

TRAFFIC SIGNAL NOTES

LIST OF MAJOR EQUIPMENT ITEM 678

A. NEW EQUIPMENT

1. ALL SIGNAL HEADS SHALL HAVE 12" POLYCARBONATE SECTIONS. THE HOUSING SHALL BE FEDERAL YELLOW WITH BLACK DOOR AND VISORS. BACKPLATES ARE REQUIRED ON EAST AND WEST FACING HEADS. BACKPLATES SHALL BE LOUVERED AND HAVE A FLAT BLACK FINISH. DISCONNECT HANGERS SHALL HAVE NON-ALUMINUM BALANCE ADJUSTER FITTINGS.

2. TRAFFIC SIGNAL CONTROLLER & CABINET

EACH UNIT SHALL BE A VEHICLE, AND WHERE APPLICABLE, PEDESTRIAN ACTUATED SOLID STATE CONTROLLER CAPABLE OF PRODUCING THE TIMING AND COORDINATION AS SHOWN ON THE PLANS. ALL CONTROLLERS SHALL HAVE A MINIMUM OF 4 PHASES. EACH PHASE (USED OR UNUSED) SHALL HAVE A LOAD SWITCH AND ALL NECESSARY FLASH TRANSFER RELAYS. EACH INSTALLATION SHALL INCLUDE TIME CLOCKS WITH BATTERY BACKUP, 6 CHANNEL CONFLICT MONITOR WITH STOP TIMING FUNCTION, LED DISPLAY LOAD SWITCHES (INPUT SIDE) REMOTE FLASHER, VEHICLE DETECTOR AMPLIFIERS, UNIFORM CODE FLASH UNIT (PER M.U.T.C.D.), RADIO INTERFERENCE FILTERS, SURGE PROTECTION, LAMP RECEPTACLE AND CONVENIENCE OUTLET WITH GROUND FAULT INTERUPTION. ALL CONTROLLERS SHALL HAVE DUAL MAXIMUM CAPABILITIES, TIME BASE COORDINATORS SHALL PROVIDE FOUR CYCLE LENGTHS WITH MULTIPLE PROGRAMS PER CYCLE. EACH SYSTEM SHALL BE POLE MOUNTED IN A PRE-WIRED CABINET WITH A POLICE DOOR HAVING STANDARD SWITCHES (MAIN ON/OFF, SIGNAL ON/OFF AND FLASH). THERE SHALL BE A WATERPROOF PLASTIC ENVELOPE ATTACHED TO THE CABINET INTERIOR FOR STORAGE OF THE CONTROLLER MANUAL AND PLAN SHEETS. ALL CONTROLLERS SHALL BE MODULAR BY PHASE WITH THUMB WHEEL ENTRY. KEYBOARD ENTRY SHALL NOT BE ALLOWED.

THE CONTROLLERS/TBC SHALL BE SHIPPED FROM THE MANUFACTURER PRESET AND A REPRESENTATIVE OF THE MANUFACTURER SHALL BE ON THE PROJECT SITE FOR TURN ON OF THE UNITS. IN ADDITION TO EQUIPMENT FURNISHED TO PROVIDE A FUNCTIONAL SIGNAL SYSTEM, THE CONTRACTOR SHALL SUPPLY THE FOLLOWING SPARE PARTS: ONE LOAD SWITCH, ONE PHASE MODULE AND ONE TRANSFER RELAY PER INTERSECTION. THIS EQUIPMENT MAY BE USED DURING THE CONSTRUCTION PERIOD TO REPLACE MALFUNCTIONING EQUIPMENT BUT MUST BE REPLACED OR MAINTAINED IN THE CABINET PRIOR TO COMPLETION. THE CONTROLLER CABINET(S) SHALL HAVE A POLISHED ALUMINUM NATURAL FINISH AND BE PROVIDED WITH A #2 LOCK, A PADLOCK AND A STANDARD POLICE DOOR LOCK. EACH LOCK SHALL HAVE 2 KEYS. EACH CABINET SHALL INCLUDE A 120° - 170° FAN/THERMOSTAT. THE CABINET DOOR SHALL BE SUPPLIED WITH TEST SWITCHES FOR EACH PHASE.

• USE A MASTER PADLOCK WITH A #3220 KEY.

3. ALL NEW EQUIPMENT SHALL MEET OR EXCEED NEMA STANDARDS AND IMSA OR ITE SPECIFICATIONS, WHERE APPLICABLE.

4. THE ELECTRIC CABLE SHALL BE LASHED ON THE SPAN WIRE.

5. STRANDED WIRE SHALL BE USED FOR ALL UNSUPPORTED AND SPAN WIRE SUPPORTED WIRE.

6. A MAIN DISCONNECT BREAKER SHALL BE INSTALLED IN A RAIN TIGHT LOCKED CABINET ON THE SIDE OF THE CABINET BELOW THE METER SOCKET.

7. STRAIN POLE DIAMETER, HEIGHT, YIELD STRENGTH AND GAGE SHALL BE STAMPED ON THE BASE PLATES OR ON AN ATTACHED METAL TAG. SEE SHEET 34 FOR STRAIN POLE DETAILS.

B. SIGNAL OPERATION

1. SIGNAL TIMING SHOWN ON THE PLANS MAY REQUIRE FINE-TUNING IN THE FIELD BASED ON TRAFFIC OBSERVATION.

2. NEW TRAFFIC SIGNAL(S) SHALL BE OPERATED IN THE FLASH MODE FOR A MINIMUM OF 24 HOURS PRIOR TO BEING PUT INTO FULL OPERATION. FULL OPERATION SHALL NOT BEGIN EXCEPT IN THE PRESENCE OF THE TRAFFIC SAFETY ENG OR HIS DESIGNATED REPRESENTATIVE.

3. THE TRAFFIC SIGNALS SHALL NOT OPERATE WITHOUT THE PAVEMENT MARKINGS AND SIGNAL RELATED SIGNING IN PLACE.

4. ALL SIGNALS SHALL DWELL ON US 7 (THRU).

C. TRAFFIC SIGNAL CONDUIT

1. ALL UNDERGROUND TRAFFIC SIGNAL CONDUIT SHALL BE NON-METALLIC, ALL EXPOSED CONDUIT (POLE RISERS) SHALL BE GALVANIZED RIGID METAL.

2. MINIMUM CONDUIT SIZES SHALL BE,
A) 1/2" FOR LOOP LEAD-INS
B) 2" FOR ALL OTHERS
SEE CHART ON STD E-172 FOR DESIGN VALUES

D. VEHICLE LOOP DETECTORS - SEE STD E-172

E. STREET LIGHTING

BOTH POLES SHALL HAVE A 200 WATT HIGH PRESSURE SODIUM LUMINAIRE. THE LUMINAIRE SHALL BE DESIGNED FOR STREET LIGHTING AND THE INDICATED LIGHT DISTRIBUTION. IT SHALL INCLUDE AN ALUMINUM HOUSING WITH EASY ACCESS TO THE BALLAST ASSEMBLY, PHOTO-ELECTRIC CONTROL, FILTERED OPTICAL ASSEMBLY AND REGULATOR BALLAST FOR 120 VOLT LAMPS. THE BALLAST SHALL BE MATCHED TO ITS STARTING CIRCUIT. WIRING SHALL BE NEAT, BUNDLED AND KEPT AWAY FROM EXCESS HEAT. THE INSTALLED LUMINAIRE LIGHT UTILIZATION AND MINIMUM FOOTCANDLES SHALL BE AT LEAST AS GREAT AS ON THE INDICATED PHOTOMETRIC DATA SHEET. THE LUMINAIRE SHALL BE INSTALLED AT 90° TO THE ROADWAY CENTERLINE AND AIMED AT A POINT 50 FEET +/- FROM THE BASE OF THE STRAIN POLE. IT SHALL BE A POLE TOP MOUNTED FIXTURE. SEE SHEET 32 FOR THE DESIGN PHOTOMETRIC.

F. GENERAL

1. ALL ELECTRICAL WORK AND MATERIALS SHALL BE SUBJECT TO INSPECTION AND APPROVAL OF THE STATE ELECTRICAL INSPECTOR. ALL WORK MUST MEET THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.

2. AFTER PROJECT ACCEPTANCE, THE TRAFFIC SIGNAL INSTALLATION(S) SHALL BECOME THE PROPERTY AND RESPONSIBILITY OF THE STATE OF VERMONT.

3. THE CONTRACTOR SHALL ACQUIRE ALL NECESSARY PERMITS AND MAKE ALL NECESSARY ARRANGEMENTS WITH THE UTILITY COMPANY TO PROVIDE A PERMANENT POWER SUPPLY TO THE SIGNAL AND STREET LIGHTING EQUIPMENT. THE METER SOCKET SHALL BE INSTALLED ON THE SIDE OF THE CONTROLLER CABINET. THE ROUTING OF POWER TO THE INTERSECTION SHALL BE SUCH THAT THE UTILITY COMPANY HAS FULL RESPONSIBILITY FROM THE SOURCE TO THE WEATHERHEAD AND THE STATE SHALL MAINTAIN FROM THAT POINT THROUGH THE SIGNAL. NO INTERVENING OWNERSHIP / RESPONSIBILITY SHALL BE ALLOWED.

4. A METAL PLAQUE LISTING OWNERSHIP AND EMERGENCY PHONE NUMBERS SHALL BE ATTACHED TO THE OUTSIDE OF THE CONTROLLER CABINET. SEE DETAIL AT RIGHT. COST OF THE PLAQUE SHALL BE SUBSIDIARY TO 678.15.

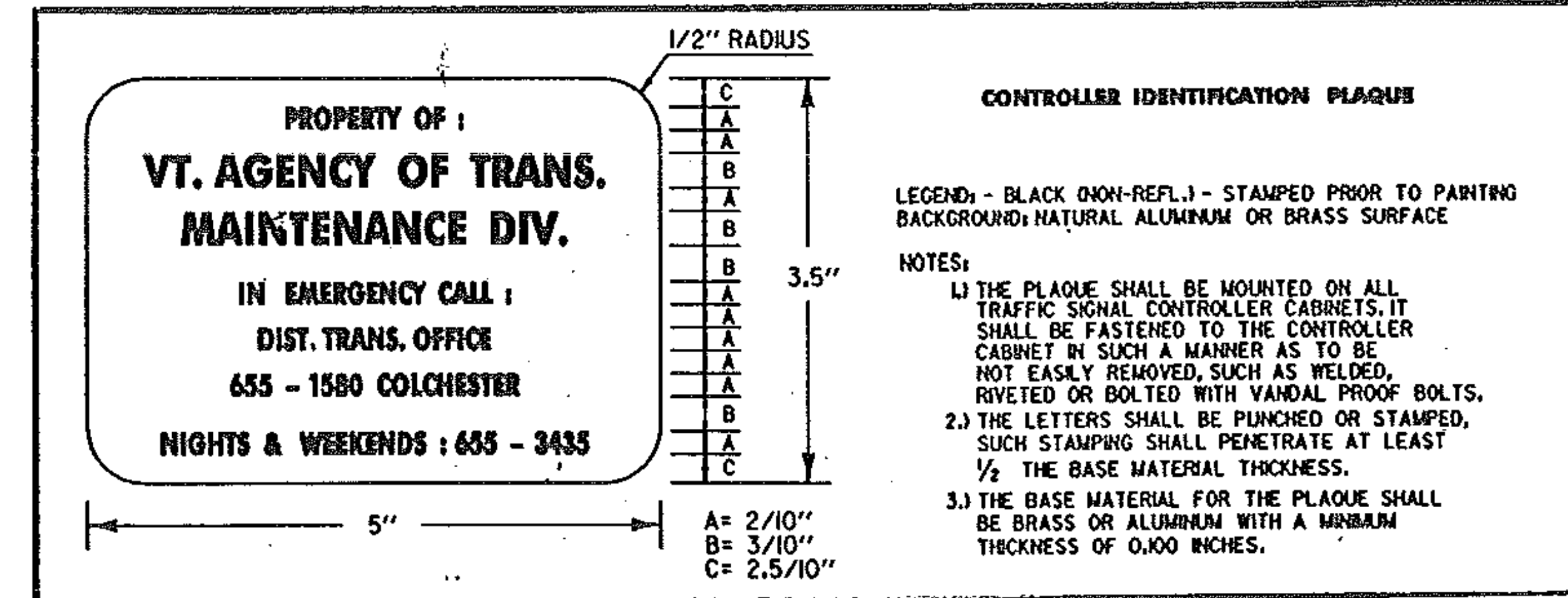
EQUIPMENT	US 7 BLAKELY RD. & SEVERANCE RD.
STRAIN POLES	2 SEE SHEET ---
NEW 12" TRAFFIC SIGNAL HEADS W/TUNNEL VISORS, DISCONNECT HANGERS & MOUNTING HARDWARE	
A TWO-WAY 3 SEC.	2
B FOUR-WAY 3 SEC.	1
BACKPLATES/ LOUVERS	4
CONTROLLER/TBC	1
CONDUIT	75 11/2" 2"
VEHICLE LOOP DETECTORS *	425
LUMINAIRES	2

THE QUANTITIES LISTED TO THE LEFT ARE APPROXIMATE AND FURNISHED FOR INFORMATION ONLY. MISCELLANEOUS (UNLISTED) WIRE, CABLE, HARDWARE ETC. ARE REQUIRED TO PROVIDE FOR FUNCTIONING SIGNAL SYSTEMS.

* THE QUANTITY LISTED IS FOR SAWCUT ONLY. LEAD-IN WIRES AND/OR SHIELDED CABLE QUANTITIES FROM THE EDGE OF PAVEMENT OR CURB TO THE CONTROLLERS ARE NOT INCLUDED IN THE TOTAL.

VEHICLE DETECTOR LOOP TEST RESULTS		BLAKELY RD. & SEVERANCE RD.			
		BLAKELY RD. CONT.	SEVERANCE RD. CONT.	TOTAL CONT.	
INDUCTANCE (uh)	CALCULATED	390	350	348	N/A
	MEASURED				
LEAKAGE TO GROUND MΩ					
LOOP RESISTANCE Ω	CALCULATED	2.38	1.39	1.33	N/A
	MEASURED				

SEE STD E-172 FOR NOTES ON LOOP TESTING
ALL LOOPS SHALL BE TWO TURNS AND ALL CONNECTIONS SHALL BE PARALLEL



SUBMITTAL OF SHOP DRAWINGS

1. THE MANUFACTURER SHALL SUBMIT, FOR APPROVAL, SHOP DRAWINGS FOR TRAFFIC SIGNAL EQUIPMENT. THE SUBMITTAL SHALL CONTAIN AT A MINIMUM THE FOLLOWING INFORMATION.

A) TRAFFIC SIGNAL CONTROLLER

TYPE OF CONTROLLER, MANUFACTURER, MODEL, NUMBER OF PHASES AND FUNCTIONS. ASSURANCE OF CONFORMANCE TO THE LATEST NEMA STANDARDS. BENCH TESTING (MINIMUM OF 7 DAYS) WILL BE REQUIRED. COPIES OF THE TEST RESULTS SHALL BE SUBMITTED AS DISCUSSED IN THE STANDARD SPECS SECTION 752.06. THE TEST RESULTS SHALL CONTAIN THE BEGIN AND END TIME AND DATE, ALL CONTROLLER AND TIME-BASED COORDINATOR SETTINGS USED, EQUIPMENT SERIAL NUMBERS, SIGNATURE OF THE PERSON PERFORMING THE TEST AND SIGNATURE OF A WITNESS WHO SHALL BE EITHER A REGISTERED ELECTRICAL ENGINEER OR A LICENSED MASTER ELECTRICIAN.

B) TRAFFIC SIGNAL HEADS

SIZE, MANUFACTURER, MODEL, LAMP WATTAGE, OPTICS, WIRING, HOUSING (MATERIAL AND COLOR) VISORS AND BACK PLATES, IF REQUIRED. THE SIGNAL HEADS SHALL MEET THE LATEST ITE STANDARDS.

C) CONTROLLER CABINET

SIZE, MANUFACTURER, MODEL, ACCESSORIES, MATERIALS, AND FINISH.

D) AUXILIARY EQUIPMENT (FLASHERS), VEHICLE DETECTOR(S), CONFLICT MONITOR, CLOCK(S), ETC.,

MANUFACTURER, MODEL, FUNCTIONS, ASSURANCE OF CONFORMANCE TO THE LATEST NEMA STANDARDS, WHERE APPLICABLE.

E) STRAIN POLES AND PEDESTAL POSTS

1. DIMENSIONS - POLE/POST HEIGHT, SPAN WIRE ATTACHMENT HEIGHT, POLE/POST DIAMETER (TOP AND BOTTOM), POLE GAUGE, HANDHOLE (SIZE AND LOCATION), BASE PLATE, BOLT CIRCLE, ANCHOR BOLT SIZE.

2. MATERIAL SPECIFICATIONS FOR EACH COMPONENT.

3. ANCHOR BOLTS AND WASHERS SHALL BE AN AUSTENITIC GRADE OF STAINLESS STEEL CONFORMING TO THE CHEMISTRY OF ASTM A276 TYPE 304 WITH THE FOLLOWING PHYSICAL PROPERTIES:

- (a) TENSILE STRENGTH, minimum 80,000 psi
- (b) YIELD STRENGTH, minimum 55,000 psi
- (c) ELONGATION IN 2 INCHES, minimum 25%
- (d) ROCKWELL "B" HARDNESS, minimum 86
- OR CHARPY V-NOTCH (AASHTO T243 USING H FREQUENCY OF TESTING), minimum 15 ft.-lbs. @ 40° F

NUTS FOR THE ANCHOR BOLTS SHALL BE THE HEAVY HEX TYPE CONFORMING TO THE REQUIREMENTS OF ASTM A-194 GRADE 8.

4. WELDING INFORMATION FOR ALL WELDED CONNECTIONS (SEE SUBSECTION 506.10). THE FOLLOWING INFORMATION WILL BE REQUIRED FOR ALL WELDED JOINTS (ALUMINUM OR STEEL):

- (a) PROCEDURE SPECIFICATIONS PER AWS D11 APPENDIX E FORM E1
- (b) PROCESS AND PROCEDURE QUALIFICATION TESTS PER AWS D11 APPENDIX E FORM E2.
- (c) CERTIFICATE OF CONFORMANCE TO SPECIFICATIONS FOR FILLER MATERIAL.

1.E)14. CONT WHEN USING ANY GMAW OR FCAW WELDING PROCESS THE FOLLOWING WILL ALSO BE REQUIRED: A MANUFACTURER'S CERTIFICATE THAT THE GAS OR GAS MIXTURE IS SUITABLE FOR THE INTENDED APPLICATION AND MEETS THE DEW POINT REQUIREMENTS.

REFERENCE - AASHTO MODIFICATION OF AWS D11 SEC. 4.18.

5. POLE STAMPING DETAIL

2. THE MANUFACTURER SHALL SUBMIT, FOR APPROVAL, SHOP DRAWING FOR THE STREET LIGHT LUMINAIRE. THE SUBMITTAL SHALL CONTAIN AT A MINIMUM THE FOLLOWING INFORMATION.

A) LUMINAIRES

1. FIXTURES

- (a) VOLTAGE RATING
- (b) WATTAGE AND LAMP TYPE
- (c) BALLAST TYPE
- (d) PHOTO CELL
- (e) ANY OTHER FEATURES SPECIFIED ON THE PLANS SUCH AS FINISH, SPECIAL WIRE ACCESS, ETC.,

2. PHOTOMETRIC DATA

- (a) IES DISTRIBUTION TYPE
- (b) UTILIZATION CURVE
- (c) ISO - FOOT - CANDLE CURVES
- (d) MOUNTING HEIGHT FACTOR
- (e) MAINTENANCE FACTOR

B) WIRING CONDUCTOR MATERIAL, INSULATION TYPE, VOLTAGE RATING, AND TEMPERATURE RATING, SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE USE AND SIZE AND BE COLOR CODED.

3. IN #1 AND #2 ABOVE, THE INFORMATION SUPPLIED SHALL EITHER MATCH OR BE EQUIVALENT TO THE DETAILS SPECIFIED ON THE PLANS OR ON THE STD. SHEETS. IF EQUIVALENT, THE CONTRACTOR MAY BE ASKED TO SUPPLY PROOF OF EQUIVALANCY. COPIES OF CATALOGUE SHEETS ARE ACCEPTABLE IF ALL THE APPROPRIATE INFORMATION IS INCLUDED.

TRAFFIC SIGNAL NOTES LIST OF EQUIPMENT LOOP TEST RESULTS	PREPARED BY <u>LKA</u> DATE <u>10/87</u>
	CHECKED BY _____ DATE _____
	DESIGN SUPERVISOR _____ DATE _____
	PROJ. COLCHESTER RS 0285(5) TRAFFIC SHEET NO. _____ OF _____ SHEET <u>33</u> OF <u>73</u> SHEETS