

ADDENDUM NO. 1
to the consultants for
Frantz Road at Bradenton Avenue - Design of Signalized Intersection Upgrade
Request for Proposals
Due Date: March 29, 2016

TO PROSPECTIVE CONSULTANTS: The following changes shall be made part of the request for proposals for this project:

REQUEST FOR INFORMATION

1. *Is it possible to get record plans of the signal? If I remember correctly, you mentioned this was a City of Columbus signal. Do we need to request plans from them?*

- The City of Dublin does have and can share
 - a copy of the original construction drawings for the project that installed the traffic signal;
 - a copy of the box electrical prints of the current installation. The prints came to us from the contractor, Jess Howard Electric, from its supplier, Traffic Control Products, who was the vendor for Econolite, the manufacturer of the traffic signal cabinet;
- These two documents are attached to this addendum.

2. *Is there existing fiber optic?*

- There is existing multi-mode fiber-optic cable in place to be maintained and interfaced to the new traffic signal cabinet.

3. *To be clear, can we just email a pdf? Or do we still have to mail 3 hard copies.*

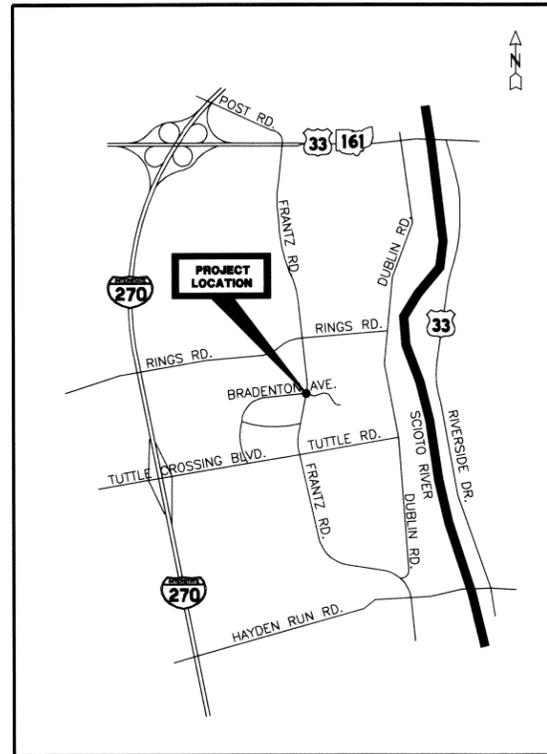
- For filing your proposal, you are required to provide
 - it in PDF format by email or delivery of a CD, DVD or thumbdrive by RFP due date of March 29, 2016; **and**
 - three (3) hard copies of the proposal, which are to be delivered to our offices by March 30, 2016.

Terminus for Addendum No. 1

CITY OF DUBLIN FRANTZ RD. AND BRADENTON AVE. TRAFFIC SIGNAL

INDEX OF SHEETS

TITLE PAGE	1
GENERAL SUMMARY	2
NOTES	3-5
INTERCONNECT PLAN	6
SIGNAL PLANS	7-8
PAVEMENT MARKING / SIGNING PLAN	9



LOCATION MAP

UNDERGROUND UTILITIES

48 HOURS
BEFORE YOU DIG

Call...800-362-2764 (Toll free)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

CAPITAL IMPROVEMENTS

ALL ITEMS OF WORK CALLED FOR ON THE PLANS FOR WHICH NO SPECIFIC METHOD OF PAYMENT IS PROVIDED SHALL BE PERFORMED BY THE CONTRACTOR AND THE COST OF WHICH SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE VARIOUS RELATED ITEMS.

THE CONTRACTOR INTENDING TO SUBMIT A BID FOR THE CITY OF DUBLIN CAPITAL IMPROVEMENT CONTRACTS SHALL BE PREQUALIFIED WITH THE OHIO DEPARTMENT OF TRANSPORTATION AS PER SECTION 102 OF THE ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS, AND CHAPTER 5525 OF THE OHIO REVISED CODE CONCERNING CONSTRUCTION CONTRACTS.

1995 SPECIFICATIONS

CITY OF COLUMBUS AND OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS, CURRENT ADDITIONS, AND ANY SUPPLEMENTS THERETO, SHALL GOVERN ALL CONSTRUCTION ITEMS UNLESS OTHERWISE NOTED. IF A CONFLICT BETWEEN SPECIFICATIONS IS FOUND, THE MORE STRICT SPECIFICATIONS WILL APPLY AS DECIDED BY THE CITY ENGINEER. ITEM NUMBERS LISTED REFER TO THE CITY OF COLUMBUS ITEM NUMBERS UNLESS OTHERWISE NOTED.

CITY OF DUBLIN, OHIO

<u>Balbir S. Kindra</u>	<u>5/7/97</u>
CITY ENGINEER, DUBLIN, OHIO	DATE
<u>D. D. B. Downing</u>	<u>5/8/97</u>
DIRECTOR OF DEVELOPMENT, DUBLIN, OHIO	DATE

SUPPLEMENTAL PRINTS OF STANDARD CONSTRUCTION DRAWINGS			
OHIO DEPARTMENT OF TRANSPORTATION			
DRAWING	DATE	DRAWING	DATE
HL-30.11	05/01/87	TC-82.10	08/29/84
TC-21.20	09/01/92	TC-83.10	03/18/92
TC-41.41	08/02/79	TC-83.20	01/20/84
TC-52.10	04/03/79	TC-84.20	01/20/84
TC-52.20	04/03/79	TC-85.10	01/20/84
TC-81.10	01/20/84	TC-85.20	01/20/84
		640.0-98*	

* = CITY OF DUBLIN STANDARD

PREPARED BY:
TRAFFIC ENGINEERING SERVICES, INC.

<u>Gerald L. Wilcox</u>	<u>9/5/96</u>
REGISTERED ENGINEER NO. 34357	DATE

GENERAL

THE CONTRACTOR SHALL FURNISH AND INSTALL TRAFFIC SIGNAL EQUIPMENT, IN CONFORMANCE TO THESE PLANS AND SPECIFICATIONS, AND THE 1993 STATE OF OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS AND ALL SUPPLEMENTAL SPECIFICATIONS. HE SHALL INSTALL ALL TRAFFIC SIGNAL EQUIPMENT IN CONFORMANCE TO THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS AND IN CONFORMANCE TO THE OHIO DEPARTMENT OF TRANSPORTATION BUREAU OF DESIGN SERVICES STANDARD CONSTRUCTION DRAWINGS.

EACH BIDDER, WITH HIS BID, SHALL SUBMIT TWO (2) COMPLETE SETS OF CATALOG CUTS, DIAGRAMS, BROCHURES OR OTHER DESCRIPTIVE DATA FOR THE ITEMS HE INTENDS TO FURNISH. EACH BIDDER SHALL ALSO PROVIDE A DETAILED LIST OF ALL VARIANCES FROM ODOT SPECIFICATIONS AND FROM THE SPECIFICATIONS CONTAINED HEREIN FOR EACH ITEM THAT DOES NOT COMPLY 100% WITH THE STATED SPECIFICATIONS. ANY BIDDER THAT DOES NOT COMPLY WITH THIS REQUIREMENT SHALL BE RULED INELIGIBLE AND SHALL NOT BE AWARDED A CONTRACT. UNLESS OTHERWISE STATED BY THE BIDDER, THE PROPOSAL WILL BE CONSIDERED AS BEING IN STRICT ACCORDANCE WITH THE SPECIFICATIONS.

THE SIGNAL CONTROLLER(S), CONFLICT MONITOR(S), TERMINAL FACILITIES, FLASHERS, AND LOAD SWITCHES SHALL PREFERABLY BE OF THE SAME MANUFACTURER. ALL LOAD SWITCHES AND INTERFACE RELAYS SHALL BE FURNISHED WITH INPUT SIDE LED'S.

TRAFFIC CONTROL STANDARD CONSTRUCTION DRAWINGS

REFERENCES TO SUPPLEMENTAL SPECIFICATIONS 857, 858, 861, 957, 958, AND 961 ON THE TRAFFIC CONTROL STANDARD CONSTRUCTION DRAWINGS IN THESE PLANS SHALL BE CONSIDERED TO READ AS RESPECTIVE REFERENCES TO ITEMS 630, 631, 633, 730, 731 AND 733.

ITEM 632 LOOP DETECTOR UNITS, AS PER PLAN

IN ADDITION TO THE OTHER REQUIREMENTS OF THIS SECTION, THE LOOP DETECTOR UNITS SHALL HAVE THE FOLLOWING FEATURES: THE UNIT SHALL BE SELF-TUNING AND SHALL BE CAPABLE OF BOTH EXTENSIONS AND DELAYS. THE OUTPUT DEVICE SHALL BE A RELAY. RACK MOUNTED UNITS WILL NOT BE ACCEPTED.

ITEM 632 VEHICULAR SIGNAL HEADS, AS PER PLAN

VEHICULAR SIGNAL HEADS SHALL BE MADE OF ALUMINUM MATERIAL AND SUPPLIED WITH GLASS LENSES AND LOUVERED ALUMINUM VEHICULAR SIGNAL HEAD BACK PLATES. THE BACK PLATES SHALL BE INSTALLED SECURELY TO EACH SIGNAL HEAD. THE SIGNAL HEADS ARE TO BE INSTALLED ACCORDING TO THE STATE OF OHIO STANDARD CONSTRUCTION DRAWING TC-85.20, 1-20-84, "RIGID SIGNAL HEAD MOUNTING FOR MAST ARMS".

POWER SUPPLY FOR TRAFFIC SIGNALS

POWER SERVICE SHALL BE OBTAINED FROM COLUMBUS AND SOUTHERN POWER COMPANY AT THE LOCATION SHOWN ON THE PLANS. IT SHALL BE ROUTED DOWN THE POWER POLE IN A CONDUIT RISER, THEN UNDERGROUND IN A SEPARATE CONDUIT TO THE SIGNAL POLE. THE POWER SUPPLY SHALL BE SUPPLIED WITH A METER BASE.

POWER SERVICE, AS PER PLAN

IN ADDITION TO THE OTHER REQUIREMENTS OF THIS SECTION, THE DISCONNECT SWITCH SHALL BE ALUMINUM AND PAINTED TO MATCH THE SIGNAL SUPPORT.

THE POWER CABLE SHALL BE ENCLOSED IN A SEPARATE CONDUIT (FLEX CONDUIT INSIDE THE SIGNAL SUPPORT) FROM THE POWER SOURCE TO THE DISCONNECT SWITCH.

ITEM 614 MAINTENANCE OF TRAFFIC SIGNAL INSTALLATIONS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRAFFIC SIGNAL INSTALLATIONS WITHIN THE PROJECT UNDER THE FOLLOWING CONDITIONS:

- a) NEW SIGNAL INSTALLATIONS OR DEVICES, INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF THESE FROM THE TIME OF INSTALLATION UNTIL THE WORK IS ACCEPTED, INCLUDING THE 10 DAY PERFORMANCE TEST.

THE CONTRACTOR SHALL CORRECT AS QUICKLY AS POSSIBLE ALL OUTAGES OR MALFUNCTIONS. HE SHALL PROVIDE THE CITY ENGINEER SUCH ADDRESSES AND PHONE NUMBERS WHERE HIS MAINTENANCE FORCES CAN BE CONTACTED. THE CONTRACTOR SHALL PROVIDE ONE OR MORE PERSONS TO RECEIVE ALL CALLS AND DISPATCH THE NECESSARY MAINTENANCE FORCES TO CORRECT OUTAGES. SUCH A PERSON OR PERSONS MAY BE USED TO PERFORM OTHER DUTIES AS LONG AS PROMPT ATTENTION IS GIVEN TO THESE CALLS AND A PERSON IS READILY AVAILABLE CONTINUOUSLY 24 HOURS A DAY, SEVEN DAYS A WEEK. ALL LAMP OUTAGES, CABLE OUTAGES, ELECTRICAL FAILURES, EQUIPMENT MALFUNCTIONS AND MISALIGNED SIGNAL HEADS SHALL BE CORRECTED TO THE SATISFACTION OF THE CITY ENGINEER WITH THE SIGNAL BACK TO SERVICE WITHIN FOUR HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF THE OUTAGE.

IN THE EVENT NEW SIGNALS ARE DAMAGED PRIOR TO ACCEPTANCE ALL DAMAGED EQUIPMENT EXCEPT POLES AND CONTROL EQUIPMENT SHALL BE REPLACED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER WITH THE SIGNAL BACK IN SERVICE WITHIN 8 HOURS AFTER THE CONTRACTOR'S NOTIFICATION OF THE OUTAGE.

IF POLES AND/OR CONTROL EQUIPMENT ARE DAMAGED AND MUST BE REPLACED, THE CONTRACTOR SHALL MAKE TEMPORARY REPAIRS AS NECESSARY TO BRING THE SIGNAL BACK INTO FULL OPERATION WITHIN THE ALLOWED 8 HOUR PERIOD, AND SHALL MAKE PERMANENT REPAIRS OR REPLACEMENT AS SOON THEREAFTER AS POSSIBLE.

NONE OF THE ABOVE SHALL BE CONSTRUED AS COLLECTIVE OR CONSECUTIVE OUTAGE TIME PERIODS AT ANY ONE LOCATION. THAT IS, WHERE MORE THAN ONE OUTAGE OCCURS AT ANY ONE LOCATION, THEN THE ALLOTTED TIME LIMIT SHALL BE FOR THE WORST SINGLE OUTAGE.

WHERE OUTAGES ARE THE DIRECT RESULT OF A VEHICLE ACCIDENT THE RESPONSIBILITY OF THE CONTRACTOR SHALL BE AS OUTLINED ABOVE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COLLECTION OF ANY COMPENSATION FOR THIS WORK FROM THOSE PARTIES RESPONSIBLE FOR THE DAMAGE.

WHERE THE CONTRACTOR HAS FAILED TO OR CANNOT RESPOND TO AN OUTAGE OR SIGNAL EQUIPMENT MALFUNCTION, AT THESE LOCATIONS WITHIN HIS RESPONSIBILITY, WITHIN PERIODS AS SPECIFIED ABOVE, THE ENGINEER MAY INVOKE THE PROVISIONS OF SECTION 105.15 AND ANY SUBSEQUENT BILLINGS TO THE CITY ENGINEER FOR POLICE SERVICES AND MAINTENANCE SERVICES BY CITY FORCES SHALL BE DEDUCTED FROM MONIES DUE OR TO BECOME DUE THE CONTRACTOR IN ACCORDANCE WITH PROVISIONS OF SECTION 105.15.

THE CONTRACTOR SHALL PROVIDE THE MAINTENANCE SERVICE ENTIRELY WITH HIS FORCES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY TRAFFIC SIGNAL COMPONENTS REQUIRED TO BE HANDLED DURING THE RELOCATION OF POLES AND REVISIONS TO THE SIGNAL SYSTEM.

WHEN A TRAFFIC SIGNAL MUST BE TAKEN OUT OF SERVICE BY THE CONTRACTOR, DUE TO CONSTRUCTION PROCEDURES, THIS OUTAGE SHALL NOT EXCEED 7 HOURS AND SHALL NOT INCLUDE THE HOURS OF 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM. ANY SIGNALIZED INTERSECTION, WHERE THE SIGNAL IS OUT OF SERVICE DUE TO CONSTRUCTION PROCEDURES, OR DUE TO AN OUTAGE OR MALFUNCTION OF EQUIPMENT AS DESCRIBED ABOVE, SHALL BE PROTECTED BY A SPECIAL DUTY UNIFORMED POLICE OFFICER, HIRED BY THE CONTRACTOR.

ANY VEHICULAR TRAFFIC SIGNAL HEAD, EITHER NEW OR EXISTING WHICH WILL BE OUT OF OPERATION SHALL BE COVERED IN THE MANNER DESCRIBED IN 632.24.

ALL COSTS RESULTING FROM THE ABOVE REQUIREMENTS SHALL BE CONSIDERED TO BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 614. MAINTAINING TRAFFIC.

WIRING DIAGRAMS

TWO (2) EACH WIRING DIAGRAMS AND TWO (2) EACH SERVICE/OPERATION MANUALS FOR EACH DIFFERENT PIECE OF EQUIPMENT SHALL BE PROVIDED. A HEAVY CLEAR PLASTIC ENVELOPE ATTACHED TO THE INSIDE OF THE CABINET DOOR SHALL BE PROVIDED FOR STORING WIRING DIAGRAMS. (MINIMUM OF 9" BY 12" IN SIZE)

SIGNAL STARTUP

THE SIGNAL SHALL BE PLACED ON FLASH FOR ONE WEEK PRIOR TO STARTUP AND TESTING.

ITEM 632 SIGNAL SUPPORT, TYPE TC-81.20, AS PER PLAN

IN ADDITION TO THE OTHER REQUIREMENTS OF THIS SECTION, A 3" BLIND HALF COUPLING SHALL BE USED FOR THE CONTROLLER.

THE MAST ARMS SHALL BE PAINTED TO MATCH THE CITY OF DUBLIN STANDARD FOR POLE PAINT COLOR. INTERPON/COURTAULDS (FORMERLY PORTER) DARK BRONZE (BROWN) #MM138U. THE PAINT SHALL BE A POWDER POLYESTER PAINT FINISHED TO A GLOSS OF 35% (AT 60'). PAINT CHIP SAMPLES MUST BE SUBMITTED TO THE CITY ENGINEER AT LEAST SEVEN DAYS PRIOR TO ORDERING MATERIALS FOR REVIEW AND APPROVAL ALONG WITH SHOP DRAWINGS FOR ALL COMPONENTS.

THE POLE, MAST ARM, AND ALL POLE HARDWARE AND SIGNAL BRACKETS ATTACHED TO THE POLE SHALL BE FACTORY PREPARED UNDER THE FOLLOWING SPECIFICATIONS OR AN APPROVED EQUAL:

- a. SANDBLAST TO AN SSPC-SP7 BRUSH BLAST.
- b. PRIME 1 COAT TILE CLAD II HI-BUILD PRIMER B62 N71/B60V70 3 TO 4 MILS D.F.T.
- c. FINISH 1 COAT POLANE POLYURETHANE ENAMEL 1 TO 1.5 MILS D.F.T.

IF DURING TRANSPORTATION, ERECTION, INSTALLATION OF SIGNAL HARDWARE OR AT ANYTIME BEFORE FINAL ACCEPTANCE THE PAINTED SURFACES ARE SCRATCHED OR MARRED IN ANY MANNER, THE CONTRACTOR SHALL BE REQUIRED TO APPLY "TOUCH-UP" PAINT OF THE SAME TYPE AS SPECIFIED ABOVE TO THE AFFECTED AREAS.

ITEM 632 PEDESTAL, 11', AS PER PLAN

IN ADDITION TO THE OTHER REQUIREMENTS OF THIS SECTION, THE PEDESTAL SHALL BE PAINTED THE SAME COLOR AND IN ACCORDANCE WITH THE SAME SPECIFICATIONS AS THE SIGNAL SUPPORTS.

ITEM 614 MAINTAINING TRAFFIC

ALL TRAFFIC CONTROL DEVICES SHALL BE FURNISHED, ERECTED, MAINTAINED, AND REMOVED BY THE CONTRACTOR IN ACCORDANCE WITH THE OHIO MANUAL OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION AND MAINTENANCE OPERATIONS, (CURRENT ADDITION), COPIES OF WHICH ARE AVAILABLE FROM THE OHIO DEPARTMENT OF TRANSPORTATION, BUREAU OF TRAFFIC, 25 SOUTH FRONT STREET, COLUMBUS, OHIO 43215.

TWO-WAY, ONE LANE TRAFFIC MAY BE MAINTAINED ON HARD ROAD IN ACCORDANCE WITH PAGE C-18 OF THE OHIO MANUAL, FOR THE INSTALLATION OF LOOPS. A UNIFORMED POLICE OFFICER SHALL BE SUBSTITUTED FOR EACH FLAGMAN SHOWN ON THIS PAGE AND SUCH OFFICERS SHALL BE PRESENT WHENEVER TWO-WAY, ONE-LANE OPERATION IS IN EFFECT.

ALL COSTS RESULTING FROM THE ABOVE REQUIREMENTS SHALL BE CONSIDERED TO BE INCLUDED IN THE LUMP SUM BID PRICE FOR ITEM 614 MAINTAINING TRAFFIC.

SPECIAL - INTERNALLY ILLUMINATED STREET NAME SIGNS, SINGLE FACED, AS PER PLAN

THE CONTRACTOR SHALL FURNISH AND INSTALL INTERNALLY ILLUMINATED STREET NAME SIGNS ACCORDING TO THE PLANS. THE SIGNS SHALL BE SUSPENDED FROM TRAFFIC SIGNAL MAST ARMS, AND THE SIGN HANGER ATTACHMENT HARDWARE WITH WIRING CONNECTION SHALL BE INCLUDED WITH THIS ITEM.

THE SIGN ASSEMBLY SHALL CONSIST OF AN ALUMINUM BODY WITH TWO INTERNAL HIGH OUTPUT T12 FLUORESCENT FIXTURES, COMPLETE WITH UPPER AND LOWER REFLECTORS. THE SIGN FACE SHALL DISPLAY THE LEGEND BY SHOWING WHITE TRANSLUCENT LETTERS ON A REFLECTORIZED BROWN TRANSLUCENT BACKGROUND (DARK BRONZE TO MATCH FED. SPEC. #10075). WHEN MOUNTED, THE SIGN SHALL PROVIDE A 5 DEGREE DOWNWARD ANGLE FOR INCREASED VISIBILITY.

THE SIGN CIRCUITRY SHALL PROVIDE FOR TWO INDIVIDUAL FLUORESCENT LAMP 800 MILLI-AMPERE BALLASTS WITH APPROPRIATE FUSE PROTECTION, SPRING LOADED LAMP HOLDERS, AN INSULATED TWO-POLE TERMINAL BLOCK, A WATER-TIGHT WIRE ENTRANCE JUNCTION BOX, A TOP-MOUNTED PHOTOELECTRIC CONTROL AND SIGN CONDUCTORS OF MINIMUM NO. 16 STRANDED COPPER RATED AT 1000 VOLTS 90 DEGREES F. BALLASTS SHALL BE U.L. LISTED FOR OUTDOOR OPERATION ON 120 VOLT 60 Hz. CIRCUITS. BALLASTS SHALL ALSO PROVIDE FOR 0 DEGREE F. TURN ON.

THE SIGN HOUSING SHALL CONSIST OF ALUMINUM WHICH SHALL BE CAST, EXTRUDED, OR FORMED CONSTRUCTION. ALL JUNCTIONS OF TOP, BOTTOM, AND SIDES SHALL BE CONTINUOUS WEATHER-TIGHT WELDING. THE TOP SIDE SHALL PROVIDE MOUNTING HUBS SIMILAR IN DESIGN TO TRAFFIC SIGNAL ATTACHMENTS. DRIP RAILS SHALL OVERHANG THE SIGN FACE TO PREVENT WATER FROM ENTERING THE ELECTRICAL HOUSING. THE BOTTOM SHALL PROVIDE FOUR DRAIN HOLES, ONE AT EACH SIGN FACE. EACH DOOR SHALL HAVE A FULL LENGTH HINGE ON THE BOTTOM EDGE AND SHALL BE SECURED BY THREE QUARTER-TURN AIR LOCK FASTENERS. WATER-TIGHT GASKETING SHALL BE PROVIDED BETWEEN THE DOOR AND THE HOUSING, AND BETWEEN THE SIGN FACE AND THE FRAME MEMBERS. THE EXTERIOR OF THE SIGN SHALL BE FINISHED WITH A BRONZE COLOR TO MATCH INTERPON/COURTAULDS (FORMERLY PORTER) DARK BRONZE (BROWN) #MM138U OR APPROVED EQUAL.

THE SIGN FACE SHALL BE CONSTRUCTED OF A TRANSLUCENT SHATTERPROOF LENS, TO PROVIDE A WHITE LEGEND. THE LETTERS SHALL BE SIX (6) INCH UPPER CASE HELVETICA LETTER STYLE. THE SIGN FACE LEGEND BACKGROUND SHALL BE A TRANSLUCENT STANDARD TRAFFIC BROWN FILM OR PAINT (DARK BRONZE TO MATCH FED. SPEC. #10075). A CLEAR COAT SHALL BE APPLIED TO ALL SIGN FACES TO PREVENT FADING AND PROTECT THE SURFACE. ALL SIGNS SHALL CARRY A FIVE-YEAR MANUFACTURER'S WARRANTY.

MAST ARM CLAMP BRACKETS AND HANGER ASSEMBLIES SHALL BE OF THE TWO-ASSEMBLY TYPE, FOR MOUNTING ON PERPENDICULAR MAST ARMS. MAST ARM BRACKETS AND HANGER ASSEMBLIES FOR MOUNTING ON SKEWED MAST ARMS SHALL HAVE A SINGLE SUPPORT ABOVE THE CENTER OF THE SIGN. THE SINGLE SUPPORT SHALL LOCK THE SIGN FACE PERPENDICULAR TO THE FLOW OF TRAFFIC. THE ATTACHMENT HARDWARE SHALL BE FORMED OF HEAT-TREATED ALUMINUM BAR STOCK OR GALVANIZED STEEL, OF ADEQUATE DESIGN AND STRENGTH. ALL OF THE SIGN HANGING HARDWARE SHALL BE PAINTED TO BLEND IN WITH THE MAST ARM.

PAYMENT FOR INTERNALLY ILLUMINATED STREET NAME SIGNS, SINGLE FACED, AS PER PLAN, SHALL BE AT THE CONTRACT UNIT PRICE BID PER EACH COMPLETE AND IN PLACE INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

ITEM 632 CONCRETE FOR ANCHOR BASE FOUNDATION, AS PER PLAN

THE CONTRACTOR SHALL PROVIDE A SEPARATE 2" CONDUIT ELL FOR THE POWER SUPPLY. THE OTHER CONDUIT ELL SHALL BE 3".

ITEM 632 PEDESTRIAN SIGNAL HEAD, TYPE D2, AS PER PLAN

PEDESTRIAN SIGNAL HEADS SHALL BE FIBER OPTIC SYMBOLIC UNITS. HEADS SHALL BE MOUNTED ON BLACK, TWO-HINGED TYPE BRACKETS WHICH ARE BOLTED OR BANDED (2 BANDS PER BRACKET) TO THE POLE. THE HOUSING SHALL BE FIELD DRILLED AND REINFORCED (MANUFACTURER TO SUPPLY REINFORCEMENT) SO IT FITS TO THE HINGED BRACKET. THE BRACKETS SHALL BE HINGED TO ALLOW THE PEDESTRIAN HEADS TO SWING AWAY FROM EACH OTHER.

ITEM 632 INTERCONNECT CABLE MISC: FIBER OPTIC

- 1) GENERAL
 - 1.1) THIS SPECIFICATION SETS FORTH THE MINIMUM REQUIREMENTS FOR A SYSTEM THAT IS COMMUNICATING OVER FIBER OPTIC CABLES.
 - 2) SIGNAL CONTROLLERS
 - 2.1) THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF THE SIGNAL PHASING AND ALL OTHER INFORMATION NEEDED TO INSTALL THE NEW CONTROLLERS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOADING ALL TIMING INTO THE NEW CONTROLLERS, INCLUDING THE BACK-UP TIMING EEPROMS. THE SYSTEM TO BE INSTALLED SHALL BE AN ECONOLITE ZONE MONITOR IV SYSTEM, UTILIZING MULTI-MODE FIBER OPTIC INTERCONNECT. ALL CONTROLLERS SUPPLIED MUST BE FULLY TS-1, ECONOLITE ASC/2-2120-1-1, SYSTEM COMPATIBLE CONTROLLERS. ON-STREET MASTERS SHALL BE ECONOLITE ASC/2M-1000, WITH 2 CHANNELS OF FIBER OPTIC TELEMETRY MODULES.
 - CONTROLER HOUSING SHALL BE EQUIPPED WITH A SEPARATE 15 AMP BREAKER FOR INTERNALLY ILLUMINATED STREET NAME SIGNS.
 - 3) INTERCONNECT CABLE INSTALLATION
 - 3.1) ALL CABLE RUNS SHALL BE CONTINUOUS FROM CONTROLLER TO CONTROLLER AND SHALL NOT BE SPLICED.
 - 3.2) THE PRICE BID FOR FIBER OPTIC INTERCONNECT CABLE SHALL INCLUDE ALL HARDWARE NECESSARY FOR ITS COMPLETE INSTALLATION.

CALCULATED
CHECKED

NOTES
FRANTZ RD. @ BRADENTON AVE.

CITY OF DUBLIN

4) FIBER OPTICS SPECIFICATION

4.1) FIBER OPTIC MATERIALS AND EQUIPMENT SHALL BE THE STANDARD PRODUCT OF A MANUFACTURER REGULARLY ENGAGED IN THE MANUFACTURE OF THE PRODUCTS. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW OF FIRST QUALITY, OF THE LATEST DESIGN AND BE COMPLETELY FREE FROM DEFECTS IN MATERIAL AND POOR WORKMANSHIP. ALL LIKE PIECES OF EQUIPMENT SHALL BE OF THE SAME TYPE AND MANUFACTURER TO ASSURE UNIFORMITY, INTERCHANGEABILITY OF COMPONENTS, SINGLE RESPONSIBILITY, AND MOST SATISFACTORY SERVICE.

4.2) EACH MAJOR COMPONENT OF EQUIPMENT SHALL HAVE THE MANUFACTURER'S NAME, ADDRESS, TYPE OR STYLE MODEL OR SERIAL NUMBER, AND CATALOG NUMBER ON A PLATE SECURED TO THE EQUIPMENT.

4.3) THE FIBER OPTIC CABLE INSTALLATION SHALL BE SUPERVISED BY TRAINED AND EXPERIENCED PERSONNEL. THE CABLE TERMINATIONS SHALL BE DONE BY QUALIFIED FIBER OPTIC TECHNICIANS PREAPPROVED BY THE SYSTEM OPERATION ENGINEER. (614-645-7400)

4.4) THE FIBER OPTIC INSTALLATION SHALL BE IN ACCORDANCE WITH OR EXCEED ALL MINIMAL REQUIREMENTS OF STATE CODES, NATIONAL CODES, AND MANUFACTURER CODES AS APPLICABLE.

4.5) DURING CONSTRUCTION AND TESTING, THE CONTRACTOR SHALL PROVIDE MAINTENANCE ON ALL INSTALLED EQUIPMENT. THIS INCLUDES MAINTENANCE ON ALL HARDWARE EQUIPMENT FROM THE TIME THE EQUIPMENT IS INSTALLED TO THE DAY OF FINAL ACCEPTANCE OF THE SYSTEM.

4.5.1) THE CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY MISCELLANEOUS EQUIPMENT TO MAKE A COMPLETE AND OPERATING INSTALLATION IN ACCORDANCE WITH THE PLANS, STANDARD SHEETS, STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND ACCEPTED GOOD PRACTICE OF THE INDUSTRY.

4.6) CABLE RECORDS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. DEVIATIONS FROM THE CONSTRUCTION PLANS SHALL BE PREAPPROVED BY THE SYSTEM OPERATION ENGINEER, AND RECORDED AS REDLINES ON THE PLAN SHEETS. ALL CHANGES SHALL BE RECORDED TO THE NEAREST ONE-HALF METER.

5) MATERIALS AND COMPONENTS

5.1) CONDUIT SHALL BE A MINIMUM OF 75mm SCHEDULE 40 (PVC) CONDUIT. FACTORY MANUFACTURED BENDS SHALL BE USED WHERE A CHANGE OF DIRECTION IS REQUIRED. CONDUIT SHALL BE INSTALLED AS STRAIGHT AS POSSIBLE (180°) WITH GENTLE CURVATURE WHEN REQUIRED.

5.2) THE FIBER OPTIC CABLE SHALL BE MULTIMODE, GRADED INDEX, SIX OPTICAL FIBERS STRANDED WITH A MINIMUM OF ONE NON-METALLIC STRENGTH MEMBER. IT SHALL ALSO BE LOOSE TUBE, INDIVIDUALLY BUFFRED, ALL DIELECTRIC CONSTRUCTION, GEL FILLED BUFFERS, 62.5/125 MICRON DIAMETER (CORE/CLAD), SUITABLE FOR OUTDOOR USE IN UNDERGROUND CONDUIT OR ON AERIAL SUPPORTS. THE FIBER OPTIC CABLE SHALL BE CONSTRUCTED WITH KEVLAR BRAID AND OUTER POLYETHYLENE JACKETS AS A MINIMUM. IF THE INNER JACKET IS USED IT SHALL BE PVC. MAXIMUM ATTENUATION OF THE CABLE SHALL BE 3.5 DB/KM NOMINAL, MEASURED AT ROOM TEMPERATURE AT 850 NM. THE BANDWIDTH SHALL NOT BE LESS THAN 160 MHZ/KM ALSO AT 850 NM. EACH FIBER SHALL BE CONTINUOUS WITH NO FACTORY SPLICES EXCEPT FOR JOINING STANDARD LENGTH CABLES TO FORM LONGER, CONTINUOUS JACKETED CABLE TO FIT INSTALLATION REQUIREMENTS. THE CABLE SHALL HAVE STANDARD NYLON RIP CORDS. KEVLAR RIP CORDS WILL NOT BE ACCEPTED.

5-3) PULL BOX COVERS SHALL BE AS DETAILED EXCEPT THE MESSAGE DISPLAYED ON THE LID SHALL READ "TRAFFIC" AND "FIBER OPTIC" ON 2 LINES. THIS WORDING SHALL BE DISPLAYED HORIZONTALLY ACROSS THE CENTER OF THE LID. THIS DESCRIPTION SHALL APPLY ONLY TO NEW PULL BOXES WHICH WILL BE CONTAINING FIBER OPTIC CABLE.

5.4) UNLESS OTHERWISE SPECIFIED, THE CABLE SHALL BE TERMINATED AT EACH CONTROLLER CABINET UTILIZING BREAKOUT KITS. BREAKOUT KITS SHALL PROVIDE FOR THE SEPARATION AND PROTECTION OF INDIVIDUAL FIBERS WITH BUFFER TUBING AND JACKETING MATERIALS SUITABLE FOR TERMINATION OF THE FIBER WITH THE FIBER OPTIC CONNECTOR(S) AS SPECIFIED.

5.5) CONNECTORS SHALL BE "ST" (CERAMIC) COMPATIBLE, FIELD INSTALLABLE, AND SELF-ALIGNING AND CENTERING. FIBER OPTIC EQUIPMENT SHALL USE THE SAME TYPE OF CONNECTORS. WHITE OR CLEAR EPOXY'S SHALL NOT BE USED WHEN MAKING CONNECTIONS.

5.6) MECHANICAL SPLICES SHALL BE 3M "FIBRLOK" OPTICAL FIBER SPLICES OR APPROVED EQUAL. SPLICES SHALL BE SECURED IN 3M "FIBRLOK" SPLICE ORGANIZER TRAY PRODUCT NO. 2524 OR APPROVED EQUAL. FACTORY MANUFACTURED PIGTAIL ASSEMBLIES SHALL BE FULLY COMPATIBLE WITH THE FIBER OPTIC INTERCONNECT CABLE AND CONNECTING MODEMS AND MODULES. THE PIGTAILS SHALL BE EQUIPPED WITH CONNECTORS AS DESCRIBED ABOVE, AND SHALL BE 180 mm IN LENGTH.

5.7) COMMUNICATIONS BETWEEN LOCAL CONTROLLERS AND THE SYSTEM MASTER CONTROLLER(S) SHALL BE FACILITATED BY THE USE OF FIBER OPTIC MODEMS. THE MODEMS SHALL BE CAPABLE OF COMMUNICATIONS WITH NEMA TS-1, ECONOLITE TRAFFIC SIGNAL CONTROLLERS IN A COORDINATED CLOSED LOOP SYSTEM. MODEMS SHALL BE ACTIVE DEVICES PROVIDING FULL-DUPLEX COMMUNICATIONS VIA RS-232 CONNECTOR AND SUPPORTING DAISY-CHAIN WIRING. THE NOMINAL OPERATING WAVELENGTH SHALL BE 850 NANOMETERS. THE MODEMS SHALL MEET THE APPLICABLE NEMA ENVIRONMENTAL SPECIFICATIONS (SECTION 2 OF 1983 TS-1 STANDARD). TWO FIBER OPTIC PORTS SHALL BE PROVIDED ON EACH MODEM, MARKED "T" FOR TRANSMIT AND "R" FOR RECEIVE. THE PORTS SHALL BE "ST" (CERAMIC) STYLE. THE OTHER END OF THE MODEM SHALL HAVE THE MODEL TYPE OF RS-232 CONNECTOR. THE MODEMS SHALL BE INSTALLED ON THE INTERFACE PANEL ON THE SIDE OF THE CONTROLLER CABINET. THE MODEMS SHALL BE POWERED FROM THE CONTROLLER TELEMETRY MODULE.

5-8) AN LED LIGHT SOURCE WITH A WAVELENGTH THAT IS THE SYSTEM WAVELENGTH SHALL BE USED. THE LED SHALL BE STABLE WITHIN 0.1 DB IN INTENSITY OVER A TIME PERIOD SUFFICIENTLY LONG TO PERFORM THE MEASUREMENT. THE OUTPUT OF THE LED SHALL OVERFILL THE INPUT END OF THE LAUNCH FIBER-CABLE IN BOTH NUMERICAL APERTURE (NA) AND CORE DIAMETER.

5.9) THE LAUNCH CABLE SHALL PROVIDE FOR ATTACHMENT TO THE LIGHT SOURCE. THE LAUNCH CABLE FIBER SHALL BE OF THE SAME FIBER CORE SIZE AND TYPE AS THE FIBER UNDER TEST.

5.10) THE DETECTOR IN THE POWER METER SHALL HAVE AN EFFECTIVE NUMERICAL APERTURE AND ACTIVE REGION THAT IS LARGER THAN THE LAUNCH REFERENCE CABLE AND/OR THE FIBER UNDER TEST. THE POWER METER SHALL HAVE A MINIMUM RANGE FROM +3 DBM TO -40 DBM. THE POWER METER SHALL HAVE AN ACCURACY OF +/-0.5 DB THROUGH THE OPERATING TEMPERATURE AND MINIMUM RESOLUTION OF 0.1 DB.

5.11) THE CLEAVING SHALL BE A "T & B" CLEAVING TOOL - CATALOG NO. 92208 OR APPROVED EQUAL.

6) EXECUTION

6.1) ALL SYSTEM COMPONENTS AND APPURTENANCES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL NECESSARY INTERCONNECTIONS, SERVICES AND ADJUSTMENTS REQUIRED FOR A COMPLETE AND OPERABLE DATA TRANSMISSION SYSTEM SHALL BE PROVIDED. THE SYSTEM OPERATION ENGINEER WILL DIRECT THE CONTRACTOR IN LOCATING PULL BOXES AND CONDUIT RUNS.

6.2) THE CONDUIT SHALL BE PLACED AS SHOWN ON THE PLANS. IN CHANGES OF ALIGNMENT, THE LARGEST POSSIBLE RADIUS SHALL BE UTILIZED TO ACCOMPLISH BENDS. IN NO CASE SHALL THE MINIMUM RADIUS BE LESS THAN 0.3 METERS AS REQUIRED BY THE SPECIFICATIONS OF THE FIBER OPTIC CABLE MANUFACTURER.

6.3) CONDUITS SHALL BE JOINED IN SUCH A MANNER AS TO MAKE A FIRM, WATER-TIGHT JOINT THAT SHALL NOT AFFECT THE LAY OF THE CONDUITS. THE CONDUITS SHALL BE CAPPED TO KEEP DIRT AND DEBRIS FROM ENTERING THE PIPES WHEN PLACING OPERATIONS ARE DISCONTINUED AT THE END OF EACH DAY OR WHEN PLACING IS COMPLETE IN EACH SECTION. CARE SHALL BE EXERCISED TO INSURE THAT INSIDE WALLS AT JOINTS ARE FREE OF BURRS OR SPLITS.

6.4) PLASTIC WARNING TAPE SHALL BE ACID AND ALKALI RESISTANT POLYETHYLENE FILM, 75mm WIDE WITH MINIMUM THICKNESS OF 0.10mm. THE TAPE SHALL BE OF A TYPE SPECIFICALLY MANUFACTURED FOR MARKING AND LOCATING UNDERGROUND UTILITIES. TAPE COLOR SHALL BE ORANGE AND SHALL BEAR A CONTINUOUS PRINTED INSCRIPTION "CAUTION-FIBER OPTIC CABLE". WHERE CONDUIT IS INSTALLED IN TRENCH, WARNING TAPE SHALL BE INSTALLED DIRECTLY ABOVE THE CONDUIT AT A DEPTH OF 300 mm BELOW FINISHED GRADE UNLESS OTHERWISE SHOWN ON THE PLANS. THE CONTRACTOR SHALL INSTALL A TRACER WIRE (NO.10 AWG COPPER-CLAD) WHICH SHALL BE BUTTED AGAINST THE INTERCONNECT CONDUIT AND PLACED ON THE FRANTZ ROAD SIDE OF THE CONDUIT. THE TRACER WIRE SHALL EXIT THE EXISTING CABINET FOUNDATION AT FRANTZ RD. AND DUBLIN RD. VIA A SEPERATE EMT, RUN CONTINUOUSLY NORTHWARD, AND TERMINATE AT THE CABINET FOUNDATION AT FRANTZ RD. AND TUTTLE CROSSING BLVD. COST FOR THE TRACER WIRE SHALL BE INCIDENTAL TO THE COST OF THE TRENCH.

6.5) THE FIBER OPTIC CABLE SHALL BE INSTALLED IN CONTINUOUS RUNS AS INDICATED ON THE PLANS. SPLICES SHALL BE ALLOWED ONLY IN CONTROLLER CABINETS BETWEEN THE END OF THE FIBER OPTIC INTERCONNECT CABLE AND A FACTORY MANUFACTURED PIGTAIL ASSEMBLY. THE CABLE SHALL BE TERMINATED AT EACH INTERCONNECT CABINET UTILIZING "ST" COMPATIBLE CONNECTORS AND PIGTAIL ASSEMBLIES. ALL FIBERS SHALL BE TERMINATED WITH A CONNECTOR. THE CONNECTORS ON UNUSED FIBERS SHALL BE PROTECTED WITH A PLASTIC SLEEVE/CAP AND THE SLEEVE/CAP SECURED WITH TAPE. THE UNUSED FIBERS SHALL BE SECURE IN A SUITABLE LOCATION FOR QUICK AND EASY ACCESS. ALL FIBERS SHALL BE RELIEVED OF STRAIN BY NEATLY SECURING THE CABLE INSIDE THE CONTROLLER CABINET. THE CONTRACTOR SHALL USE CAUTION TO AVOID PRE-MATURE CUTTING OF ANY EXCESS CABLE LENGTH.

6.6) A SUITABLE CABLE FEEDER GUIDE SHALL BE USED BETWEEN THE CABLE REEL AND THE FACE OF THE CONDUIT TO PROTECT THE CABLE AND GUIDE IT INTO THE IT INTO THE CONDUIT OFF THE REEL. IT SHALL BE CAREFULLY INSPECTED FOR JACKET DEFECTS. IF DEFECTS ARE NOTICED, THE PULLING OPERATION SHALL BE STOPPED IMMEDIATELY AND THE ENGINEER NOTIFIED. PRECAUTIONS SHALL BE TAKEN DURING INSTALLATION TO PREVENT THE CABLE FROM BEING "KINKED" OR "CRUSHED". A PULLING EYE SHALL BE ATTACHED TO THE CABLE AND USED TO PULL THE CABLE THROUGH THE CONDUIT SYSTEM. A PULLING SWIVEL SHALL BE USED TO ELIMINATE TWISTING OF THE CABLE. AS THE CABLE IS PLACED OFF THE REEL INTO THE CABLE FEEDER GUIDE, IT SHALL BE SUFFICIENTLY LUBRICATED WITH A TYPE OF LUBRICANT RECOMMENDED BY THE CABLE MANUFACTURER. DYNAMOMETERS OR BREAK AWAY PULLING SWING SHALL BE USED TO ENSURE THAT THE PULLING LINE TENSION DOES NOT EXCEED THE INSTALLATION TENSION VALUE SPECIFIED BY THE CABLE MANUFACTURER. THE MECHANICAL STRESS PLACED ON A CABLE DURING INSTALLATION SHALL NOT BE SUCH THAT THE CABLE IS TWISTED OR STRETCHED. THE PULLING OF CABLE SHALL BE HAND ASSISTED AT EACH CONTROLLER CABINET. THE CABLE SHALL NOT BE CRUSHED, KINKED OR FORCED AROUND A SHARP CORNER. IF A LUBRICANT IS USED IT SHALL BE OF WATER BASED TYPE AND APPROVED BY THE CABLE MANUFACTURER. SUFFICIENT SLACK SHALL BE LEFT AT EACH END OF THE CABLE TO ALLOW PROPER CABLE TERMINATION. ADDITIONAL SLACK CABLE (3 TURNS AROUND THE BOTTOM PERIMETER) SHALL BE LEFT IN EACH PULL BOX AND CONTROLLER CABINET. THE MINIMUM SLACK AMOUNT SHALL BE 6.0m AT EACH PULL BOX.

6.6.1) STORAGE OF ADDITIONAL SLACK CABLE IN PULL BOXES SHALL BE COILED. THE SLACK COILS SHALL BE BOUND AT A MINIMUM OF 3 POINTS AROUND THE COIL PERIMETER AND SUPPORTED IN THEIR STATIC STORAGE POSITIONS. STORAGE OF ADDITIONAL SLACK CABLE ADJACENT TO CONDUIT RISERS AND SUPPORT POLES SHALL BE AS DIRECTED BY THE ENGINEER. AT EACH CONTROLLER CABINET, POLE HAND HOLE, AND PULL BOX THE CABLE SHALL BE VISIBLY MARKED/TAGGED AS "CAUTION-FIBER OPTIC CABLE". MAXIMUM LENGTH OF CABLE PULLING TENSIONS SHALL NOT EXCEED THE CABLE MANUFACTURER'S RECOMMENDATIONS.

6.7) FOR STATIC STORAGE, THE CABLE SHALL NOT BE BENT AT ANY LOCATION TO LESS THAN TEN TIMES THE DIAMETER OF THE CABLE OUTSIDE DIAMETER OR AS RECOMMENDED BY THE MANUFACTURER. DURING INSTALLATION, THE CABLE SHALL NOT BE BENT AT ANY LOCATION TO LESS THAN TWENTY TIMES THE DIAMETER OF THE CABLE OUTSIDE DIAMETER OR AS RECOMMENDED BY THE MANUFACTURER.

6.8) EACH SECTION OF THE CABLE SHALL BE TESTED FOR CONTINUITY AND ATTENUATIONS AS A MINIMUM. IF THE ATTENUATION IS FOUND NOT TO BE WITHIN THE ACCEPTABLE NOMINAL VALUES, THE CONTRACTOR SHALL USE AN OPTICAL TIME DOMAIN REFLECTOMETER (OTDR) TO LOCATE POINTS OF LOCALIZED LOSS CAUSED BY BENDS OR KINKS AND TRY TO RELAX THESE BENDS OR KINKS. IF THIS IS NOT SUCCESSFUL THE CONTRACTOR SHALL REPLACE THE DAMAGED CABLE IN TOTAL WITH NO ADDITIONAL PAYMENT. SPLICES WILL NOT BE ALLOWED TO REPAIR THE DAMAGED SECTION. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A CERTIFIED WRITTEN REPORT SHOWING ALL OF THE VALUES MEASURED DURING THESE TESTS.

6.9) TERMINATIONS SHALL BE MADE USING THE METHOD RECOMMENDED BY THE CONNECTOR MANUFACTURER.

7) TESTING

7.1) THE CONTRACTOR SHALL PROVIDE ALL PERSONNEL, EQUIPMENT, INSTRUMENTATION AND SUPPLIES NECESSARY TO PERFORM ALL TESTING.

7.1.1) ALL TESTING SHALL BE PERFORMED IN AN ACCEPTED MANNER AND IN ACCORDANCE WITH THE TESTING EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. ALL DATA SHALL BE RECORDED AND SUBMITTED TO THE CITY.

7.2) THE END-TO-END ATTENUATION SHALL BE MEASURED FOR EACH LINK AFTER INSTALLATION BY INSERTION LOSS TESTING.

7.3) THE LAUNCH REFERENCE CABLE SHALL BE CONNECTED TO THE LIGHT SOURCE AND THE POWER METER. A REFERENCE POWER READING (P1) SHALL THEN BE TAKEN AND RECORDED.

7.4) THE SYSTEM LINK TO BE TESTED SHALL THEN BE INSERTED BETWEEN THE LAUNCH REFERENCE CABLES AND THE POWER METER. A TEST POWER READING (P2) SHALL THEN BE TAKEN AND RECORDED.

7.5) THE LINK ATTENUATION (A) IN DB SHALL BE RECORDED AS THE MATHEMATICAL DIFFERENCE BETWEEN THE REFERENCE POWER (P1) AND THE TEST POWER (P2).

LINK ATTENUATION (A) = P1 - P2

WHERE: P1 = REFERENCE POWER
P2 = TEST POWER

7.5.1) THIS TEST SHALL BE PERFORMED IN BOTH DIRECTIONS ALONG THE LINK. DIRECTION OF THE TEST SHALL BE RECORDED IN THE DOCUMENTATION.

CALCULATED
CHECKED

SIGNAL DESIGN
FRANTZ RD. @ BRADENTON AVE.

CITY OF DUBLIN

7.6) THE OUTPUT POWER LEVELS AT THE NETWORK HARDWARE TRANSMITTERS AND RECEIVERS SHALL BE MEASURED AND RECORDED FOR SYSTEM DOCUMENTATION.

7.6.1) THE POWER METER SHALL BE CONNECTED TO THE TRANSMITTER SIDE OF THE EQUIPMENT WITH A SYSTEM JUMPER. THE TRANSMIT POWER LEVEL SHALL THEN BE READ AND RECORDED. THE TRANSMITTER IS THEN RE-CONNECTED TO THE CABLE LINK AND THE POWER METER CONNECTED TO THE RECEIVER SIDE OF THE EQUIPMENT. THE RECEIVE POWER LEVEL SHALL THEN BE READ AND RECORDED.

7.7) CONTINUITY TESTS SHALL BE USED TO DETERMINE WHETHER A TEST OR SYSTEM JUMPER DOES OR DOES NOT PASS LIGHT. A CONTINUITY TEST SHALL ALSO BE USED TO ASSURE THAT FIBERS HAVE NOT BEEN CROSSED OVER IN THE JUMPER AND THAT THE TRANSMIT FIBER GOES TO THE RECEIVE FIBER.

7.7.1) TO PERFORM CONTINUITY TESTS, A HIGH-INTENSITY FLASHLIGHT SHALL BE AIMED INTO THE CONNECTOR AT ONE END, WHILE AN OBSERVER WATCHES FOR FLICKER OF LIGHT AT THE OTHER END.

7.8) AN OPTICAL TIME DOMAIN REFLECTOMETER (OTDR) SHALL BE USED TO EVALUATE THE QUALITY AND LENGTH OF CABLE REELS PRIOR TO THEIR USE ON THE PROJECT. THE FIBER LOSS IN DB/KM AND THE LENGTH OF EACH REEL SHALL BE RECORDED IN THE DOCUMENTATION. THE MAXIMUM ATTENUATION OF THE CABLE SHALL BE 3.5 DB/KM NOMINAL, MEASURED AT ROOM TEMPERATURE AT 850 NM.

7.8.1) OTDR TESTING SHALL BE PERFORMED ON THE FIBERS

- 1) WHILE ON THE SPOOL BEFORE INSTALLING
- 2) WHEN INSTALLED, BUT BEFORE APPLICATION OF CONNECTORS
- 3) WHEN INSTALLATION IS COMPLETE

7.8.2) A HARD COPY OF OTDR SIGNATURE TRACES FOR ALL SYSTEM LINKS SHALL BE MADE AND PROVIDED IN THE DOCUMENTATION.

7.8.3) THE RESULTS OF ALL TESTING SHALL BE RECORDED ALONG WITH DATE OF TEST, NAME OF PERSON PERFORMING TEST, BRAND NAME, MODEL NUMBER, SERIAL NUMBER OF EQUIPMENT USED DURING TEST, AND ANY OTHER PERTINENT INFORMATION AND DATA.

PAYMENT FOR ITEM 632 INTERCONNECT CABLE (FIBER OPTIC) WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER METER FOR FIBER OPTIC CABLE WHICH SHALL BE FULL COMPENSATION TO THE CONTRACTOR FOR FURNISHING AND INSTALLING THE FIBER OPTIC CABLE, ALL NECESSARY SLACK, CABLE TERMINATION AND TESTING, BREAK-OUT KITS, CONNECTORS, PIGTAIL ASSEMBLIES, MECHANICAL SPLICES, SPLICE TRAYS AND ALL OTHER MATERIALS, HARDWARE AND LABOR NECESSARY TO COMPLETE THE INSTALLATION. THE INSTALLATION OF THE FIBER OPTIC CABLE SHALL BE MEASURED IN FEET OF CABLE ACTUALLY INSTALLED.

ITEM 633 CONTROLLER, ACTUATED, 8-PHASE, SOLID DIGITAL MICROPROCESSOR, AS PER PLAN

IN ADDITION TO THE OTHER REQUIREMENTS OF ODOT 633 & 733, THE CONTROLLER SHALL BE ECONOLITE ASC/2-2120-1-1 CLOSED LOOP MODEL THE CABINET ASSEMBLY SHALL BE COMPLETELY WIRED FOR CLOSED LOOP SYSTEM OPERATION AND CONTAIN A MODEM, A SMALL SUBLINE PHONE PLUS ALL ITS CONNECTORS, EXPANDABLE SYSTEM DETECTOR, TYPE OF CONFIGURATION PROM, A 3M BRAND FIBERLOCK BREAKOUT PANEL KIT FOR THE CONNECTION OF FIBER OPTIC INTERCONNECT AND THE COLUMBUS MUTCD FLASH CIRCUITRY. THE CONTRACTOR SHALL CONSULT WITH THE PROJECT ENGINEER (614-645-7790) TO DETERMINE THE SYSTEM I/O'S THAT ARE TO BE TRANSMITTED BACK TO CENTRAL. ADDITIONAL SPARE COMPONENTS THAT SHALL BE PROVIDED: TWO T10 BOARDS WITH ALL CONNECTING HARNESSES AND MOUNTING HARDWARE, TWO BLANK RACK PROGRAM BOARDS & ONE COLUMBUS MUTCD FLASH CIRCUIT BOARD WITH HARNESS. COST FOR THE ADDITIONAL SPARE COMPONENTS SHALL BE INCIDENTAL TO THE COST OF THE CONTROL EQUIPMENT.

(10) ONE (1) 30 AMP CIRCUIT BREAKER, LABELLED AS "MAIN", SHALL BE WIRED AS THE MAIN POWER DISTRIBUTION BREAKER. A SECOND CIRCUIT BREAKER, LABELLED AS "PED" AND RATED AT 10 AMPS, SHALL BE SUPPLIED FOR THE PEDESTRIAN SIGNAL LOAD ONLY. THE PEDESTRIAN SIGNAL BREAKER SHALL BE WIRED IN SERIES WITH BUT AFTER THE MAIN POWER BREAKER. A THIRD CIRCUIT BREAKER, LABELLED AS "AUX" AND RATED AT 15 AMPS, SHALL SUPPLY A SEPARATE BRANCH OF AC+ POWER TO THE VENTILATING FAN, CONVENIENCE OUTLET AND LIGHT SO THAT THEY MAY OPERATE INDEPENDENTLY OF THE MAIN POWER BREAKER. ALL BREAKERS SHALL BE MOUNTED SIDE-BY-SIDE ON THE POWER DISTRIBUTION PANEL. (ALSO SEE ODOT 733.04(7))

(11) ALL CONTROLLER MS CONNECTOR HARNESSES SHALL HAVE A CONDUCTOR FOR EACH PLUG PIN EXCEPT THE REMOTE RESET FUNCTION FOR THE CONFLICT MONITOR. THE CONTROLLER AND CONFLICT MONITOR MS HARNESS CONDUCTORS SHALL BE CONNECTED TO A BACK PANEL TERMINAL STRIP WHICH IS ACCESSIBLE FROM THE FRONT OF THE PANEL. DETECTOR UNIT HARNESS CONDUCTORS SHALL BE CONNECTED TO A LEFT SIDE CABINET MOUNTED TERMINAL STRIP. OTHER EQUIPMENT SHALL BE CONNECTED AS APPROPRIATE. (ALSO SEE ODOT 733.04 (15))

(12) THE CABINET ASSEMBLY SHALL CONTAIN ALL PEDESTRIAN SIGNAL CIRCUITRY FOR EACH NEMA DEFINED THROUGH PHASE.

(13) A POLICE DOOR MOUNTED SIGNAL SHUTDOWN SWITCH WITH SWITCH POSITIONS LABELLED AS "SIG ON" AND "SIG OFF" SHALL BE INSTALLED. (ALSO SEE ODOT 733.04 (11.a))

(14) A POLICE DOOR MOUNTED SIGNAL-FLASH SWITCH WITH SWITCH POSITIONS LABELLED AS "ON SIG" AND "ON FLASH" SHALL NOT ONLY PLACE THE SIGNALS ON FLASH BUT ALSO STOP-TIME THE CONTROLLER UNIT. A RUN/STOP-TIME SWITCH WITH SWITCH POSITIONS LABELLED AS "CONT. RUN" AND "STOP-TIME" SHALL BE INSTALLED ON THE INSIDE OF THE CABINET DOOR. THE RUN/STOP-TIME SWITCH SHALL ALLOW THE CONTROLLER UNIT TO TIME NORMALLY BUT KEEP THE SIGNALS ON FLASH. THE SIGNAL-FLASH SWITCH SHALL NOT RETURN THE SIGNALS TO NORMAL OPERATION UNLESS THE RUN STOP-TIME SWITCH IS RESET TO THE STOP-TIME POSITION SO THE SIGNAL-FLASH SWITCH CAN AGAIN STOP-TIME THE CONTROLLER UNIT. THE SIGNAL-FLASH SWITCH SHALL NOT REMOVE POWER TO THE CONTROLLER UNIT OR ITS AUXILIARY EQUIPMENT. (ALSO SEE ODOT 733.04 (11.b AND 11.d))

(15) A POLICE DOOR MOUNTED AUTO-MANUAL TRANSFER SWITCH WITH SWITCH POSITIONS LABELLED AS "AUTO" AND "MANUAL" SHALL BE INSTALLED. A MANUAL PUSH BUTTON CONTROL SHALL BE INSTALLED, BUT WIRING FOR A PUSH BUTTON CONTROL SHALL BE PROVIDED UP TO THE POINT WHERE THE PUSH BUTTON WOULD HAVE BEEN CONNECTED. (ALSO SEE ODOT 733.04 (11.F))

(16) A CONTROLLER SHUTDOWN SWITCH WITH SWITCH POSITIONS LABELLED AS "CONT ON" AND "CONT OFF" AND A COORDINATED/FREE SWITCH WITH SWITCH POSITIONS LABELLED AS "COORD" AND "FREE" SHALL BE INSTALLED INSIDE THE CABINET NEXT TO THE RUN/STOP-TIME SWITCH. A COORDINATED/FREE SWITCH SHALL NOT BE REQUIRED IF THE CONTROLLER HAS A BUILT-IN COORD/FREE SWITCH. (ALSO SEE ODOT 733.04 (11.e AND 11.f))

(17) AFTER A NEMA DEFINED POWER INTERRUPTION THE CONFLICT MONITOR SHALL CAUSE THE INTERSECTION SIGNALS TO FLASH AS PER PLAN FOR 10 SECONDS BEFORE THE INITIALIZED CONTROLLER UNIT TAKES CONTROL OF THE INTERSECTION SIGNALS. THE CONFLICT MONITOR SHALL BE EDI MODEL SSM 12LE.

(18) THE CONFLICT MONITOR SHALL BE CONNECTED DIRECTLY TO THE FIELD TERMINALS. USING JUMPERS OR LINKS ON THE BACK PANEL TO FORM A CIRCUIT FOR THE CONFLICT MONITOR SHALL NOT BE ACCEPTABLE.

(19) THE CONFLICT MONITOR SETTINGS FOR MINIMUM YELLOW TIMING ON ALL CHANNELS SHALL BE SET AT THREE AND ONE HALF (3.5) SECONDS.

(20) THE WATCH DOG TIMER SHALL CAUSE THE CONTROLLER TO GO ON A FLASH OPERATION IF A MICROPROCESSOR FAILURE IS DETECTED.

(21) ALL BACK PANEL HARDWARE SHALL BE MOUNTED WITH SCREWS. ALL SCREWS SHALL BE COMPLETELY SCREWED DOWN. RIVETS OR OTHER NON-REMOVABLE FASTNERS ARE NOT ACCEPTABLE.

(22) WIRE CONNECTIONS ON THE BACK PANEL SHALL BE MADE WITH CRIMP TERMINALS AND THREADED FASTNERS. TELEPHONE TYPE KNIFE CONNECTORS (SOLDERED OR OTHERWISE) ARE NOT ACCEPTABLE.

(23) ALL WIRE FASTNED TO THE LOAD SWITCH AND FLASHER PLUGS SHALL BE SOLDERED IN PLACE.

(24) THE BACK PANEL AND POWER DISTRIBUTION PANEL SHALL HAVE SILK SCREENED TERMINAL/SOCKET FUNCTION IDENTIFICATION LABELS SUCH AS AC COM, PHASE 3 GREEN, 115 VAC, SIGNAL BUS, ECT. REFERENCE NUMBERS SHALL NOT BE ACCEPTABLE IN LIEU OF FUNCTION LABELS BUT THEY CAN SUPPLEMENT THEM. ADDITIONAL TERMINAL BLOCKS AND AUXILIARY PANELS SHALL USE SILK SCREENED REFERENCE NUMBERS TO IDENTIFY TERMINAL CONNECTIONS.

(25) ALL TERMINAL STRIPS IN CLOSE PROXIMITY OF SHELF MOUNTED CONTROL DEVICE EQUIPMENT SHALL BE COVERED WITH NON-CONDUCTIVE MATERIAL TO PREVENT ACCIDENTAL CONTACT WITH THE DEVICES. ALL TERMINAL STRIPS SHALL BE READILY ACCESSIBLE WITHOUT REMOVAL OF ANY EQUIPMENT.

(26) THE CABINET SHALL HAVE TWO (2) NON-LIPPED AND NON-VENTED (SOLID) SHELVES SPACED AT LEAST 225mm APART. THE SHELF ARRANGEMENT SHALL BE SUCH SO ALL SHELF DEVICES FIT ON THE SHELVES.

(27) THERE SHALL BE A MINIMUM OF 25 mm EMPTY SPACE BETWEEN ALL ITEMS ATTACHED TO THE DOOR AND ALL SHELF-MOUNTED DEVICES INCLUDING ITS CONNECTING HARNESS(ES), ALL LOAD SWITCHES, FLASHER AND ALL SIDE-PANEL -MOUNTED ITEMS.

(28) THE THERMOSTAT TO THE VENTILATING FAN SHALL BE SET AT 95 DEGREES FAHRENHEIT. (ALSO SEE ODOT 733.04 (1))

(29) ALL FLASH TRANSFER RELAYS SHALL BE WIRED FOR FAIL-SAFE OPERATION (ENERGIZED DURING NORMAL OPERATION) AND WIRED WITH A MAXIMUM OF TWO PHASES PER RELAY.

(30) THE CONTROLLER ASSEMBLY, WHEN PLACED IN OR COMING OUT OF AN AUTOMATIC FLASHING MODE, SHALL CONFORM TO THE AUTOMATIC FLASHING CRITERIA SET FORTH IN THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, SECTION 6B-18, INCLUDING THE FOLLOWING ADDITIONS:

- 1) A VEHICULAR CALL SHALL BE PLACED ON ALL PHASES

AND

- 2) THE CONTROLLER SHALL ENTER THE FLASH MODE AT THE END OF THE THROUGH SIDE STREET PHASE(S) YELLOW (OR DURING THE SIDESTREET PHASE(S) RED CLEARANCE INTERVAL) BUT JUST PRIOR TO ANY MAIN STREET GREEN.

THE FLASH TRANSFER LOGIC DEVICE SHALL BE SOLID STATE, SHALL BE EXTERNAL TO THE CONTROLLER (A CABINET ASSEMBLY DEVICE), AND SHALL FUNCTION WITH ANY NEMA CONTROLLER.

EXCEPTION, FOR ON-STREET MASTER ARTERIAL CONTROLLERS ONLY, INTERNAL IC LOGIC CAN BE USED IN LIEU OF AN EXTERNAL DEVICE AS LONG AS THE INTERNAL IC LOGIC MEETS THE STANDARDS SET FORTH ABOVE. (ALSO SEE ODOT 733.04(11.b))

(31) THE POWER CABLE SHALL BE CONNECTED TO AN ACCESSIBLE TERMINAL STRIP WHICH SHALL BE LOCATED NEAR THE BOTTOM OF THE CABINET AND SHALL BE OF SUFFICIENT SIZE TO ACCEPT A SUPPLIED #8 WIRE LUG. THE TERMINAL STRIP SHALL BE COVERED OR SHIELDED TO MINIMIZE ACCIDENTAL CONTACT DURING NORMAL SERVICING OPERATIONS. THE COVER SHALL BE SNAPPED ON/OFF OR SECURED BY STANDARD SCREWS. THE POWER CABLE LUG TERMINAL CONNECTION SHALL BE LOCATED IMMEDIATELY BELOW THE MAIN POWER DISTRIBUTION BREAKER. POWER SHALL BE JUMPERED TO THE MAIN POWER DISTRIBUTION BREAKER. THE POWER DISTRIBUTION PANEL SHALL BE LOCATED IN THE BOTTOM RIGHT SIDE OF THE CABINET OR IT SHALL BE AN INTEGRAL PART OF THE RIGHT SIDE OF THE BACK PANEL. THERE SHALL BE A MINIMUM OF 50 mm CLEARANCE BETWEEN THE POWER TERMINAL AND THE BOTTOM OF THE CABINET. A #4 WIRE LUG SHALL BE PROVIDED FOR ATTACHING A GROUNDING WIRE FROM A GROUND ROD. THE GROUNDING WIRE LUG SHALL BE ATTACHED TO THE POWER DISTRIBUTION PANEL (LOWER LEFT CORNER), OR IF NONE, TO THE BACK PANEL (BOTTOM MIDDLE).

(32) A SINGLE POLE MERCURY PLUNGER RELAY SHALL BE INSTALLED WHICH WILL ALLOW POWER TO BE REMOVED FROM THE VEHICULAR AND PEDESTRIAN POWER BUSES. THE MERCURY RELAY SHALL BE RATED AT 35 AMPS AND THE RELAY COIL WIRED WITH A NOISE SUPPRESSION DEVICE.

(33) ALL EXTERNAL RELAY COILS SHALL HAVE NOISE SUPPRESSION DEVICES.

(34) ALARM 1 CIRCUITRY SHALL BE ASSOCIATED WITH A DOOR SWITCH: DOOR OPEN = TRUE; DOOR CLOSED = FALSE. ALARM 2 CIRCUITRY SHALL BE ASSOCIATED WITH THE LOOP FAILED CHANNEL OUTPUTS OF ALL DS 262FC OR EDI LM632f UNITS: LOOP FAILED = TRUE; LOOP OKAY = FALSE.

FOUR (4) SETS OF CABINET WIRING SCHEMATICS, ONE (1) SERVICE MANUAL AND ONE (1) INSTRUCTIONAL MANUAL SHALL BE PROVIDED PER CABINET. DELIVERY OF THESE DIAGRAMS & MANUALS SHALL ACCOMPANY THE CABINET. THE CONTRACTOR SHALL CLEARLY NOTE ANY DEVIATIONS, CHANGES, ADDITIONS OR OTHER MODIFICATIONS ON THE DIAGRAMS AND MANUALS THAT ARE APPROPRIATE TO REFLECT THE EXACT EQUIPMENT TO BE PROVIDED. THE COST FOR THIS MATERIAL SHALL BE INCIDENTAL TO THE COST OF THE SIGNAL EQUIPMENT. THE COPIES OF DIAGRAMS AND MANUALS SHALL BE STORED IN A PLASTIC ENVELOPE MOUNTED HORIZONTALLY AND SECURELY FASTENED TO THE INSIDE OF THE MAIN CABINET DOOR. THE ENVELOPE OPENING SHALL BE TO THE RIGHT OR LEFT. THE ENVELOPE SHALL NOT BLOCK ANY PART OF THE AIR FILTER OR THE AIR INTAKE LOCATED IN THE DOOR.

SERVICE & INSTRUCTIONAL MANUALS SHALL INCLUDE SECTIONS COVERING THE GENERAL DESCRIPTION OF EQUIPMENT, EQUIPMENT INSTALLATION PROCEDURES, EQUIPMENT PROGRAMMING PROCEDURES, THEORY OF OPERATION WITH SYSTEM DESCRIPTION INCLUDING BLOCK DIAGRAMS AND DETAILED CIRCUIT DIAGRAMS, PREVENTIVE MAINTENANCE, FIELD TROUBLE ANALYSIS, BENCH TROUBLE ANALYSIS, TROUBLESHOOTING ANALYSIS CHART, WAVE FORMS, VOLTAGE MEASUREMENTS, VOLTAGE MEASUREMENT CHARTS, PARTS LIST, ELECTRICAL INTERCONNECTION DRAWINGS, SCHEMATIC AND LOGIC DIAGRAMS, ASSEMBLY DRAWINGS WITH PICTORIAL DIAGRAMS SHOWING PHYSICAL LOCATIONS AND IDENTIFICATION OF EACH COMPONENT.

ITEM SPECIAL - PLASTIC CAUTION TAPE

THE LOCATION OF UNDERGROUND FIBER OPTIC CABLE SHALL BE MARKED BY THE USE OF A CONTINUOUS IDENTIFYING TAPE BURIED IN THE TRENCH ABOVE THE LINE. THE IDENTIFYING TAPE SHALL BE AN INERT MATERIAL, APPROXIMATELY 75MM WIDE, COMPOSED OF POLYETHYLENE PLASTIC, HIGHLY RESISTANT TO ALKALIS, ACID OR OTHER CHEMICAL COMPOUNDS LIKELY TO BE ENCOUNTERED IN SOILS. THE TAPE SHALL BE ORANGE WITH IDENTIFYING PRINTING "CAUTION: FIBER OPTIC CABLE" IN BLACK LETTERS, ONE SIDE ONLY. TAPES SHALL BE SUPPLIED IN CONTINUOUS ROLLS WITH THE IDENTIFYING LETTERING REPEATED CONTINUOUSLY THE FULL LENGTH OF THE TAPE. IDENTIFYING TAPES SHALL BE BURIED IN THE TRENCH WITH ONE STRIP PLACED APPROXIMATELY DOWN THE CENTERLINE AND LOCATED APPROXIMATELY 300 mm BELOW THE FINAL FINISHED GRADE. THE TAPE SHALL BE PLACED IN THE TRENCH WITH PRINTED SIDE UP AND SHALL BE ESSENTIALLY PARALLEL WITH THE FINISHED SURFACE. THE CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO INSURE THAT THE TAPE IS NOT PULLED, DISTORTED, OR OTHERWISE MISPLACED IN COMPLETING THE TRENCH BACKFILL. TAPE SHALL BE ALLEN SYSTEM'S, TERRA TAPE, TECTA TAPE, OR EQUAL AS APPROVED BY THE ENGINEER.

THE TAPE SHALL BE PAID FOR PER FOOT OF "ITEM SPECIAL - PLASTIC CAUTION TAPE", COMPLETE AND IN PLACE.

CALCULATED

CHECKED

SIGNAL DESIGN
FRANTZ RD. @ BRADENTON AVE.

CITY OF DUBLIN

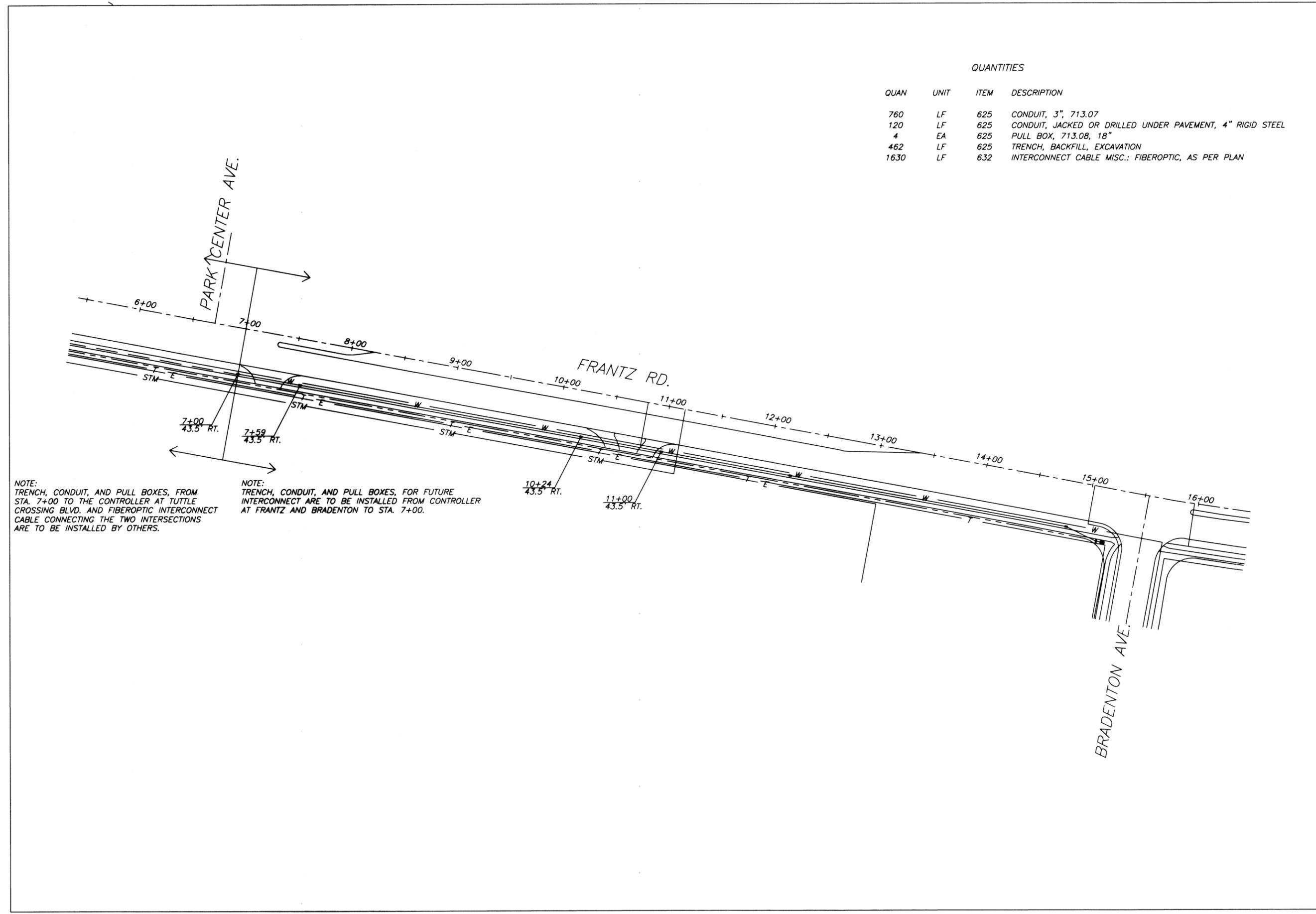
5
9

DRAWING NUMBER
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REVISION BY NUMBER/DATE
POSTION LINE OF PAPER ON THIS SHEET

DRAWING NUMBER
MICROFILMED
11-01
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REVISION BY NUMBER/DATE
POSTION LINE OF PAPER ON THIS SHEET

96-016-CIP
Signal
96-016-CIP
Page 6 of 9
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REVISION BY NUMBER/DATE
POSTION LINE OF PAPER ON THIS SHEET

DRAWING NUMBER
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REVISION BY NUMBER/DATE
POSTION LINE OF PAPER ON THIS SHEET



NOTE:
TRENCH, CONDUIT, AND PULL BOXES, FROM STA. 7+00 TO THE CONTROLLER AT TUTTLE CROSSING BLVD. AND FIBEROPTIC INTERCONNECT CABLE CONNECTING THE TWO INTERSECTIONS ARE TO BE INSTALLED BY OTHERS.

NOTE:
TRENCH, CONDUIT, AND PULL BOXES, FOR FUTURE INTERCONNECT ARE TO BE INSTALLED FROM CONTROLLER AT FRANTZ AND BRADENTON TO STA. 7+00.

QUANTITIES

QUAN	UNIT	ITEM	DESCRIPTION
760	LF	625	CONDUIT, 3", 713.07
120	LF	625	CONDUIT, JACKED OR DRILLED UNDER PAVEMENT, 4" RIGID STEEL
4	EA	625	PULL BOX, 713.08, 18"
462	LF	625	TRENCH, BACKFILL, EXCAVATION
1630	LF	632	INTERCONNECT CABLE MISC.: FIBEROPTIC, AS PER PLAN

CALCULATED
CHECKED

0 20 40 80
HORIZONTAL SCALE IN FEET

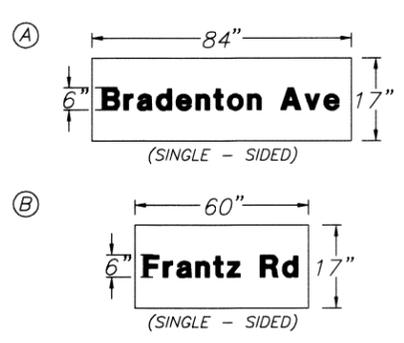
INTERCONNECT PLAN

CITY OF DUBLIN

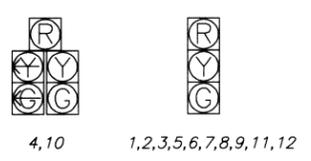
9 6

- LEGEND:**
- W — WATER LINE
 - G — GAS LINE
 - STM — STORM SEWER
 - SAN — SANITARY SEWER
 - UGT — UNDERGROUND TELEPHONE CABLE
 - C — CABLE LINE
 - C.B. — CATCH BASIN
 - ⊗ W.V. — WATER VALVE
 - ⊗ G.V. — GAS VALVE
 - ⊗ F.H. — FIRE HYDRANT
 - — POWER POLE
 - — LIGHT POLE
 - — TELEPHONE POLE
 - — CONTROLLER
 - — PULL BOX
 - — STRAIN POLE
 - 2" C — CONDUIT
 - ↕ — 3 SECTION SIGNAL HEAD
 - ↕ — 5 SECTION SIGNAL HEAD
 - ↕ — PEDESTRIAN SIGNAL
 - — RIGHT OF WAY

INTERNALLY ILLUMINATED STREET NAME SIGN LEGEND



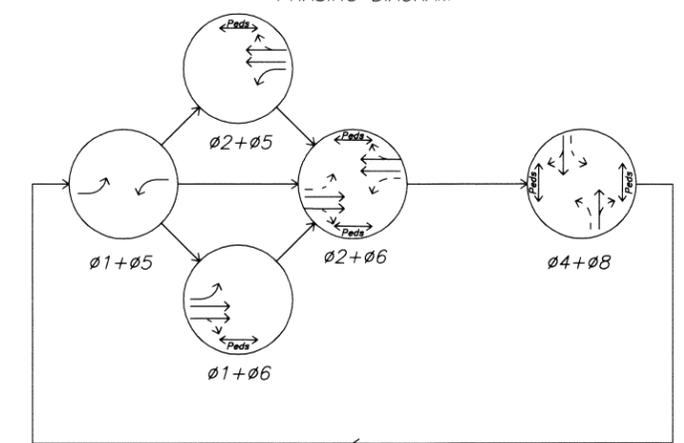
SIGNAL HEADS



PEDESTRIAN SIGNAL



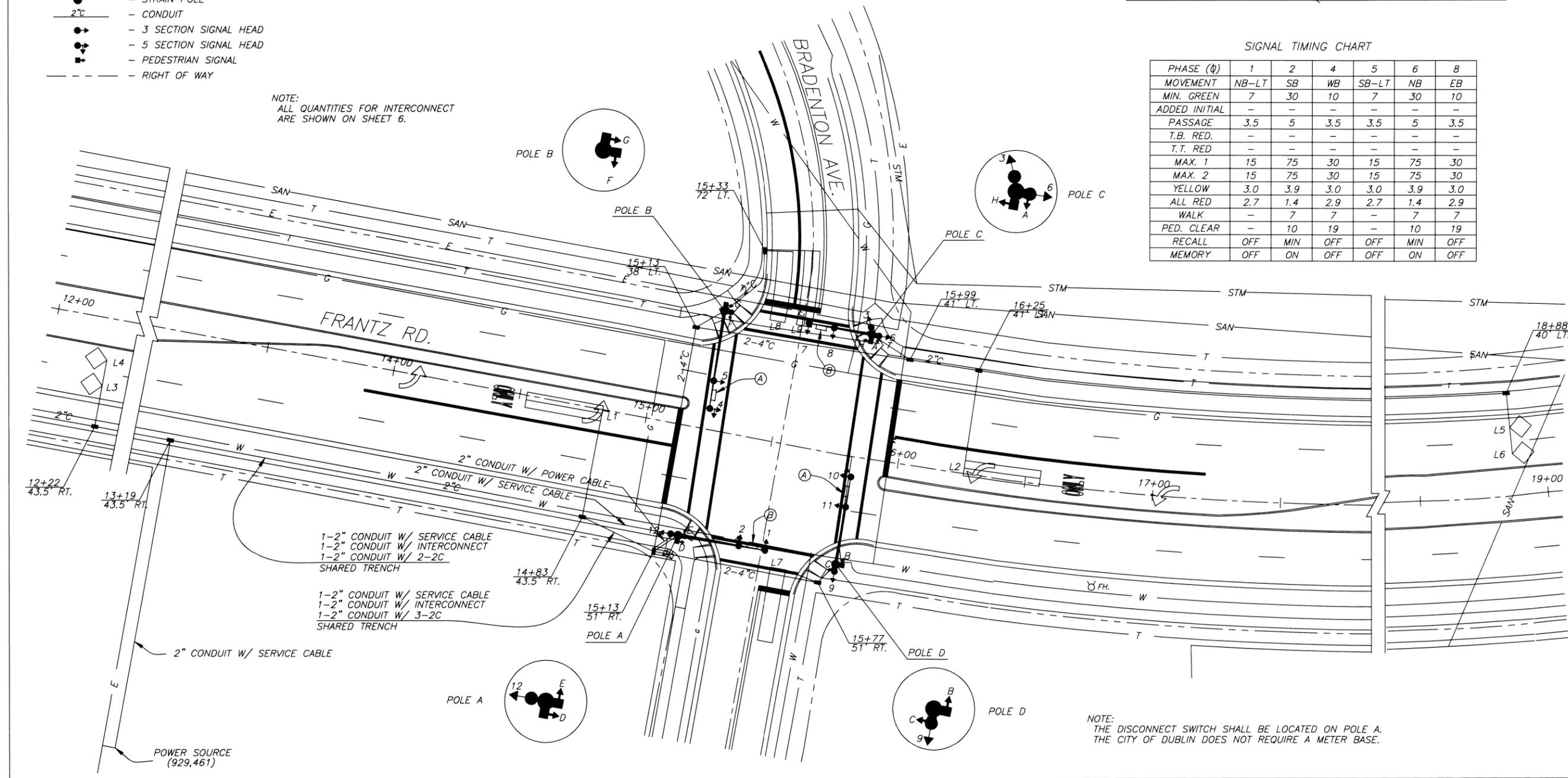
PHASING DIAGRAM



NOTE:
ALL QUANTITIES FOR INTERCONNECT ARE SHOWN ON SHEET 6.

SIGNAL TIMING CHART

PHASE (Q)	1	2	4	5	6	8
MOVEMENT	NB-LT	SB	WB	SB-LT	NB	EB
MIN. GREEN	7	30	10	7	30	10
ADDED INITIAL	-	-	-	-	-	-
PASSAGE	3.5	5	3.5	3.5	5	3.5
T.B. RED	-	-	-	-	-	-
T.T. RED	-	-	-	-	-	-
MAX. 1	15	75	30	15	75	30
MAX. 2	15	75	30	15	75	30
YELLOW	3.0	3.9	3.0	3.0	3.9	3.0
ALL RED	2.7	1.4	2.9	2.7	1.4	2.9
WALK	-	7	7	-	7	7
PED. CLEAR	-	10	19	-	10	19
RECALL	OFF	MIN	OFF	OFF	MIN	OFF
MEMORY	OFF	ON	OFF	OFF	ON	OFF



NOTE:
THE DISCONNECT SWITCH SHALL BE LOCATED ON POLE A.
THE CITY OF DUBLIN DOES NOT REQUIRE A METER BASE.

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIF.
RECORD BY NUMBER 07348
POSTER SIZE OF PAPER OR TITLE LINE

DRAWING NUMBER
MICROFILMED
11-01

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORD BY NUMBER 07348
POSTER SIZE OF PAPER OR TITLE LINE

96-016-CIP
Signal Road / Bradenton Avenue Traffic
City Index No. Page 9 of 9

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORD BY NUMBER 07348
POSTER SIZE OF PAPER OR TITLE LINE

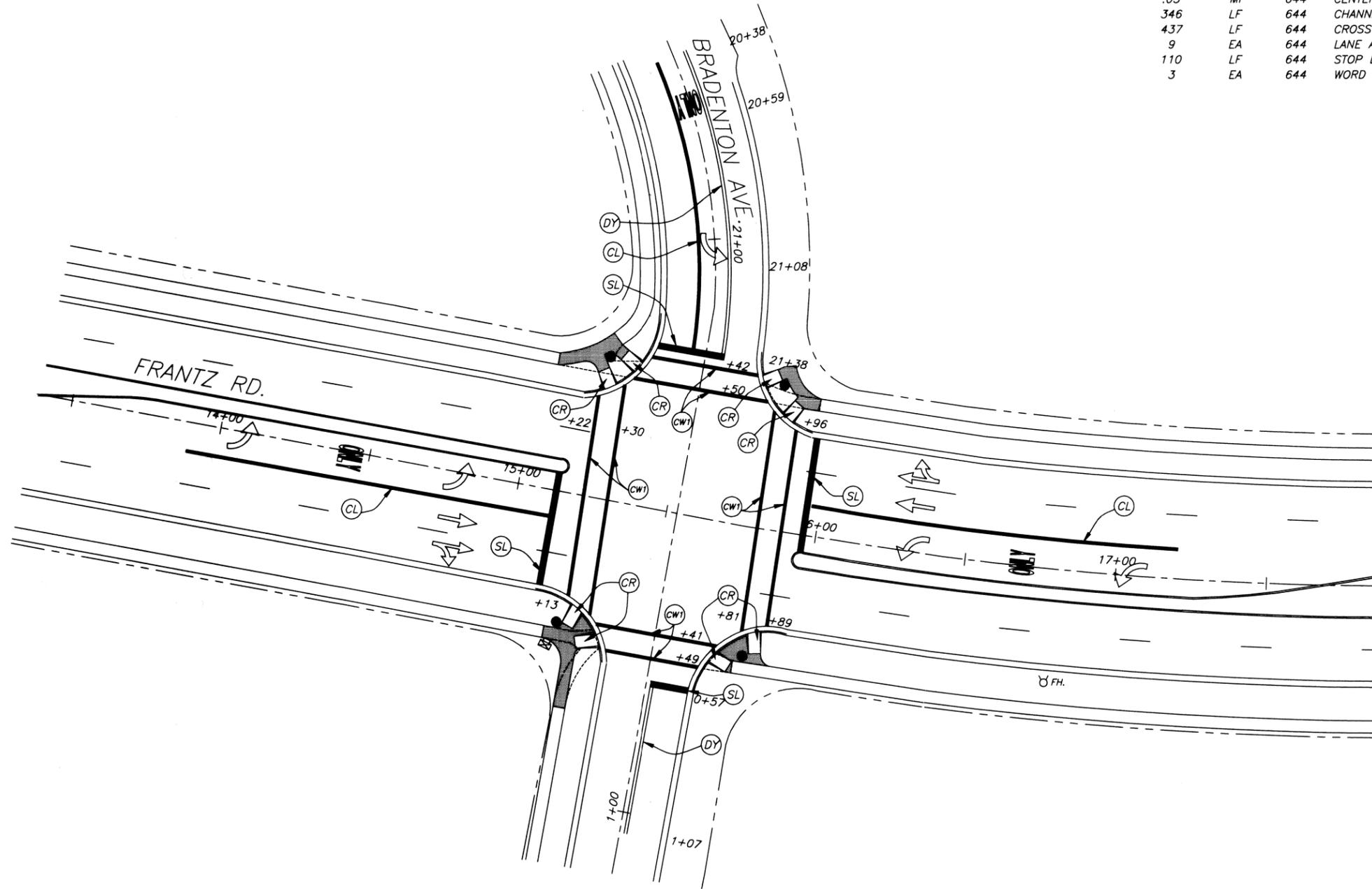
DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
RECORD BY NUMBER 07348
POSTER SIZE OF PAPER OR TITLE LINE

- (SL) - STOP LINE, 24"
- (CL) - CHANNELIZING LINE, 8"
- (DY) - CENTER LINE, 4"
- (CW1) - CROSSWALK LINE, 12"
- (CR) - NEW CURB RAMP
- ▬ - NEW SIDEWALK

QUANTITIES

QUAN	UNIT	ITEM	DESCRIPTION
472	SF	202	WALK REMOVED
461	SF	608	4" CONCRETE WALK
8	EA	608	CURB RAMP, AS PER PLAN
.03	MI	644	CENTER LINE
346	LF	644	CHANNELIZING LINE
437	LF	644	CROSSWALK LINE
9	EA	644	LANE ARROW
110	LF	644	STOP LINE
3	EA	644	WORD ON PAVEMENT, 72"



PAVEMENT MARKING AND SIGNING PLAN
FRANTZ RD. @ BRADENTON AVE.

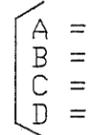
CITY OF DUBLIN

9 9

MAIN PANEL 33575G4

ASC/2-2100 CONTROLLER WITH:

- CONFIGURATION EEPROM: 32790C
- CONTROLLER I/O MODE: 0 TS1 COMPATIBLE
- SPECIAL SOFTWARE: FUNCTION
- OVERLAPS
 - IN EEPROM
 - KEYBOARD ENTERED
 - PGM. BOARD
- ANALOG TELEMETRY MODULE: 32825G1
- F/O TELEMETRY MODULE: 33525G1
- TEST INPUT A =
- TEST INPUT B =
- TEST INPUT C =



LEGEND

BIU	BUS INTERFACE UNIT
BU()	BIU C/C ()
CB()	CIRCUIT BREAKER ()
C/C	CONNECTING CABLE
CCA	CONTROLLER CABLE "A"
CCB	CONTROLLER CABLE "B"
CCC	CONTROLLER CABLE "C"
CL	CABINET LIGHT
CMA	CONFLICT MONITOR CABLE "A"
CMB	CONFLICT MONITOR CABLE "B"
CO	CONVENIENCE OUTLET
DCI	"D" CONNECTOR INTERFACE PANEL
DI()	DETECTOR RACK () INPUT PGM. BOARD
DO()	DETECTOR RACK () OUTPUT PGM. BOARD
DR()	DETECTOR RACK ()
DS()	DOOR SWITCH ()
EVP	EMERGENCY VEHICLE PREEMPTOR
FL()	FLASHER ()
FR()	FLASH TRANSFER RELAY ()
GB()	GROUND BUS ()
LPI	DETECTOR LOOP INTERFACE PANEL
LS()	LOAD SWITCH ()
MC	MERCURY CONTACTOR
MMA	MALFUNCTION MANAGEMENT UNIT CABLE "A"
MMB	MALFUNCTION MANAGEMENT UNIT CABLE "B"
MO	MODEM OUTLET
MP	MAIN PANEL
MT()	MASTER TELEMETRY C/C ()
PAP	POWER / AUXILIARY PANEL
PBI	PEDISTRIAN PUSH BUTTON ISOLATOR
PS	POWER SUPPLY
RIS	RADIO INTERFERENCE SUPPRESSOR
SA	SURGE ARRESTOR
SW()	SWITCH ()
TH	FAN THERMOSTAT
TID	TELEMETRY INTERFACE PANEL
TPB()	TEST PUSH BUTTON ()

MAIN PANEL PLUG-IN REQUIREMENTS

<input checked="" type="checkbox"/> LS1 VEH 1	<input checked="" type="checkbox"/> LS2 VEH 2	<input type="checkbox"/> LS3 VEH 3	<input checked="" type="checkbox"/> LS4 VEH 4	<input checked="" type="checkbox"/> LS5 VEH 5	<input checked="" type="checkbox"/> LS6 VEH 6	<input type="checkbox"/> LS7 VEH 7	<input type="checkbox"/> LS8 VEH 8	<input type="checkbox"/> FL1 1CKT	<input type="checkbox"/> FL2 1CKT
<input checked="" type="checkbox"/> LS9 PED 2	<input checked="" type="checkbox"/> LS10 PED 4	<input checked="" type="checkbox"/> LS11 PED 6	<input checked="" type="checkbox"/> LS12 PED 8	<input type="checkbox"/> LS13	<input type="checkbox"/> LS14	<input type="checkbox"/> LS15	<input type="checkbox"/> LS16	<input checked="" type="checkbox"/> 2CKT	<input type="checkbox"/> 2CKT
<input checked="" type="checkbox"/> FR1 L/R V1/V2	<input checked="" type="checkbox"/> FR2 L/R V3/V4	<input checked="" type="checkbox"/> FR3 L/R V5/V6	<input checked="" type="checkbox"/> FR4 L/R V7/V8	<input type="checkbox"/> FR5 NOT USED	<input type="checkbox"/> FR6 NOT USED	<input checked="" type="checkbox"/> K1 CMU SENSOR	<input checked="" type="checkbox"/> K2 +24V CONT.		

DENOTES TYPE OF OPERATION AND/OR WHERE PLUG-IN IS REQUIRED. L = LEFT, R = RIGHT.
 DENOTES WHERE "UNUSED RED" JUMPER PART NUMBER 32448G1 IS REQUIRED. INSTALL BETWEEN PINS 1 & 3 FOR LOAD SWITCH OR PINS 6 & 8 AND 5 & 7 FOR FLASH TRANSFER RELAY.

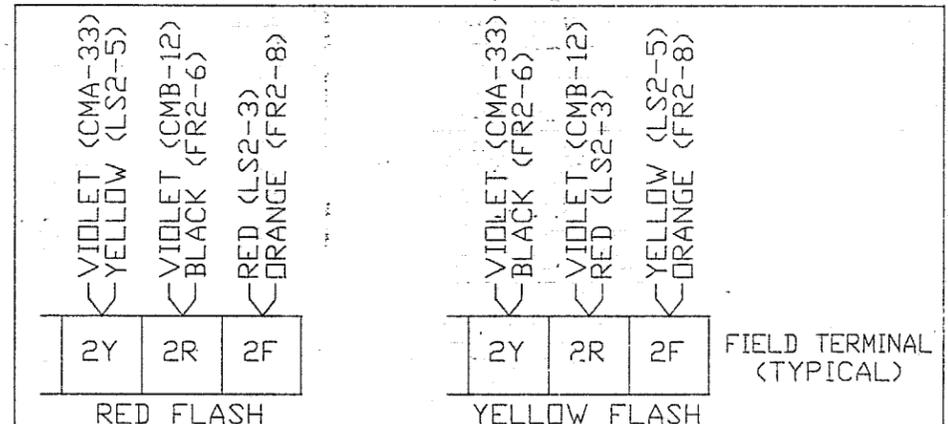
FLASH:
 Ø2&6 YELLOW, ALL OTHERS RED
 ALL RED.
 RELAYS DE-ENERGIZED FOR FLASH
 RELAYS ENERGIZED FOR FLASH
 CMU DISCONNECTED
 CMU DISCONNECTED & DOOR CLOSED

FLASHER

PIN	FUNCTION
7	CIRCUIT #1
8	CIRCUIT #2
9	CHASSIS GND
10	AC COMMON
11	115 VAC
12	

LOAD SWITCH

PIN	FUNCTION
1	115 VAC
2	CHASSIS GND
3	RED/DW OUTPUT
4	
5	YEL OUTPUT
6	RED/DW INPUT
7	GRN/W OUTPUT
8	YEL INPUT
9	+24 VDC
10	GRN/W INPUT
11	AC COMMON
12	



TO CHANGE FROM RED FLASH TO YELLOW FLASH:
 1. MOVE RED WIRE ON 2F-A TO 2R-A;
 2. MOVE BLACK WIRE ON 2R-A TO 2Y-A;
 3. MOVE YELLOW WIRE ON 2Y-A TO 2F-A.

TO CHANGE FROM YELLOW FLASH TO RED FLASH:
 1. MOVE YELLOW WIRE ON 2F-A TO 2Y-A;
 2. MOVE BLACK WIRE ON 2Y-A TO 2R-A;
 3. MOVE RED WIRE ON 2R-A TO 2F-A.

SHEET 1 OF 8

4 FOR "WIG-WAG" FLASH:
 MOVE JUMPER 159B-160B FROM 160B TO 158B,
 MOVE JUMPER 157B-158B FROM 158B TO 160B.

3 USE ONLY COPPER CONDUCTORS FOR FIELD AND SERVICE CONNECTIONS.

CONNECT A.C. SERVICE TO TERMINAL BLOCK 501 (HOT), 502 (NEUTRAL) AND GB2 (EARTH) ON RIGHT SIDEWALL OF CABINET.

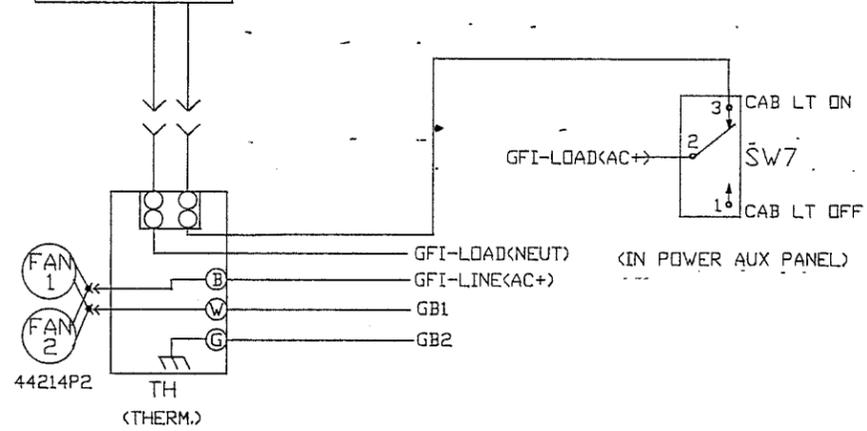
① INSTALL 2.2K, 10 WATT LOAD RESISTORS BETWEEN PINS 3 AND 11 ON LOAD SWITCHES 9, 10, 11 & 12.

NOTES: UNLESS SPECIFIED OTHERWISE

DESIGNER	DATE	ECONOLITE CONTROL PRODUCTS INC.	3360 EAST LA PALMA AVE. ANAHEIM, CALIFORNIA 92806	P.O. NO.
DRAWN	11-6-97		TRAFFIC CONTROL CORPORATION	1040 NORTH MAIN STREET LOMBARD, ILLINOIS 60148
G.V. T.C.C.				
CHECKED				FLASHER
INSPECTED				SW.PACKS
APPROVED		INTERSECTION FRANTZ RD. @ BRADENTON		
CONTRACT NO.	044205	INSTALLED BY	SALES ORDER NO.	SIZE
		Jess Howard Elect.		B
				DRAWING NO.
				REV.

CAB. LIGHT

- FL. 54396G8
- FL. 57451G1
- IN. 54329G1
- GN. 43316G1



FAN THERMOSTAT ASSY. 32644G3 (MODIFIED)

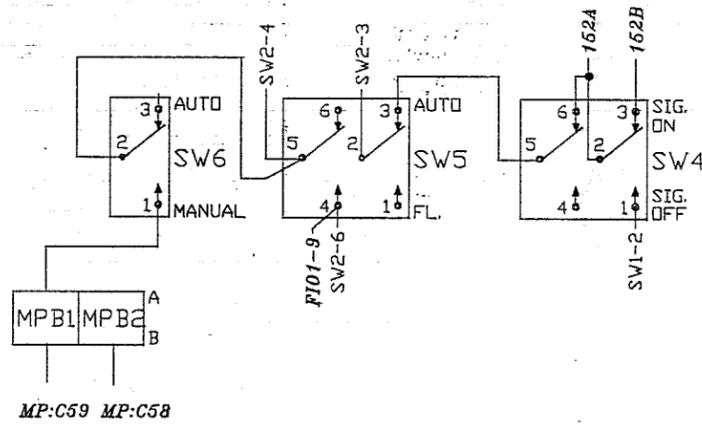
DS1



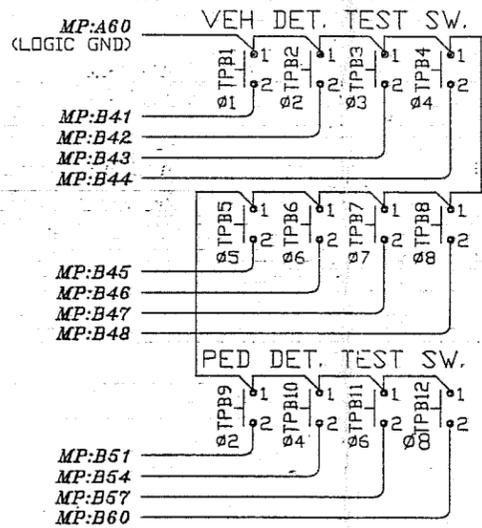
DOOR OPEN ALARM
55832P1

POLICE PANEL

PART OF 33555G3 (MODIFIED)

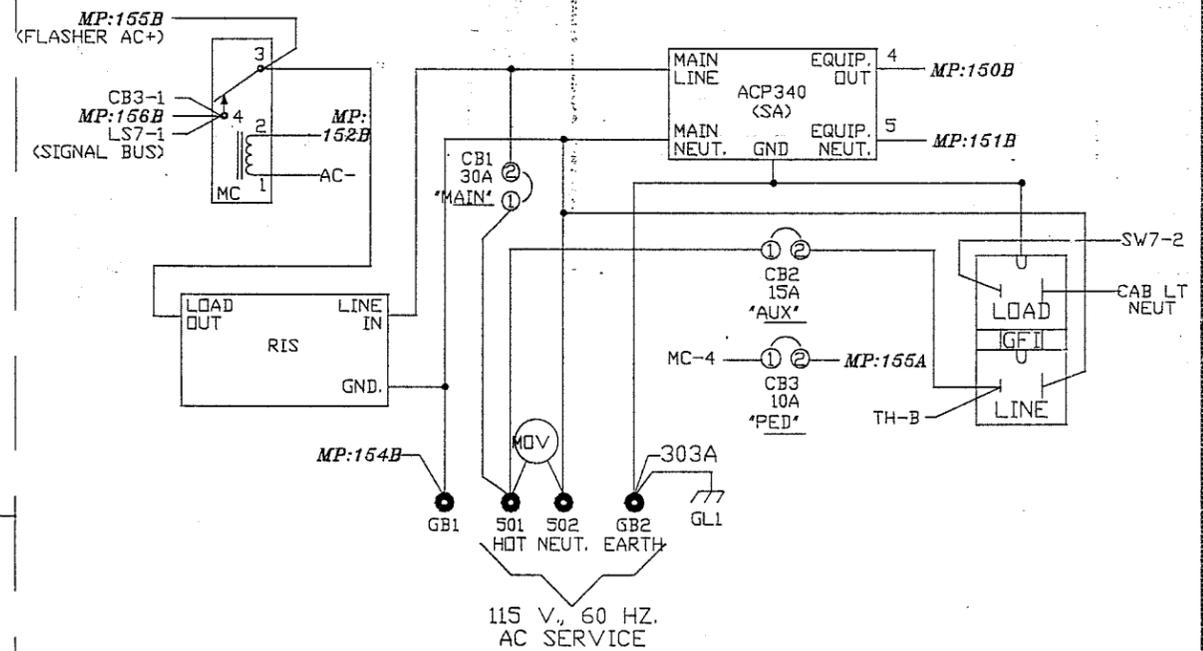


MP:C59 MP:C58



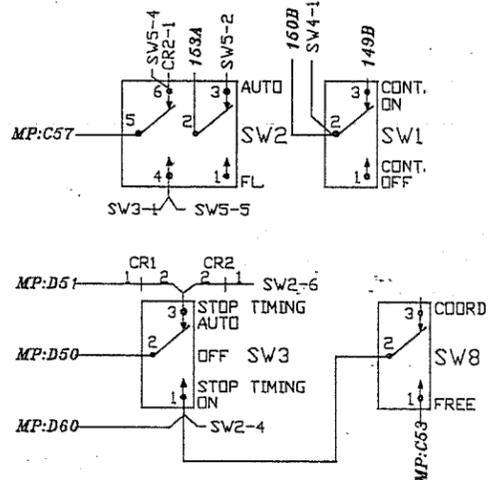
POWER/AUX PANEL (PAP)

33530G1 (MODIFIED)



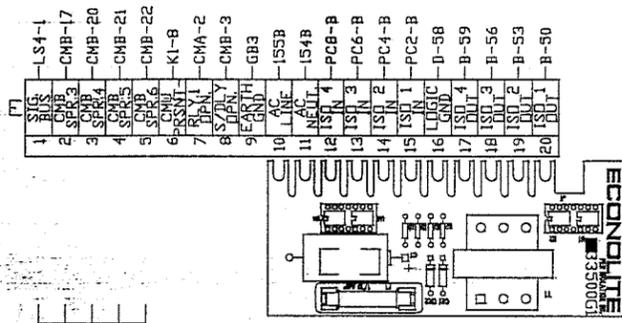
POWER PANEL

PART OF 33555G3

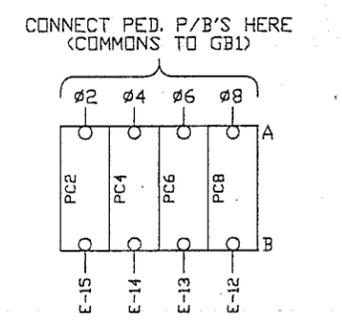
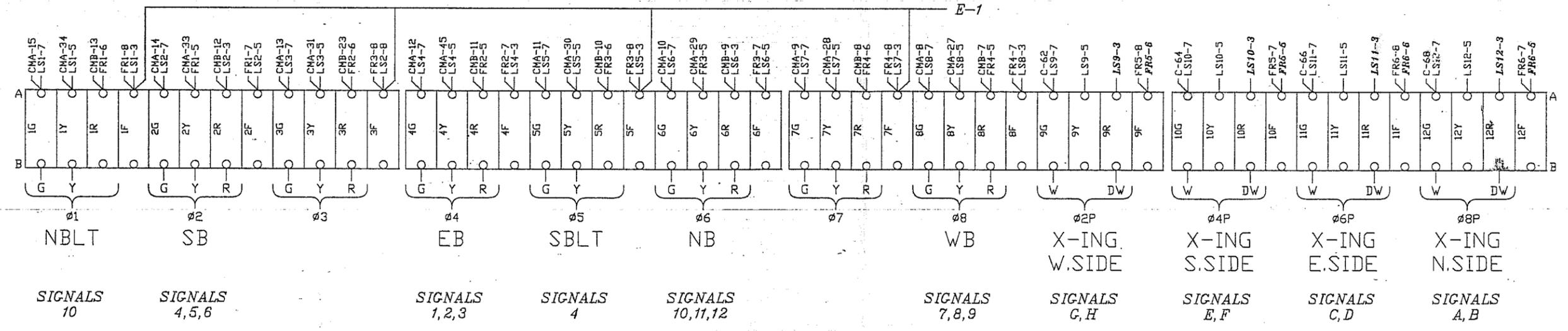
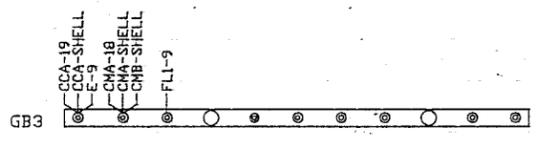
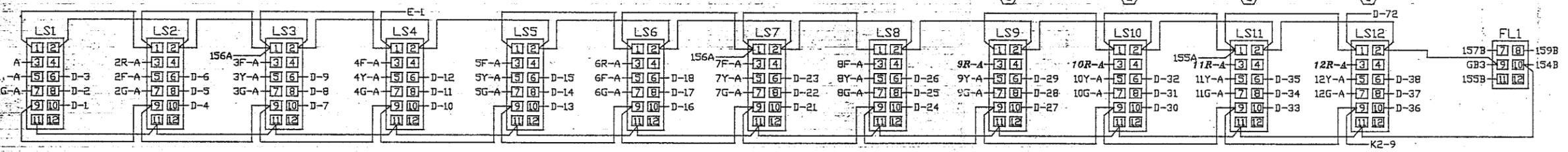
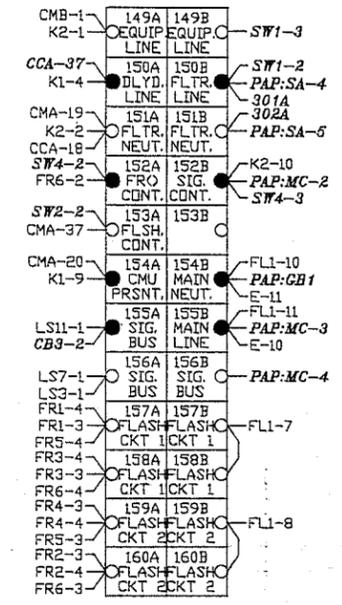
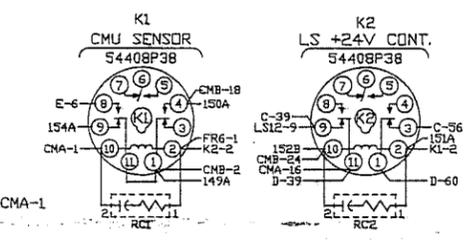
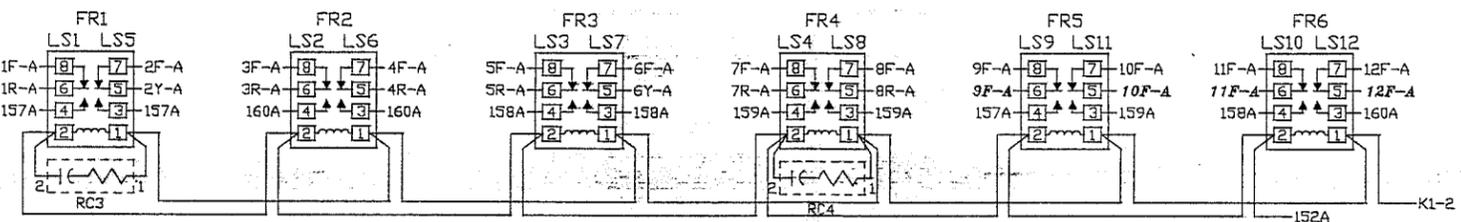


POLICE/AUX. SW. ASSY.
33555G3 (MODIFIED)

NOTE: SWITCHES ARE SHOWN IN THE NORMAL, NON-CONFLICT, OPERATIONAL POSITION.



NOTE: K1, K2 AND FR1 THRU FR6 ARE SHOWN ENERGIZED



CMU SPARES

FIELD TERMINALS

1	08	CHECK	CCC-53
2	07	CHECK	CCC-59
3	06	CHECK	CCC-49
4	05	CHECK	CCC-34
5	04	CHECK	CCB-10
6	03	CHECK	CCB-39
7	02	CHECK	CCA-27
8	01	CHECK	CCA-42
9	08	NEXT	CCC-55
10	07	NEXT	CCC-61
11	06	NEXT	CCC-51
12	05	NEXT	CCC-12
13	04	NEXT	CCB-29
14	03	NEXT	CCB-41
15	02	NEXT	CCB-3
16	01	NEXT	CCB-1
17	08	DN	CCC-54
18	07	DN	CCC-60
19	06	DN	CCC-50
20	05	DN	CCC-13

1	08	GRN	CCB-48
2	07	YEL	CCB-37
3	06	RED	CCB-38
4	05	GRN	CCB-54
5	04	YEL	CCB-49
6	03	RED	CCB-50
7	02	GRN	CCB-53
8	01	YEL	CCB-55
9	08	RED	CCB-51
10	07	GRN	CCB-44
11	06	YEL	CCB-52
12	05	RED	CCB-42
13	04	FLSH	CCA-21
14	03	BLA	CCA-50
15	02	BLB	CCA-39
16	01	BLC	CCA-22
17	08	RG2	CCC-1
18	07	RG2	CCC-2
19	06	RG2	CCC-26
20	05	RG2	CCC-26

1	01	GRN	CCA-40
2	01	YEL	CCA-23
3	01	RED	CCA-4
4	02	GRN	CCA-26
5	02	YEL	CCA-25
6	02	RED	CCA-6
7	03	GRN	CCB-4
8	03	YEL	CCB-5
9	03	RED	CCB-8
10	04	GRN	CCB-23
11	04	YEL	CCB-26
12	04	RED	CCB-12
13	05	GRN	CCC-32
14	05	YEL	CCC-9
15	05	RED	CCC-8
16	06	GRN	CCC-30
17	06	YEL	CCC-31
18	06	RED	CCC-7
19			
20			

1	LS1	GRN	
2	LS1	YEL	
3	LS1	RED	
4	LS2	GRN	
5	LS2	YEL	
6	LS2	RED	
7	LS3	GRN	
8	LS3	YEL	
9	LS3	RED	
10	LS4	GRN	
11	LS4	YEL	
12	LS4	RED	
13	LS5	GRN	
14	LS5	YEL	
15	LS5	RED	
16	LS6	GRN	
17	LS6	YEL	
18	LS6	RED	
19			
20			

B44 (DIODE)

21	04	DN	CCB-28
22	03	DN	CCB-40
23	02	DN	CCA-28
24	01	DN	CCA-51
25	08	PET	CCB-36
26	07	PET	CCB-35
27	06	PET	CCB-34
28	05	PET	CCB-17
29	04	PET	CCB-45
30	03	PET	CCB-33
31	02	PET	CCA-43
32	01	PET	CCA-52
33	08	DMT	CCC-40
34	07	DMT	CCC-39
35	06	DMT	CCC-38
36	05	DMT	CCC-36
37	04	DMT	CCB-30
38	03	DMT	CCB-15
39	02	DMT	CCB-16
40	01	DMT	CCB-18

21	RG1	CCA-32
22	RG2	CCC-22
23	RG1	CCA-14
24	RG2	CCC-24
25	RG1	CCA-54
26	RG2	CCB-47
27	RG1	CCA-45
28	RG2	CCC-42
29	RG1	CCA-44
30	RG2	CCC-43
31	RG1	CCA-53
32	RG2	CCB-19
33	RG1	CCA-33
34	RG2	CCA-35
35	RG1	CCA-47
36	RG2	CCA-49
37	RG1	CCA-36
38	RG2	CCA-48
39	RG1	CCA-17
40	RG2	CCA-17

21	07	GRN	DR1DR2J19-24
22	07	YEL	CCC-29
23	07	RED	CCC-5
24	08	GRN	DR1DR2J19-15
25	08	YEL	CCC-6
26	08	RED	DR1DR2J19-25
27	02	WLK	CCC-45
28	02	PEDCLR	CCC-28
29	02	D/VLK	CCC-4
30	04	WLK	CCA-9
31	04	PEDCLR	CCA-8
32	04	D/VLK	CCA-7
33	06	WLK	CCB-27
34	06	PEDCLR	CCB-8
35	06	D/VLK	CCB-9
36	08	WLK	CCC-58
37	08	PEDCLR	CCC-48
38	08	D/VLK	CCC-47
39	08	TEST	CCC-27
40	08	TEST	CCC-44

21	LS7	GRN	
22	LS7	YEL	
23	LS7	RED	
24	LS8	GRN	
25	LS8	YEL	
26	LS8	RED	
27	LS9	GRN	
28	LS9	YEL	
29	LS9	RED	
30	LS10	GRN	
31	LS10	YEL	
32	LS10	RED	
33	LS11	GRN	
34	LS11	YEL	
35	LS11	RED	
36	LS12	GRN	
37	LS12	YEL	
38	LS12	RED	
39	K2-11	SW3	
40	CCA-2	SW3-1	

41	08	HOLD	CCC-21
42	07	HOLD	CCC-52
43	06	HOLD	CCC-37
44	05	HOLD	CCC-35
45	04	HOLD	CCB-31
46	03	HOLD	CCB-32
47	02	HOLD	CCA-12
48	01	HOLD	CCA-31
49	08	PMT	CCB-2
50	07	PMT	CCB-20
51	06	PMT	CCB-21
52	05	PMT	CCB-43
53	04	COORD	CCB-46
54	03	TEST	CCC-25
55	02	MODE	CCA-38
56	01	LOGIC	CCA-38
57	08	MODE	CCA-46
58	07	LOGIC	CCA-56
59	06	MODE	CCA-60
60	05	LOGIC	CCA-55

41	VEH	CCA-29
42	VEH	CCA-10
43	VEH	CCB-13
44	VEH	CCB-11
45	VEH	CCC-14
46	VEH	CCC-16
47	VEH	CCC-19
48	VEH	CCC-41
49	VEH	CCA-30
50	ISD	E-20
51	ISD	CCA-11
52	ISD	CCB-14
53	ISD	E-19
54	ISD	CCB-12
55	ISD	CCC-15
56	ISD	E-18
57	ISD	CCC-17
58	ISD	CCC-18
59	ISD	E-17
60	ISD	CCC-20

41	01	WLK	CCA-41
42	01	PEDCLR	CCA-24
43	01	D/VLK	CCA-5
44	03	WLK	CCB-22
45	03	PEDCLR	CCB-23
46	03	D/VLK	CCB-24
47	05	WLK	CCC-33
48	05	PEDCLR	CCC-10
49	05	D/VLK	CCC-11
50	07	WLK	CCC-56
51	07	PEDCLR	CCC-57
52	07	D/VLK	CCC-46
53	COORD	SWB-1	
54	DOOR	DS1-1	
55	EXTR	CCA-15	
56	RESTART	K2-3	
57	LOCAL	SW2-5	
58	INT	MPB-2	
59	MAN	MPB-1	
60	LOGIC	DS1-2	

41	CMA	48	CMA-48
42	SPR	48	CMA-54
43	SPR	44	CMB-14
44	SPR	44	CMB-16
45	SPR	45	CMB-25
46	SPR	46	CMB-26
47	INTR	47	CMA-50
48	INTR	48	CMA-51
49	RY2	49	CMA-3
50	STOP	50	CCA-13
51	TIME	51	CCC-23
52	CMU	52	CMA-38
53	FAULT	53	CCA-1
54	MON	54	CMA-35
55	CMON	55	CCA-3
56	CMON	56	CMA-36
57	RESET	57	CMA-49
58	SPR	58	CMA-55
59	LOGIC	59	CMA-21
60	LOGIC	60	CMA-17

61	CH	1	GMA-47
62	CH	2	GMA-46
63	CH	3	GMA-32
64	CH	4	GMA-53
65	CH	5	GMA-44
66	CH	6	GMA-52
67	CH	7	GMA-43
68	CH	8	GMA-42
69	CH	9	GMA-41
70	CH	10	GMA-24
71	CH	11	GMA-40
72	CH	12	GMA-39

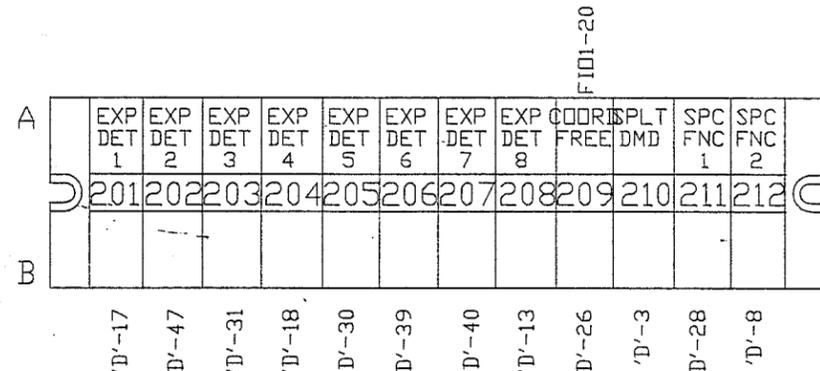
61	CH	9	GMA-47
62	CH	9	GMA-46
63	CH	9	GMA-32
64	CH	10	GMA-53
65	CH	10	GMA-44
66	CH	10	GMA-52
67	CH	11	GMA-43
68	CH	11	GMA-42
69	CH	11	GMA-41
70	CH	12	GMA-24
71	CH	12	GMA-40
72	CH	12	GMA-39

CONTROLLER INTERFACE TERMINALS

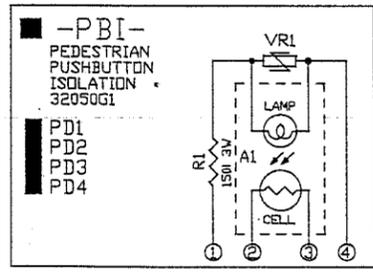
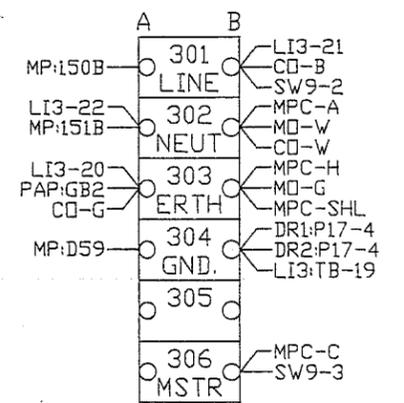
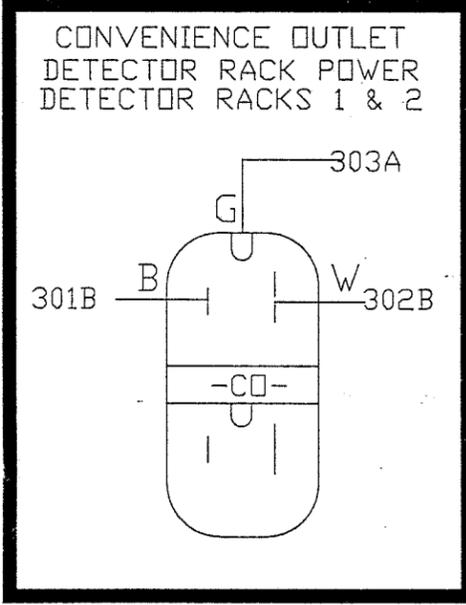
CONNECTOR LIST FOR ASC/2-2XXX CONTROLLER

CONNECTOR "A" (CCA)				CONNECTOR "B" (CCB)				CONNECTOR "C" (CCC)			
PIN	WIRE	FUNCTION	TO	PIN	WIRE	FUNCTION	TO	PIN	WIRE	FUNCTION	TO
A	A-1	FAULT MONITOR	D-52	A	B-1	Ø1 NEXT	A-16	A	C-1	STATUS BIT A (2)	B-17
B	A-2	+24VDC EXTERNAL	D-40	B	B-2	PREEMPT DET. 2	A-49	B	C-2	STATUS BIT B (2)	B-18
C	A-3	VOLTAGE MONITOR	D-54	C	B-3	Ø2 NEXT	A-15	C	C-3	Ø8 DON'T WALK	C-38
D	A-4	Ø1 RED	C-3	D	B-4	Ø3 GREEN	C-7	D	C-4	Ø8 RED	C-26
E	A-5	Ø1 DON'T WALK	C-43	E	B-5	Ø3 YELLOW	C-8	E	C-5	Ø7 YELLOW	C-22
F	A-6	Ø2 RED	C-6	F	B-6	Ø3 RED	C-9	F	C-6	Ø7 RED	C-23
G	A-7	Ø2 DON'T WALK	C-29	G	B-7	Ø4 RED	C-12	G	C-7	Ø6 RED	C-18
H	A-8	Ø2 PED CLEAR	C-28	H	B-8	Ø4 PED CLEAR	C-31	H	C-8	Ø5 RED	C-15
J	A-9	Ø2 WALK	C-27	J	B-9	Ø4 DON'T WALK	C-32	J	C-9	Ø5 YELLOW	C-14
K	A-10	VEH. DETECTOR 2	B-42	K	B-10	Ø4 CHECK	A-51	K	C-10	Ø5 PED CLEAR	C-48
L	A-11	PED. DETECTOR 2	B-51	L	B-11	VEH. DETECTOR 4	B-44	L	C-11	Ø5 DON'T WALK	C-49
M	A-12	Ø2 HOLD	A-47	M	B-12	PED. DETECTOR 4	B-54	M	C-12	Ø5 NEXT	A-12
N	A-13	STOP TIME (1)	D-50	N	B-13	VEH. DETECTOR 3	B-43	N	C-13	Ø5 ON	A-20
P	A-14	INH. MAX. TERM.(1)	B-23	P	B-14	PED. DETECTOR 3	B-52	P	C-14	VEH. DETECTOR 5	B-45
R	A-15	EXTERNAL START	C-55	R	B-15	Ø3 OMIT	A-38	R	C-15	PED. DETECTOR 5	B-55
S	A-16	INTERVAL ADVANCE	C-58	S	B-16	Ø2 OMIT	A-39	S	C-16	VEH. DETECTOR 6	B-46
T	A-17	IND. LAMP CONT.	B-39	T	B-17	Ø5 PED OMIT	A-28	T	C-17	PED. DETECTOR 6	B-57
U	A-18	AC NEUTRAL (AC-)	151A	U	B-18	Ø1 OMIT	A-40	U	C-18	PED. DETECTOR 7	B-58
V	A-19	EARTH GROUND	GB3	V	B-19	PED RECYCLE (2)	B-32	V	C-19	VEH. DETECTOR 7	B-47
W	A-20	LOGIC GROUND	A-60	W	B-20	PREEMPT 4 DET.	A-50	W	C-20	PED. DETECTOR 8	B-60
X	A-21	FL. LOGIC OUT	B-13	X	B-21	PREEMPT 5 DET.	A-51	X	C-21	Ø8 HOLD	A-41
Y	A-22	STATUS BIT C (1)	B-16	Y	B-22	Ø3 WALK	C-44	Y	C-22	FORCE OFF (2)	B-22
Z	A-23	Ø1 YELLOW	C-2	Z	B-23	Ø3 PED CLEAR	C-45	Z	C-23	STOP TIME (2)	D-50
a	A-24	Ø1 PED CLEAR	C-42	a	B-24	Ø3 DON'T WALK	C-46	a	C-24	INH. MAX. TERM.(2)	B-24
b	A-25	Ø2 YELLOW	C-5	b	B-25	Ø4 GREEN	C-10	b	C-25	TEST INPUT C	A-54
c	A-26	Ø2 GREEN	C-4	c	B-26	Ø4 YELLOW	C-11	c	C-26	STATUS BIT C (2)	B-19
d	A-27	Ø2 CHECK	A-7	d	B-27	Ø4 WALK	C-30	d	C-27	Ø8 WALK	C-36
e	A-28	Ø2 ON	A-23	e	B-28	Ø4 ON	A-21	e	C-28	Ø8 YELLOW	C-25
f	A-29	VEH. DETECTOR 1	B-41	f	B-29	Ø4 NEXT	A-13	f	C-29	Ø7 GREEN	C-21
g	A-30	PED. DETECTOR 1	B-49	g	B-30	Ø4 OMIT	A-37	g	C-30	Ø6 GREEN	C-16
h	A-31	Ø8 HOLD	A-48	h	B-31	Ø4 HOLD	A-45	h	C-31	Ø6 YELLOW	C-17
i	A-32	FORCE OFF (1)	B-21	i	B-32	Ø3 HOLD	A-46	i	C-32	Ø5 GREEN	C-13
j	A-33	EXT. MIN. RECALL	B-33	j	B-33	Ø3 PED OMIT	A-30	j	C-33	Ø5 WALK	C-47
k	A-34	MAN. CONT. ENABLE	C-59	k	B-34	Ø6 PED OMIT	A-27	k	C-34	Ø5 CHECK	A-4
m	A-35	CALL NON-ACT I	B-34	m	B-35	Ø7 PED OMIT	A-26	m	C-35	Ø5 HOLD	A-44
n	A-36	TEST INPUT A	B-37	n	B-36	Ø8 PED OMIT	A-25	n	C-36	Ø5 OMIT	A-36
p	A-37	AC LINE (AC+)	150A	p	B-37	Ø/L A YELLOW	B-2	p	C-37	Ø6 HOLD	A-35
q	A-38	I/O MODE BIT A	A-55	q	B-38	Ø/L A RED	B-3	q	C-38	Ø6 OMIT	A-35
r	A-39	STATUS BIT B (1)	B-15	r	B-39	Ø3 CHECK	A-6	r	C-39	Ø7 OMIT	A-34
s	A-40	Ø1 GREEN	C-1	s	B-40	Ø3 ON	A-22	s	C-40	Ø8 OMIT	A-33
t	A-41	Ø1 WALK	C-41	t	B-41	Ø3 NEXT	A-14	t	C-41	VEH. DETECTOR 8	B-48
u	A-42	Ø1 CHECK	A-8	u	B-42	Ø/L D RED	B-12	u	C-42	RED REST MODE (2)	B-28
v	A-43	Ø2 PED OMIT	A-30	v	B-43	PREEMPT 6 DET.	A-52	v	C-43	ØMIT RED CLR. (2)	B-30
w	A-44	ØMIT RED CLR. (1)	B-29	w	B-44	Ø/L D GREEN	B-10	w	C-44	Ø8 PED CLEAR	C-37
x	A-45	RED REST (1)	B-27	x	B-45	Ø4 PED OMIT	A-29	x	C-45	Ø8 GREEN	C-24
y	A-46	I/O MODE BIT B	A-57	y	B-46	FREE (NO COORD)	A-53	y	C-46	Ø7 DON'T WALK	C-52
z	A-47	CALL NON-ACT II	B-35	z	B-47	MAX. II SELECT (2)	B-26	z	C-47	Ø6 DON'T WALK	C-35
AA	A-48	TEST INPUT B	B-38	AA	B-48	Ø/L A GREEN	B-1	AA	C-48	Ø6 PED CLEAR	C-34
BB	A-49	WALK REST MOD.	B-36	BB	B-49	Ø/L B YELLOW	B-5	BB	C-49	Ø6 CHECK	A-3
CC	A-50	STATUS BIT A (1)	B-14	CC	B-50	Ø/L B RED	B-6	CC	C-50	Ø6 ON	A-19
DD	A-51	Ø1 ON	A-24	DD	B-51	Ø/L C RED	B-9	DD	C-51	Ø6 NEXT	A-11
EE	A-52	Ø1 PED OMIT	A-32	EE	B-52	Ø/L D YELLOW	B-11	EE	C-52	Ø7 HOLD	A-42
FF	A-53	PED RECYCLE (1)	B-31	FF	B-53	Ø/L C GREEN	B-7	FF	C-53	Ø8 CHECK	A-1
GG	A-54	MAX. II SELECT (1)	B-25	GG	B-54	Ø/L B GREEN	B-4	GG	C-54	Ø8 ON	A-17
HH	A-55	I/O MODE BIT C	A-59	HH	B-55	Ø/L C YELLOW	B-8	HH	C-55	Ø8 NEXT	A-9
AA	A-56	SHELL-CHASSIS GND	GB3					JJC	C-56	Ø7 WALK	C-50
								KKC	C-57	Ø7 PED CLEAR	C-51
								LLC	C-58	Ø6 WALK	C-33
								MMC	C-59	Ø7 CHECK	A-2
								NNC	C-60	Ø7 ON	A-18
								PPC	C-61	Ø7 NEXT	A-10

NOTE: *MODE INPUT/OUTPUT FUNCTIONS ARE DEPENDENT ON THE I/O MODE BIT INPUTS. REFER TO NEMA TS2 -1992 SECTION 3.5.5.5 FOR THE DEFINED FUNCTIONS.



ASC CONTROLLER CABLE "D"			
C/C 32231G61 (MODIFIED)			
PIN	FUNCTION	IN	OUT
212	27 COORD STATUS		DC
	8 NIC SPECIAL FUNCTION 2		DC
	36 SYSTEM COMMAND INPUT OFFSET BIT 3		DC
	9 CMU STOP TIME		DC
	15 SYSTEM COMMAND INPUT SPLIT BIT 2		DC
	35 SYSTEM COMMAND INPUT OFFSET BIT 1		DC
	11 NIC SPECIAL FUNCTION 4		DC
	60 REMOTE FLASH		DC
	47 PREEMPTOR CALL 1		DC
209	19 COORD FREE		DC
202	47 EXPANDED DETECTOR 2		DC
	19 TEST INPUT E		DC
	21 SYSTEM COMMAND OUTPUT SPLIT BIT 1		DC
	22 PREEMPTOR 1 ACTIVE		DC
	46 SYSTEM COMMAND OUTPUT SPLIT BIT 2		DC
204	18 EXPANDED DETECTOR 4		DC
	41 SPARE OUTPUT 4		DC
	43 SYSTEM COMMAND OUTPUT CYCLE BIT 1		DC
	23 PREEMPTOR 3 ACTIVE		DC
	46 SYSTEM COMMAND OUTPUT OFFSET BIT 1		DC
206	39 EXPANDED DETECTOR 6		DC
	51 SPARE OUTPUT 6		DC
	42 SYSTEM COMMAND OUTPUT OFFSET BIT 2		DC
	17 PREEMPTOR 5 ACTIVE		DC
	37 TEST INPUT 3		DC
208	13 EXPANDED DETECTOR 8		DC
	54 SPARE OUTPUT 8		DC
	56 PREEMPTOR CALL 5		DC
	50 PREEMPTOR CALL 2		DC
	9 CROSS STREET SYNC		DC
211	28 NIC SPECIAL FUNCTION 1		DC
	4 SYSTEM COMMAND INPUT COORD SYNC		DC
	16 SYSTEM COMMAND INPUT SPLIT BIT 1		DC
	10 SYSTEM COMMAND INPUT SPLIT BIT 2		DC
	24 NIC SPECIAL FUNCTION 3		DC
	6 SYSTEM COMMAND INPUT CYCLE BIT 3		DC
	59 PREEMPTOR / CMU INTERLOCK		DC
	25 SYSTEM COMMAND INPUT CYCLE BIT 1		DC
201	17 EXPANDED DETECTOR 1		DC
210	14 SPLIT DEMAND		DC
	14 TIME RESET		DC
	49 PREEMPTOR CALL 2		DC
	15 DUAL COORD		DC
203	15 PREEMPTOR FLASH CONTROL		DC
	31 EXPANDED DETECTOR 3		DC
	53 SYSTEM COMMAND SYNC OUTPUT		DC
	32 PREEMPTOR 2 ACTIVE		DC
	44 SYSTEM COMMAND OUTPUT CYCLE BIT 2		DC
	49 SPARE OUTPUT 5		DC
205	30 EXPANDED DETECTOR 5		DC
	29 SYSTEM COMMAND OUTPUT CYCLE BIT 3		DC
	34 PREEMPTOR 4 ACTIVE		DC
	2 SYSTEM COMMAND OUTPUT OFFSET BIT 3		DC
	52 SPARE OUTPUT 7		DC
207	40 TEST INPUT C		DC
	20 PREEMPTOR 6 ACTIVE		DC
	48 PREEMPTOR CALL 6		DC
	55 PREEMPTOR CALL 4		DC



CONTROLLER CONNECTING CABLES

WIRE LIST FOR NEMA CONFLICT MONITOR UNIT

CONNECTOR "A" (CMA)					CONNECTOR "B" (CMB)				
PIN	WIRE	MON. FUNCTION	TO	SIG. FUNCTION	PIN	WIRE	MON. FUNCTION	TO	SIG. FUNCTION
A	A-1	AC+ I INPUT	K1-10	CMU SENSOR	A	B-1	AC+ II INPUT	149A	CMU POWER
B	A-2	OUT RLY 1 OPEN	E-7		B	B-2	S. DLY RLY COMM.	K1-1	AC+ CTRL
C	A-3	OUT RLY 2 CLSD	D-49		C	B-3	S. DLY RLY OPEN	E-8	
D	A-4	CH. 12 GREEN	D-70		D	B-4	CH. 12 RED	D-72	
E	A-5	CH. 11 GREEN	D-67		E	B-5	CH. 11 RED	D-69	
F	A-6	CH. 10 GREEN	D-64		F	B-6	CH. 9 RED	D-63	
G	A-7	CH. 9 GREEN	D-61		G	B-7	CH. 8 RED	8R-A	Ø8 RED
H	A-8	CH. 8 GREEN	8G-A	Ø8 GRN	H	B-8	CH. 7 RED	7R-A	Ø7 RED
J	A-9	CH. 7 GREEN	7G-A	Ø7 GRN	J	B-9	CH. 6 RED	6R-A	Ø6 RED
K	A-10	CH. 6 GREEN	6G-A	Ø6 GRN	K	B-10	CH. 5 RED	5R-A	Ø5 RED
L	A-11	CH. 5 GREEN	5G-A	Ø5 GRN	L	B-11	CH. 4 RED	4R-A	Ø4 RED
M	A-12	CH. 4 GREEN	4G-A	Ø4 GRN	M	B-12	CH. 2 RED	2R-A	Ø2 RED
N	A-13	CH. 3 GREEN	3G-A	Ø3 GRN	N	B-13	CH. 1 RED	1R-A	Ø1 RED
P	A-14	CH. 2 GREEN	2G-A	Ø2 GRN	P	B-14	(SPARE 1)	D-43	
R	A-15	CH. 1 GREEN	1G-A	Ø1 GRN	R	B-15	+24V MONITOR II	C-40	
S	A-16	+24V MON. I	K2-11	LS +24V MON.	S	B-16	(SPARE 2)	D-44	
T	A-17	LOGIC GND	D-59	LOGIC GND	T	B-17	(SPARE 3)	E-2	
U	A-18	CHASSIS GND	GB3	EARTH GND.	U	B-18	S. DLY RLY CLSD	K1-4	CONT. POWER
V	A-19	AC- (COMMON)	151A	AC NEUTRAL	V	B-19	CH. 10 RED	D-66	
W	A-20	OUT RLY 1 COM.	154A	SIG BUS CONT	W	B-20	(SPARE 4)	E-3	
X	A-21	OUT RLY 2 COM.	D-58	LOGIC GND	X	B-21	(SPARE 5)	E-4	
Y	A-22	CH. 12 YELLOW	D-71		Y	B-22	(SPARE 6)	E-5	
Z	A-23	CH. 11 YELLOW	D-68		Z	B-23	CH. 3 RED	3R-A	Ø3 RED
a	A-24	CH. 10 WALK	C-70		a	B-24	RED ENABLE	K2-10	SIG. BUSS
b	A-25	CH. 10 YELLOW	D-65		b	B-25	(SPARE 7)	D-45	
c	A-26	CH. 9 YELLOW	D-62		c	B-26	(SPARE 8)	D-46	
d	A-27	CH. 8 YELLOW	8Y-A	Ø8 YEL		B-27	SHELL GROUND	GB3	EARTH GND.
e	A-28	CH. 7 YELLOW	7Y-A	Ø7 YEL					
f	A-29	CH. 6 YELLOW	6Y-A	Ø6 YEL					
g	A-30	CH. 5 YELLOW	5Y-A	Ø5 YEL					
h	A-31	CH. 3 YELLOW	3Y-A	Ø3 YEL					
i	A-32	CH. 3 WALK	C-63						
j	A-33	CH. 2 YELLOW	2Y-A	Ø2 YEL					
k	A-34	CH. 1 YELLOW	1Y-A	Ø1 YEL					
m	A-35	CONT. VOLT. MON.	D-53	VOLT. MON.					
n	A-36	+24V MON. INH.	D-55						
p	A-37	OUT RLY 1 CLSD	153A						
q	A-38	OUT RLY 2 OPEN	D-51	STOP TIME					
r	A-39	CH. 12 WALK	C-72						
s	A-40	CH. 11 WALK	C-71						
t	A-41	CH. 9 WALK	C-69						
u	A-42	CH. 8 WALK	C-68	Ø8 WALK					
v	A-43	CH. 7 WALK	C-67						
w	A-44	CH. 5 WALK	C-65						
x	A-45	CH. 4 YELLOW	4Y-A	Ø4 YEL					
y	A-46	CH. 2 WALK	C-62	Ø2 WALK					
z	A-47	CH. 1 WALK	C-61						
AA	A-48	(SPARE 1)	D-41						
BB	A-49	RESET	D-56	DISCONNECTED					
CC	A-50	CAB. INTLK A	D-47						
DD	A-51	CAB. INTLK B	D-48						
EE	A-52	CH. 6 WALK	C-66	Ø6 WALK					
FF	A-53	CH. 4 WALK	C-64	Ø4 WALK					
GG	A-54	(SPARE 2)	D-42						
HH	A-55	(SPARE 3)	D-57						
	A-56	SHELL GND	GB3	EARTH GND.					

NOTES FOR 12CH CONFLICT MONITOR

- (1) RELAY CONTACT POSITIONS SPECIFIED ARE FOR NON-CONFLICT MODE.
- (2) TO PROGRAM CONFLICT MONITOR, SOLDER JUMPERS IN PROGRAMMING CARD FOR ALL PERMISSABLE PHASE MOVEMENTS.

CMU CHANNEL ASSIGNMENTS

CH. 1 =	L/S 1 =	VEH. 1
CH. 2 =	L/S 2,9 =	VEH. 2,PED 2
CH. 3 =	L/S 3 =	VEH. 3
CH. 4 =	L/S 4,10 =	VEH. 4,PED 4
CH. 5 =	L/S 5 =	VEH. 5
CH. 6 =	L/S 6,11 =	VEH. 6,PED 6
CH. 7 =	L/S 7 =	VEH. 7
CH. 8 =	L/S 8,12 =	VEH. 8,PED 8
CH. 9 =		
CH. 10 =		
CH. 11 =		
CH. 12 =		

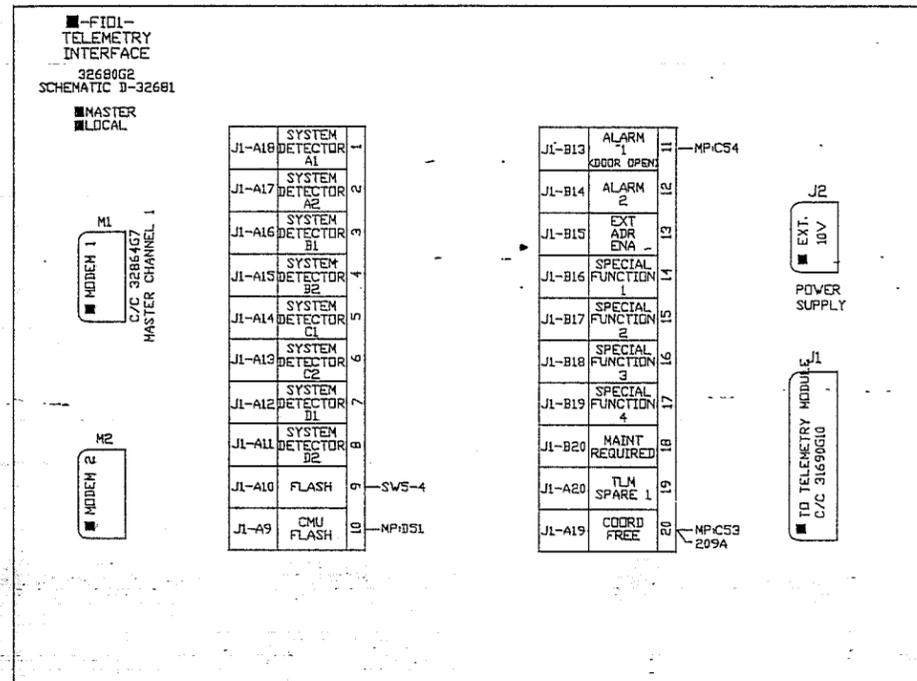
CONFLICT MONITOR
PROGRAMMING INSTRUCTIONS
CHANNEL-INPUT ASSIGNMENTS

CHANNEL 01 = L/S 1	CHANNEL 07 = L/S 7
CHANNEL 02 = L/S 2&9	CHANNEL 08 = L/S 8&12
CHANNEL 03 = L/S 3	CHANNEL 09 = N/U
CHANNEL 04 = L/S 4&10	CHANNEL 10 = N/U
CHANNEL 05 = L/S 5	CHANNEL 11 = N/U
CHANNEL 06 = L/S 6&11	CHANNEL 12 = N/U

CHANNEL-INPUT COMBINATIONS NOT JUMPERED CONSTITUTE CONFLICTING MOVEMENTS. TO PROGRAM: JUMPER PERMISSIVE COMBINATIONS AS SHOWN BELOW.

01	02	03	04	05	06	07	08	09	10	11
02	03	04	05	06	07	08	09	10	11	12
01	02	03	04	05	06	07	08	09	10	11
03	04	05	06	07	08	09	10	11	12	
01	02	03	04	05	06	07	08	09	10	11
04	05	06	07	08	09	10	11	12		
01	02	03	04	05	06	07	08	09	10	11
05	06	07	08	09	10	11	12			
01	02	03	04	05	06	07	08	09	10	11
06	07	08	09	10	11	12				
01	02	03	04	05	06	07	08	09	10	11
07	08	09	10	11	12					
01	02	03	04	05	06	07	08	09	10	11
08	09	10	11	12						
01	02	03	04	05	06	07	08	09	10	11
09	10	11	12							
01	02	03	04	05	06	07	08	09	10	11
10	11	12								
01	02	03	04	05	06	07	08	09	10	11
11	12									
01	02	03	04	05	06	07	08	09	10	11
12										

CONFLICT MONITOR

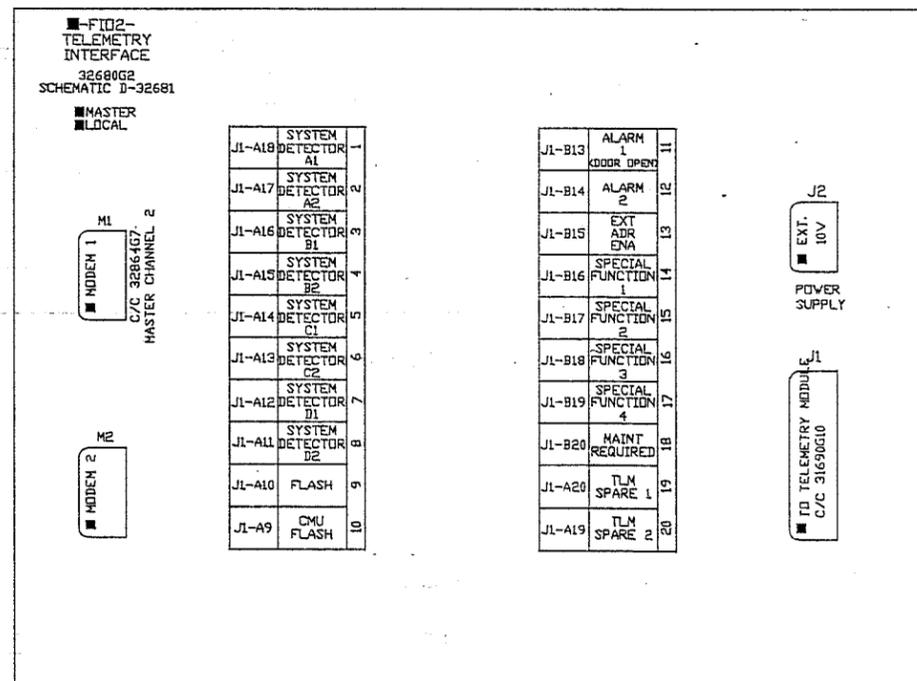


ASC/2 TELEMETRY
C/C 31690G10

J1/P3	FID PCB	PIN	FUNCTION	IN	OUT
A1		24	SHIELD-CHASSIS GROUND		
A2		23	RECEIVE ID	X	X
A3		22	RECEIVE ID		
A4		21	TRANSMIT ID	X	X
A5		20	TRANSMIT ID		
A6		19	SHIELD-CHASSIS GROUND		
A9	FID-10	18	CMU FLASH		
A10	FID-9	18	FLASH		
A11	FID-8	18	SYSTEM DETECTOR B2		
A12	FID-7	18	SYSTEM DETECTOR B1		
A13	FID-6	18	SYSTEM DETECTOR C2		
A14	FID-5	18	SYSTEM DETECTOR C1		
A15	FID-4	18	SYSTEM DETECTOR B2		
A16	FID-3	18	SYSTEM DETECTOR B1		
A17	FID-2	18	SYSTEM DETECTOR A2		
A18	FID-1	18	SYSTEM DETECTOR A1		
A19	FID-0	18	PREAMP		
A20	FID-0	18	LOCAL FREE		
B2	FID-24	24	RECEIVE ID		
B3	FID-23	23	RECEIVE ID		
B4	FID-22	22	ALARM 1 DOOR OPEN		
B5	FID-21	21	ALARM 2		
B6	FID-20	20	SUM CHECK		
B7	FID-19	19	SPECIAL FUNCTION 4		
B8	FID-18	18	SPECIAL FUNCTION 3		
B9	FID-17	17	SPECIAL FUNCTION 2		
B10	FID-16	16	SPECIAL FUNCTION 1		
B11	FID-15	15	SPECIAL FUNCTION 1		
B12	FID-14	14	MAINTENANCE REQUIRED		
B13	FID-13	13	KEY		

J3/P3 PINS NOT USED: A7, A8, A10, B1, B4 - B12

① ② SHIELDED TWISTED PAIR
③ P3 CONNECTED TO J3 OF TELEMETRY INTERFACE BOARD, 32680G2, SCHEMATIC D-3238L

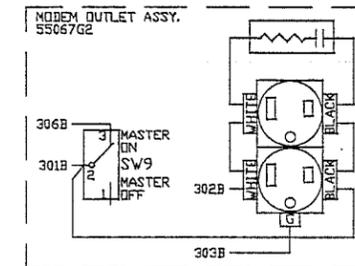


ASC/2 TELEMETRY
C/C 31690G10

J1/P3	FID PCB	PIN	FUNCTION	IN	OUT
A1		24	SHIELD-CHASSIS GROUND		
A2		23	RECEIVE ID	X	X
A3		22	RECEIVE ID		
A4		21	TRANSMIT ID	X	X
A5		20	TRANSMIT ID		
A6		19	SHIELD-CHASSIS GROUND		
A9	FID-10	18	CMU FLASH		
A10	FID-9	18	FLASH		
A11	FID-8	18	SYSTEM DETECTOR B2		
A12	FID-7	18	SYSTEM DETECTOR B1		
A13	FID-6	18	SYSTEM DETECTOR C2		
A14	FID-5	18	SYSTEM DETECTOR C1		
A15	FID-4	18	SYSTEM DETECTOR B2		
A16	FID-3	18	SYSTEM DETECTOR B1		
A17	FID-2	18	SYSTEM DETECTOR A2		
A18	FID-1	18	SYSTEM DETECTOR A1		
A19	FID-0	18	PREAMP		
A20	FID-0	18	LOCAL FREE		
B2	FID-24	24	RECEIVE ID		
B3	FID-23	23	RECEIVE ID		
B4	FID-22	22	ALARM 1 DOOR OPEN		
B5	FID-21	21	ALARM 2		
B6	FID-20	20	SUM CHECK		
B7	FID-19	19	SPECIAL FUNCTION 4		
B8	FID-18	18	SPECIAL FUNCTION 3		
B9	FID-17	17	SPECIAL FUNCTION 2		
B10	FID-16	16	SPECIAL FUNCTION 1		
B11	FID-15	15	SPECIAL FUNCTION 1		
B12	FID-14	14	MAINTENANCE REQUIRED		
B13	FID-13	13	KEY		

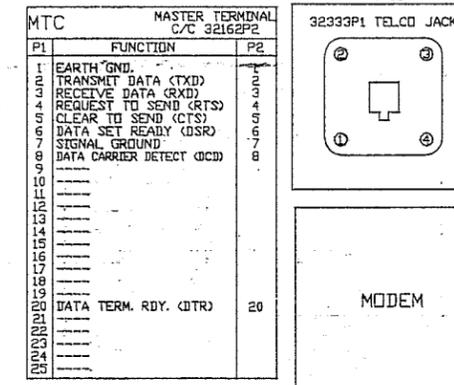
J3/P3 PINS NOT USED: A7, A8, A10, B1, B4 - B12

① ② SHIELDED TWISTED PAIR
③ P3 CONNECTED TO J3 OF TELEMETRY INTERFACE BOARD, 32680G2, SCHEMATIC D-3238L



MPC MASTER POWER C/C 32864G2		MASTER TELEMETRY C/C 32864G2	
PIN	FUNCTION	ASC/2M/FID1/FID2 P11/PIN	FUNCTION
A	AC NEUTRAL	302B	
B	AC LINE	306B	
C	RESERVED		
D	RESERVED		
E	EARTH GND.	303B	
F	EARTH GND.	303B	

ASC/2M/FID1/FID2 P11/PIN	P11/PIN	P11/PIN	FUNCTION
21	2	9	CH. 1 RXD
22	3	10	CH. 1 TXD
23	4	11	CH. 1 SIG. GND.
24	5	12	CH. 1 +12 VDC
25	6	13	CH. 2 RXD
26	7	14	CH. 2 TXD
27	8	15	CH. 2 SIG. GND.
28	9	16	CH. 2 +12 VDC

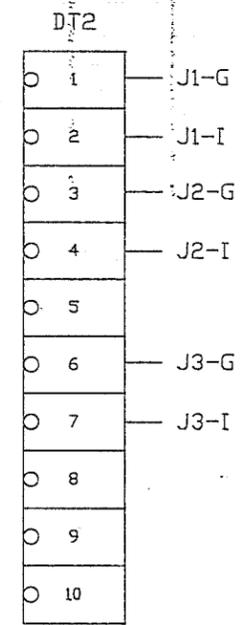
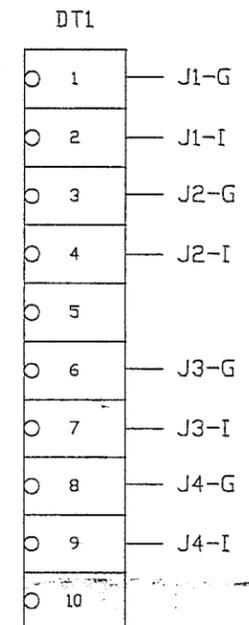
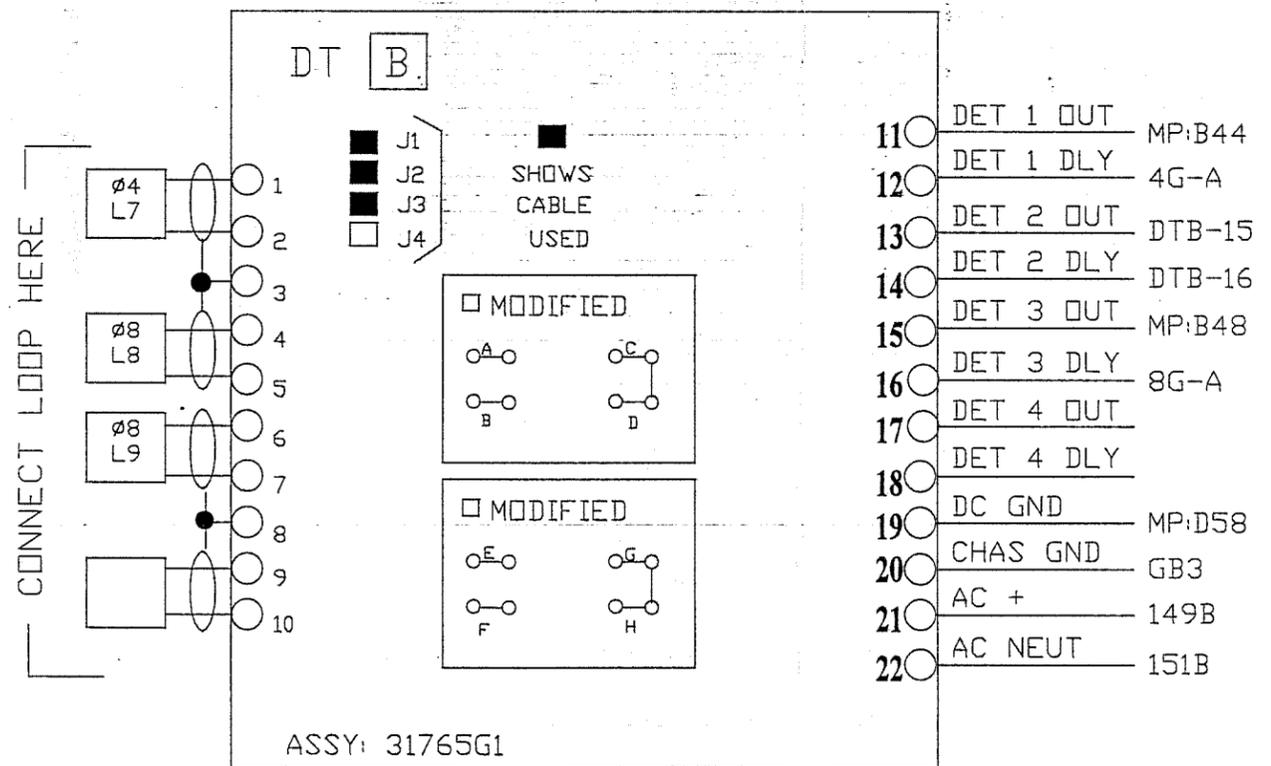
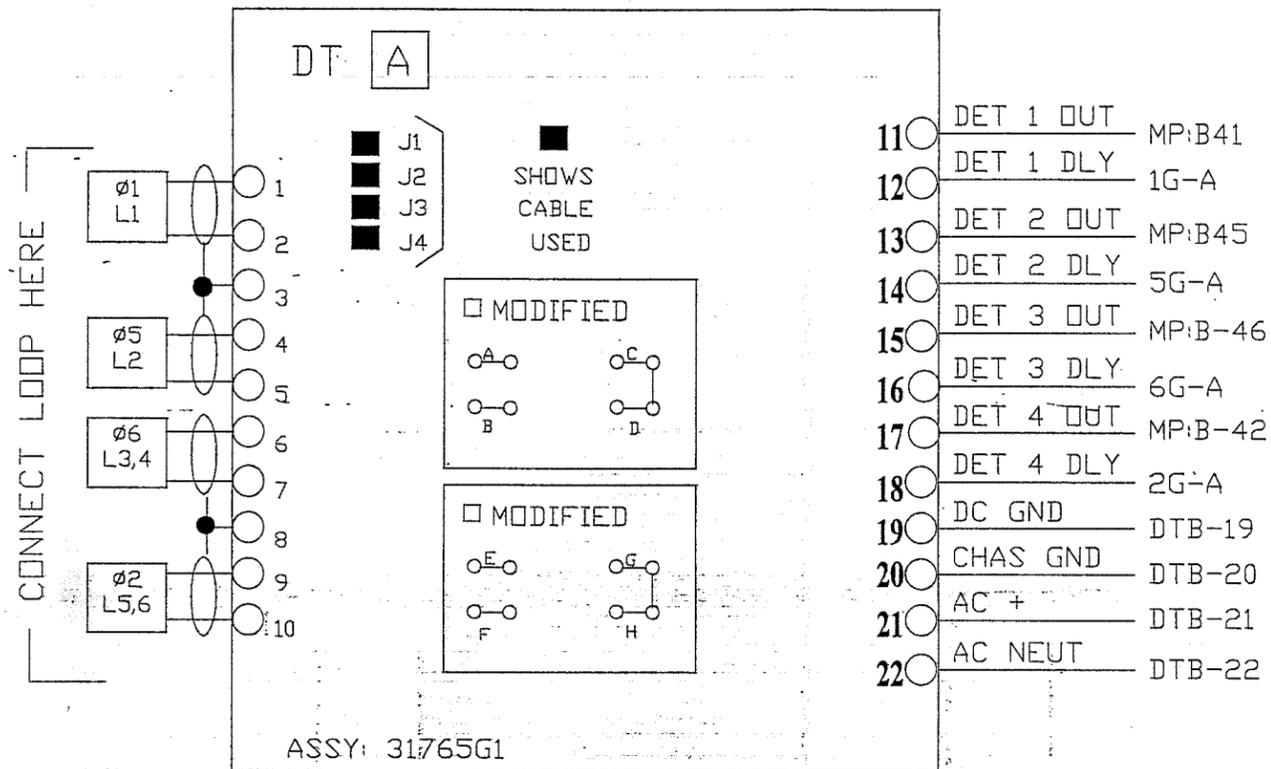


FIBEROPTIC TELEMETRY

DET INT	SINGLE CHANNEL DETECTOR □ C/C 40130G3	
J1 J4	DET PIN	
14	A	AC-
12	B	OUTPUT RELAY COMMON
13	C	AC+
1	D	LOOP
2	E	LOOP
4	F	OUTPUT RELAY N.O.
7	G	SYS. OUT. RLY. N.O.*
8	H	CHASSIS GROUND/SHIELD
9	I	SYS. OUT. RLY. COM. *
5	J	DELAY INHIBIT INPUT

① SHIELDED, TWISTED PAIR
SHIELD TO PIN 8

* NOT AVAILABLE ON ALL MODELS



DT BOARD