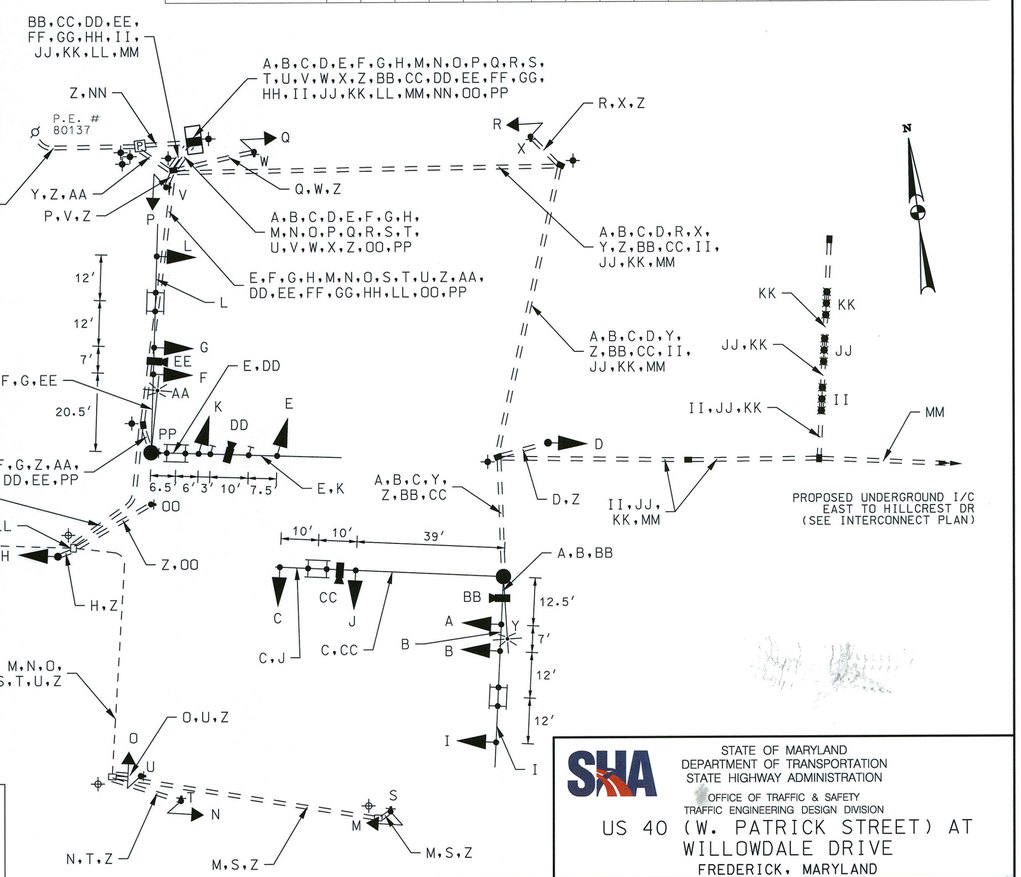
MS. CORREN JOHNSON
DIVISION CHIEF,
TRAFFIC OPERATIONS
PHONE: 410-787-7630

MR. ED RODENHIZER
CHIEF, SIGNAL OPERATIONS
410-787-7650

MR. EUGENE BAILEY
CHIEF, SIGN OPERATIONS
410-787-7676

PHASING CHART

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PHASE 2 AND 5	←R-	←R-	R	R	←G-	←G-	G	G	R	R	R	R	DW	DW	DW	DW	DW	DW
2 AND 5 CHANGE	←R-	←R-	R	R	←Y-	←Y-	G	G	R	R	R	R	DW	DW	DW	DW	DW	DW
PHASE 2 AND 6	←R-	←R-	G	G	←R-	←R-	G	G	R	R	R	R	DW	DW	WK	WK	WK	WK
PED CLEARANCE	←R-	←R-	G	G	←R-	←R-	G	G	R	R	R	R	DW	DW	FL/DW	FL/DW	FL/DW	FL/DW
2 AND 6 CHANGE	←R-	←R-	G	G	←R-	←R-	Y	Y	R	R	R	R	DW	DW	DW	DW	DW	DW
PHASE 1 AND 6	←G-	←G-	G	G	←R-	←R-	R	R	R	R	R	R	DW	DW	DW	DW	DW	DW
1 AND 6 CHANGE	←Y-	←Y-	Y	Y	←R-	←R-	R	R	R	R	R	R	DW	DW	DW	DW	DW	DW
PHASE 3	←R-	←R-	R	R	←R-	←R-	R	R	G ←G-	G	R	R	DW	DW	DW	DW	DW	DW
3 CHANGE	←R-	←R-	R	R	←R-	←R-	R	R	Y	Y	R	R	DW	DW	DW	DW	DW	DW
PHASE 4	←R-	←R-	R	R	←R-	←R-	R	R	R	R	G ←G-	G	DW	DW	DW	DW	DW	DW
4 CHANGE	←R-	←R-	R	R	←R-	←R-	R	R	R	R	Y	Y	DW	DW	DW	DW	DW	DW
PHASE 4 ALT	←R-	←R-	R	R	←R-	←R-	R	R	R	R	G ←G-	G	WK	WK	DW	DW	DW	DW
PED CLEARANCE	←R-	←R-	R	R	←R-	←R-	R	R	R	R	G ←G-	G	FL/DW	FL/DW	DW	DW	DW	DW
4 ALT CHANGE	←R-	←R-	R	R	←R-	←R-	R	R	R	R	Y	Y	DW	DW	DW	DW	DW	DW
FLASHING OPERATION	FL/ ←R-	FL/ ←R-	FL/Y	FL/Y	FL/ ←R-	FL/ ←R-	FL/Y	FL/Y	FL/R	FL/R	FL/R	FL/R	DARK	DARK	DARK	DARK	DARK	DARK



WIRING KEY

A,B,C,D, E,F,G,H	7-CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG)	FF,GG,HH, II,JJ,KK	NON-INVASIVE MICROPROBE SET WITH 1000 FT. LEAD-IN CABLE
I,J,K,L,M, N,O,P,Q,R	5-CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG)	LL	DISCONNECT, PULLBACK AND REROUTE EXISTING INTERCONNECT CABLE
S,T,U,V, W,X,OO,PP	2-CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG)	MM	12-PAIR COMMUNICATION CABLE, JELLYFILLED (SEE INTERCONNECT PLAN)
Y,AA	2-CONDUCTOR ELECTRICAL CABLE (NO. 12 AWG), TYPE T/C	NN	1-CONDUCTOR ELECTRICAL CABLE (NO. 8 AWG-THHN/THWN), 3 RUNS
Z	STRANDED BARE COPPER GROUND WIRE (NO. 6 AWG)	PF	PROPOSED UNDERGROUND POWER FEED
			PROPOSED GROUND ROD
BB,CC,DD,EE	IP-BASED VIDEO DETECTION CAMERA CABLE		EXISTING GROUND ROD

RK&K
Rummel, Klepper & Kahl, LLP
81 MOSHER STREET | BALTIMORE, MD 21217
PH: (410) 728-2900 FAX: (410) 728-3160
Engineers Construction Managers Planners Scientists
www.rkk.com

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF TRAFFIC & SAFETY
TRAFFIC ENGINEERING DESIGN DIVISION

US 40 (W. PATRICK STREET) AT WILLOWDALE DRIVE
FREDERICK, MARYLAND

REVISIONS
2 REDLINE NO. 2 JULY 2013 INSERT SHEET 8-5-13

GENERAL INFORMATION SHEET

SCALE NONE	DATE JULY 2013	CONTRACT NO. XX6505185	
DESIGNED BY WFW		COUNTY FREDERICK	
DRAWN BY WFW		LOGMILE 10004012.28	
CHECKED BY BJG		TIMS NO. L537	
FAP NO.		TOD NO.	
TS NO. 907D-GI	DRAWING SP-2 OF 2	SHEET NO. 2A OF 5	

PLOTTED: Monday, August 05, 2013 AT 09:30 AM
FILE: \\balsrv03\v2008\2008\08148_bcddes\Task 118_US 40 Signals\CADD\L537 (WILLOWDALE)\pSG-0002_US40@Willowdale-GI_R2-Lead-Lag.dgn