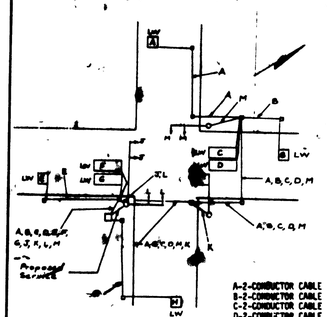
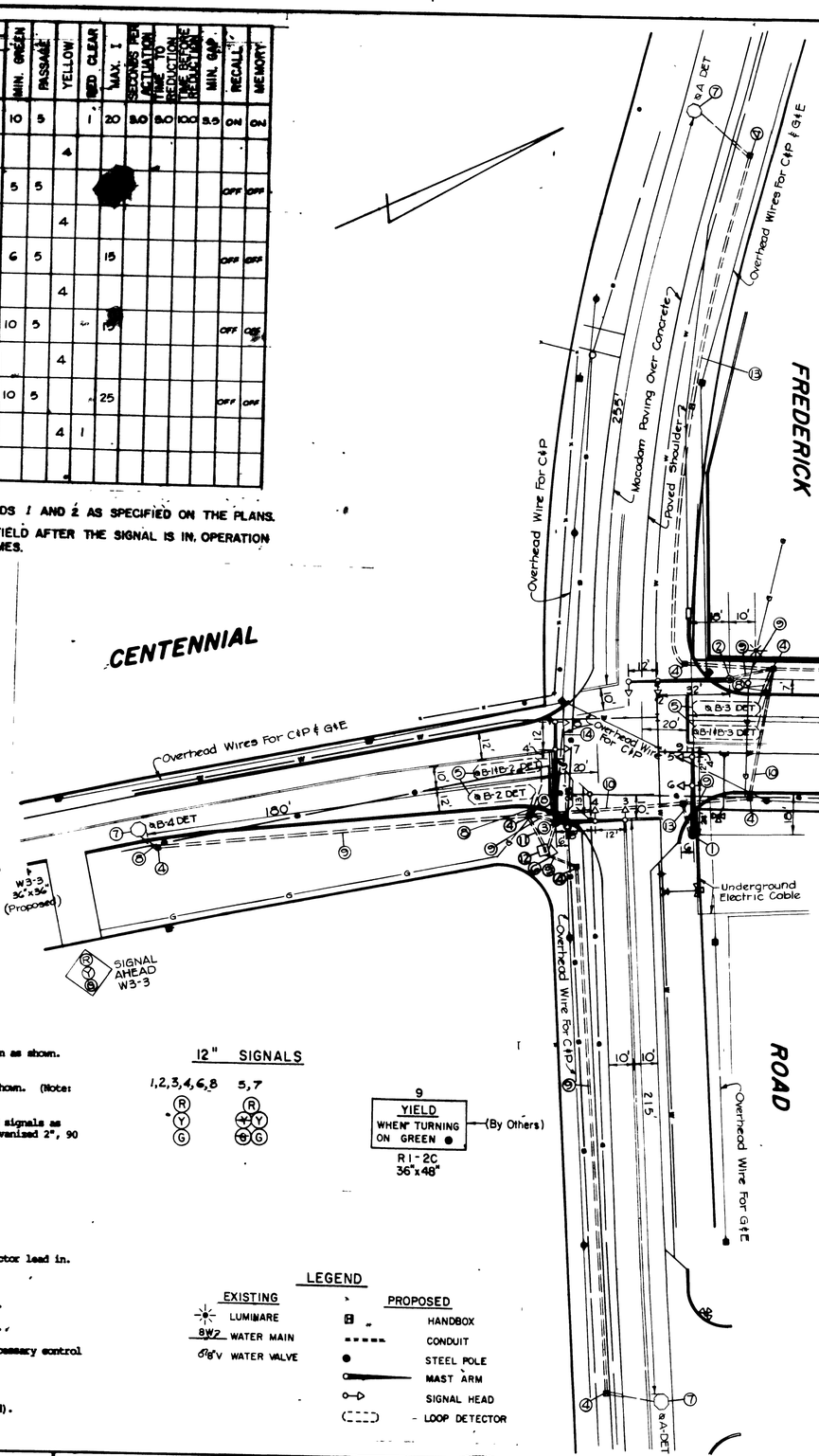
PHASE AND SEQUENCE DIAGRAM		TRAFFIC SIGNAL HEADS 3	1,2,4	7	8	6	MIN. GREEN	PASSAGE	YELLOW	RED CLEAR	MAX. I	SECONDS PER ACTUATION	TIME REDUCTION	TIME BEFORE REDUCTION	MIN. GAP	RECALL	MEMORY
	PHASE A	G	R	R	R	R	10	5		-	20	3.0	3.0	100	3.5	ON	ON
	PHASE A CLEAR	R	Y	R	R	R			4								
	PHASE B_1	R -G-	R	R -G-	R	R	5	5								OFF	OFF
	PHASE B_1 CLEAR	-Y- R	R	-Y- R	R	R			4								
	PHASE B_2	G	R	R	R	G	6	5			15					OFF	OFF
	PHASE B_2 CLEAR	-Y-	R	R	R	G			4								
	PHASE B_3	R	R	G -G-	G	R	10	5		-	15					OFF	OFF
	PHASE B_3 CLEAR	R	R	G -Y-	G	R			4								
	PHASE B_4	G	R	G	G	G	10	5		-	25					OFF	OFF
	PHASE B_4 CLEAR	Y	R	Y	Y	Y			4	1							
	FLASH	R	Y	R	R	R											

NOTES: 1. INSTALL BACK PLATES FOR SIGNAL HEADS 1 AND 2 AS SPECIFIED ON THE PLANS.
2. TIMINGS SHOULD BE ADJUSTED IN THE FIELD AFTER THE SIGNAL IS IN OPERATION AND BASED ON CURRENT TRAFFIC VOLUMES.

WIRING DIAGRAM



A-2-CONDUCTOR CABLE Alum. Shielded
B-2-CONDUCTOR CABLE
C-2-CONDUCTOR CABLE
D-2-CONDUCTOR CABLE
E-2-CONDUCTOR CABLE
F-2-CONDUCTOR CABLE
G-2-CONDUCTOR CABLE
H-2-CONDUCTOR CABLE
J-7-CONDUCTOR CABLE (No 14 AWG)
K-9-CONDUCTOR CABLE (No.14 AWG)
L-5-CONDUCTOR CABLE (No 14 AWG)
M-5-CONDUCTOR CABLE (No 14 AWG)
PS-PROPOSED SERVICE
LW-LOOP WIRE



REQUIRED CONSTRUCTION

1. Install steel pole with a 40' mast arm, signals and sign as shown. (Note: One PVC 2", 90 degree elbow).
2. Install steel pole with a 44' mast arm and signals as shown. (Note: One PVC 2", 90 degree elbow).
3. Install steel pole with two mast arms (30' and 44') and signals as shown. (Note: One PVC 2", 90 degree elbow and one galvanized 2", 90 degree elbow).
4. Install handbox (frame and cover).
5. Install 6' x 30' loop detector (2-turns).
6. Install 2" galvanized steel conduit for service.
7. Install 6' x 6' loop detector (3-turns).
8. Install 1" galvanized steel electrical conduit for detector lead in.
9. Install 2" P.V.C. electrical conduit (trenched).
10. Install 2" galvanized steel electrical conduit (pushed).
11. Install 3" galvanized steel electrical conduit (pushed).
12. Install base mounted cabinet on concrete pad and all necessary control equipment.
(Note: one 2" and one 3", 90 degree elbow).
13. Install 2" galvanized steel electrical conduit (trenched).
14. Proposed location of overhead feed.

12" SIGNALS

1,2,3,4,6,8 — R, Y, G

5,7 — R, Y, G, ←

9 YIELD WHEN TURNING ON GREEN ● (By Others)
R1-2C 36"x48"

LEGEND

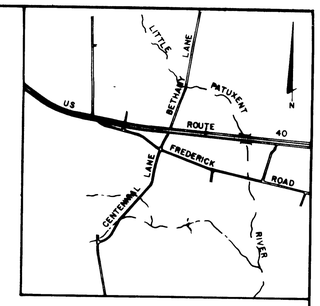
EXISTING	PROPOSED
LUMINARE	HANDBOX
8W WATER MAIN	CONDUIT
6"V WATER VALVE	STEEL POLE
	MAST ARM
	SIGNAL HEAD
	LOOP DETECTOR

GENERAL NOTES

1. All highway marking and signing shall be the responsibility of the Division of Traffic Engineering of the Bureau of Engineering, Department of Public Works, Howard County, Maryland, and is not to be considered a part of this contract.
2. The utilities shown on the construction plan are schematic only and are not to be considered complete. The contractor shall be responsible for notifying all utility companies prior to construction so that all utilities can be located in the field. The contractor shall locate existing utilities a minimum of two (2) weeks in advance of the construction operations in the vicinity of the utilities. Any damage incurred by the contractor shall be repaired immediately at the contractor's expense. See Section 4.09 of the General Specifications. Contractor shall notify the following utilities or agencies at least five (5) days before starting work shown on these plans:
-Miss Utility (Collect) 1-559-0100
-Baltimore Gas & Electric Company - Underground Electric Distribution Engineering "Damage Control" 234-5691
-Baltimore Gas & Electric Company - Underground Gas Distribution Engineering "Damage Control" 234-5533
-Chesapeake and Potomac Telephone Company - 752-9976
-Traffic Division - 992-2072
-Howard County Cable T.V. - 461-1156
3. Construction shall be completed in accordance with Howard County Standard Specifications and Details for Construction Design Manual Volume IV
4. All disturbed areas shall be properly restored in accordance with Section 4.20 of the "GENERAL SPECIFICATIONS FOR INSTALLATION OF EQUIPMENT FOR TRAFFIC SIGNALS FOR HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS" dated October 7, 1974; revised February 18, 1976.
5. All new signal heads shall be securely wrapped and/or bagged in burlap, prior to signal being placed in service.
6. The Contractor shall comply with OSHA and MOSHA codes.
7. The contractor shall comply with the following
Maintain six (6) inches minimum clearence with all underground utilities and all overhead clearence shall be in accordance with the Maryland High Votage Act

CONTROLLER AND ACCESSORIES

1. NEMA eight phase modular controller with solid state circuitry and digital timing, similar to the Econolite KMC E-8000 Series Digital Controller unit, equivalent manufactured by Crouse-Hinds, Eagle Signal Corporation or approved equal.
   a. Equipped with time base coordination unit. (NIC type)
   b. Equipped with two (2) vehicular actuated modules.
   c. Equipped with one (1) vehicular actuated module with volume density controls.
   d. Vehicular actuated phase modules shall be capable of the following functions: Minimum Green, Passage Time, Yellow, All Red Clearance, Dual Maximum, Pedestrian Timing, Recall and Memory
   e. Vehicular actuated phase module with volume density controls shall be capable of the following functions: Minimum Green, Passage Time, Yellow, All Red Clearance, Dual Maximum, Pedestrian Timing, Seconds per Acutation, Time to Reduce, Time Before Reduction, Minimum Gap, Recall and Memory
   f. Four phase signal overlap capability.
2. Conflict Monitor for all phases and Solid State load switches fully wired in cabinet.
3. Ground mounted traffic controller cabinet large enough to accommodate the above control equipment and detectors. The cabinet shall be furnished with a thermostatically controlled cabinet vent fan.
4. Finish of the cabinet shall be all-weather bronze paint.
5. The controller shall be wired with eight loop detector amplifiers (delay output type) and harnesses.
6. Meter box shall be instaled in vandal proof enclosure provided by the contractor.
7. All phases shall be skippable.



VICINITY MAP
SCALE 1"= 2000'

UNDERGROUND WIRING

1. Underground wiring shall be placed in new galvanized conduits pushed under the road surface. P.V.C. electrical conduit in grass median shall be trenched as specified and shown on the Contract Drawings.
2. The Contractor shall furnish an "as-built" drawing as per "General Specifications 4.02b".

LOOPS AND DETECTORS

1. The following new loops shall be installed.

Phase	Dimensions	No. of Loops Required
A	6' x 6'	2
B(B1,B2,B3,)	6' x 30'	4
B4	6' x 6'	2

2. All wiring shall be in accordance with manufacturer's recommendations for correct operation.
3. Phase B1,B2 & B3 loop detectors shall operate in presence mode. Phase B4 and Phase A loops shall operate by (extension) point detection
4. Detector amplifiers shall be Sarasota 235-T or equivalent manufactured by Econolite Control Products, Inc., Crouse-Hinds, or approved equal

SIGNAL HEADS

1. The Contractor shall provide the following signal heads:

Signal Number	Description
1,2,3,4,6,8	1 way, 3 section 12" signal, having red, yellow and green indications with tunnel visors and proper adjustable rigid mounting brackets for mast arm installation.
5,7	1 way, 5 section 12" signal, having red, yellow, green, yellow arrow and green arrow indications with tunnel visors and proper adjustable rigid mounting brackets for mast arm installation.

2. All signals shall be painted bronze with M.A. Bruder and Sons, Inc. Seashore Gloss Trimm 27721, Duranodic Bronze Code 7557581 or equal.
3. Signal head locations and aiming to be determined in the field with the Engineer.

POLES

The Contractor shall provide the following new steel signal poles:

1. Two (2) single arm support poles, pole height 21', "T" dimension 18 5'.
2. One (1) twin arm support pole, pole height 21', "T" dimension 18 5'.
3. Style and appearance shall be equivalent to Union Metal Design No 50700. Finish shall be bronze paint.
4.

Pole Number	Description
1	40' arm will support two (2) signal heads and one (1) sign.
2	44' arm will support two (2) signal heads.
3	30' arm will support two (2) signal heads.
3	44' arm will support two (2) signal heads, and one (1) sign

5. Signals shall be mounted on the mast arms so that the bottom of the signal head housing is not less than 16 feet nor more than 19 feet clearance above the roadway when using a rigid mounting, "ASTRO-BRAC" type adjustable signal bracket

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
DIRECTOR OF PUBLIC WORKS — DATE 5-11-84
CHIEF-BUREAU OF ENGINEERING — DATE 5/11/84
CHIEF-BUREAU OF HIGHWAYS — DATE 5/11/84

JOHN E. HARMS, JR. & ASSOC., INC.
CONSULTING ENGINEERS
PASADENA, MARYLAND
PROFESSIONAL TRANSPORTATION CONSULTANTS
LANHAM, MARYLAND

STATE OF MARYLAND — No. 3116

TRAFFIC SIGNAL PLAN

CENTENNIAL LANE & FREDERICK ROAD
CAPITAL PROJECT T-7027
HOWARD COUNTY, MARYLAND

Rev No.	Date	Revision Description	By

SCALE 1" = 30'
DATE 5/10/84
H S CHADDA — DESIGNED BY
DRAFTED BY
CHECKED BY

746

CENTFRE 3