

ITEM SPECIAL - PIPE CLEANOUT

THIS WORK SHALL CONSIST OF REMOVING SEDIMENT AND DEBRIS FROM DRAINAGE CONDUITS TO REMAIN AT THE DIRECTION OF THE ENGINEER. ALL MATERIAL REMOVED SHALL BE DISPOSED OF AS PER 105.16 AND 105.17. ALL SEWERS SHALL BE CLEANED OUT TO THE SATISFACTION OF THE ENGINEER.

CLEANOUT OF THE PIPE SHALL BE PAID FOR AT THE UNIT PRICE BID FOR ITEM SPECIAL - PIPE CLEANOUT. THIS PRICE SHALL INCLUDE THE COST FOR MATERIAL, EQUIPMENT, LABOR, AND ALL INCIDENTALS REQUIRED TO COMPLETE THE CLEANOUT.

THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN INCLUDED IN THE GENERAL SUMMARY FOR THE ABOVE NOTED WORK TO BE USED AT THE DIRECTION OF THE ENGINEER:

SPECIAL, PIPE CLEANOUT, 24" AND UNDER 100 FT.
SPECIAL, PIPE CLEANOUT, 27" TO 48" 100 FT.
SPECIAL, PIPE CLEANOUT, OVER 48" 100 FT.

SEEDING AND MULCHING

THE FOLLOWING QUANTITIES ARE PROVIDED TO PROMOTE GROWTH AND CARE OF PERMANENT SEEDED AREAS:

659, SOIL ANALYSIS TEST	2 EACH
659, TOPSOIL	7,502 CU. YD.
659, SEEDING AND MULCHING	67,586 SQ. YD.
659, REPAIR SEEDING AND MULCHING	3,379 SQ. YD.
659, COMMERCIAL FERTILIZER	9.13 TON
659, LIME	13.96 ACRES
659, WATER	365 M. GAL.

SEEDING AND MULCHING SHALL BE APPLIED TO ALL AREAS OF EXPOSED SOIL BETWEEN THE RIGHT-OF-WAY LINES, AND WITHIN THE CONSTRUCTION LIMITS FOR AREAS OUTSIDE THE RIGHT-OF-WAY LINES COVERED BY WORK AGREEMENT OR SLOPE EASEMENT. QUANTITY CALCULATIONS FOR SEEDING AND MULCHING ARE BASED ON THESE LIMITS.

POST CONSTRUCTION STORM WATER TREATMENT

THIS PLAN UTILIZES STRUCTURAL BEST MANAGEMENT PRACTICES (BMP'S) FOR POST CONSTRUCTION STORM WATER TREATMENT.

VEGETATED BIOFILTER

THIS PLAN UTILIZES VEGETATED BIOFILTER(S) FOR POST CONSTRUCTION STORM WATER TREATMENT. PLACE EITHER ITEM 660 SODDING OR ITEM 659 SEEDING AND MULCHING WITH A 4-INCH LIFT OF TOPSOIL AS SHOWN IN THE PLANS TO ANY DISTURBED AREA ON THE SHOULDER AND FORESLOPE DRAINING TO A VEGETATED BIOFILTER. THE DITCH FOR EACH VEGETATED BIOFILTER SHALL BE TRAPEZOIDAL, AS SHOWN IN THE PLAN CROSS SECTIONS. PROVIDE ITEM 670 (NEWCOMB ROAD, MUMFORD ROAD) OR ITEM 836 (SR 168) AS SPECIFIED IN THE PLANS.

VEGETATED FILTER STRIP

THIS PLAN UTILIZES VEGETATED FILTER STRIP(S) FOR POST CONSTRUCTION STORM WATER TREATMENT. PLACE EITHER ITEM 660 SODDING OR ITEM 659 SEEDING AND MULCHING WITH A 4-INCH LIFT OF TOPSOIL AND ITEM 670, SLOPE EROSION PROTECTION TO ALL DISTURBED AREAS DESIGNATED AS VEGETATED FILTER STRIPS, THE EDGE OF SHOULDER, AND THE FORESLOPE AS SPECIFIED IN THE PLANS.

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY FOR USE WITH VEGETATED FILTER STRIPS.

ITEM 670, SLOPE EROSION PROTECTION MAT, TYPE A 202 SQ YD

GEAUGA COUNTY GENERAL NOTES (APPLICABLE TO MUMFORD ROAD, NEWCOMB ROAD AND NASH ROAD)

ALL WORK ON THIS PROJECT SHALL AT ALL TIMES BE SUBJECT TO THE DIRECT INSPECTION OF THE GEAUGA COUNTY ENGINEER OR AUTHORIZED REPRESENTATIVE OF THE ENGINEER.

ALL CONSTRUCTION AND MATERIALS INCLUDED IN THIS PROJECT SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF OHIO DEPARTMENT OF TRANSPORTATION'S CONSTRUCTION AND MATERIAL SPECIFICATIONS UNLESS SUPERCEDED BY THE MODIFICATIONS TO THE OHIO DEPARTMENT OF TRANSPORTATION'S CONSTRUCTION AND MATERIAL

SPECIFICATIONS AND SUPPLEMENTAL SPECIFICATIONS FOR GEAUGA COUNTY AND THE STANDARD SPECIFICATIONS AND PROCEDURES FOR THE DESIGN AND CONSTRUCTION OF SUBDIVISION ROADS IN GEAUGA COUNTY.

THE STATIONING AND CENTERLINE INFORMATION SHOWN ON THE DRAWINGS ARE FOR CONSTRUCTION PURPOSES ONLY AND ARE NOT TO BE USED FOR RECORD PURPOSES.

ALL QUANTITIES LISTED ARE AN ESTIMATE FOR BIDDING PURPOSES. ACTUAL FINAL QUANTITIES MAY BE MORE OR LESS AS DEEMED NECESSARY BY THE ENGINEER FOR PROPER CONSTRUCTION.

THE BEDDING FOR THE TYPE "A" CULVERTS SHALL BE CLASS "B" AND THE SIZE NO. 57 AGGREGATE SHALL BE INSTALLED TO A DEPTH OF AT LEAST ONE-HALF THE DIAMETER OF THE CULVERT. ON MUMFORD ROAD, BACKFILL FOR THE REMAINING TRENCH SHALL LSM TYPE 100. ON NEWCOMB ROAD, BACKFILL FOR THE REMAINING TRENCH SHALL LSM TYPE 100 OR 304 AGGREGATE TAMPED OR COMPACTED EVERY 6 INCHES. RECYCLED CONCRETE, SLAG, OR SAND IS NOT ALLOWED.

THE ROADWAY SUBGRADE SHALL BE PREPARED IN ACCORDANCE WITH O.D.O.T. ITEM 203 - ROADWAY EXCAVATION AND EMBANKMENT. SUBGRADE SHALL BE PROOF ROLLED IN ACCORDANCE WITH ITEM 204

SOIL STABILIZATION PARAMETERS SHALL BE APPROVED BY THE GEAUGA COUNTY ENGINEER PRIOR TO THE STABILIZING OF THE SUBBASE.

A PROFESSIONAL GEOTECHNICAL ENGINEER SHALL BE REQUIRED FOR SOIL BORINGS, SOIL ANALYSIS, AND SOIL COMPACTION WHERE THE GEAUGA COUNTY ENGINEER DEEMS NECESSARY.

GUARDRAIL LOCATIONS MAY BE ADJUSTED IN THE FIELD DURING CONSTRUCTION BY THE GEAUGA COUNTY ENGINEER.

MONUMENT ASSEMBLIES SHALL BE BOXLESS PAVEMENT MONUMENTS PER THE GEAUGA COUNTY ENGINEER'S STANDARD CONSTRUCTION DRAWINGS. BOXLESS MONUMENTS SHALL BE INSTALLED AFTER FINAL SURFACE COURSE OF ASPHALT CONCRETE.

ITEM 441 ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (448) MAY BE PLACED, WITHOUT ITEM 407, IMMEDIATELY AFTER ITEM 301 ASPHALT CONCRETE BASE UNLESS SURFACE OF ITEM 301 IS NOT ACCEPTABLE TO THE ENGINEER.

ITEM 411 COMPACTED LIMESTONE AGGREGATE, TYPE B SHALL BE PLACED AFTER SURFACE COURSE.

EXCELSIOR MATTING SHALL BE USED IN ALL DITCHES. THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY FOR USE IN DITCHES.
ITEM 670, DITCH EROSION PROTECTION MAT, TYPE G 36,000 SQ YD

ITEM 441 ASPHALT CONCRETE SURFACE COURSE, TYPE 1, (448), PG64-22, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF ITEM 441 THE FOLLOWING SHALL APPLY.

PRIOR TO OR AT THE PRE-CONSTRUCTION CONFERENCE, THE CONTRACTOR SHALL SUBMIT A JOB MIX FORMULA IN A FORMAT APPROVED BY THE ENGINEER SHOWING THE DESIGN OF ALL MIXES, SOURCE AND GRADATION OF AGGREGATE AND PROPOSED ASPHALT CONTENT FOR THE ASPHALT COURSE OR COURSES PROPOSED TO BE USED FOR A PROJECT. THE PROPOSED SOURCE (ASPHALT PLANT) OF THE ASPHALT MIX MUST HAVE AN APPROVED QUALITY CONTROL PROGRAM ON FILE WITH THE GEAUGA COUNTY ENGINEER.

GRAVEL SHALL NOT BE PERMITTED IN ANY ODOT ITEM 441 SURFACE COURSES. AGGREGATE GRADATION FOR ALL MIXES SHALL MEET ODOT C&MS REQUIREMENTS.

NO MORE THAN 10% RECLAIMED ASPHALT CONCRETE PAVEMENT (RAP) (MEASURED BY DRY WEIGHT OF MIX) SHALL BE ALLOWED IN THE SURFACE COURSE. RECLAIMED ASPHALT SHINGLES (RAS) ARE NOT PERMITTED.

POLYMER MODIFIED SURFACE COURSES SHALL NOT BE PLACED WHEN THE AIR TEMPERATURE IS LESS THAN 60° F. BITUMINOUS PLANT MIXTURES SHALL NOT BE PLACED WHEN THE AIR TEMPERATURE IS BELOW THE MINIMUM ESTABLISHED AS FOLLOWS:

COURSE THICKNESS	AIR TEMPERATURE
3.0 INCHES AND OVER	40° F
1.5 TO 2.9 INCHES	45° F
1.0 TO 1.4 INCHES	50° F
LESS THAN 1.0 INCHES	60° F

PAVEMENT PLANING, ASPHALT CONCRETE, AS PER PLAN, VBL WIDTH, VBL DEPTH

IN ADDITION TO THE REQUIREMENTS OF ITEM 254, THE FOLLOWING REQUIREMENTS APPLY TO THIS WORK.

BUGGY TRAFFIC IS KNOWN TO CAUSE RUTTING NEAR THE EDGE OF PAVEMENT LANES. PRIOR TO CONSTRUCTION, THE CONTRACTOR AND THE ENGINEER SHALL MEET IN THE FIELD TO IDENTIFY LOCATIONS ON MUMFORD ROAD THAT REQUIRE SPOT MILLING. PAVEMENT SHALL BE MILLED WITHIN THE LIMITS IDENTIFIED AND TO SUFFICIENT DEPTH TO PROVIDE A CONSISTENT PAVEMENT CROSS SLOPE. VARIABLE DEPTH ASPHALT SHALL BE PLACED UNDER A SEPARATE PAY ITEM.

ITEM 441 ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (448), AS PER PLAN (VARIABLE DEPTH)

IN ADDITION TO THE REQUIREMENTS OF ITEM 441 THE FOLLOWING SHALL APPLY. CONTRACTOR SHALL PLACE VARIABLE DEPTH INTERMEDIATE COURSE IN THE LOCATIONS IDENTIFIED FOR VARIABLE WIDTH, VARIABLE DEPTH PAVEMENT PLANING AND/OR AT OTHER LOCATIONS IDENTIFIED IN THE FIELD AT THE DIRECTION OF THE ENGINEER. VARIABLE DEPTH INTERMEDIATE COURSE SHALL BE PLACED IN A MANNER TO PROVIDE A CONSISTENT PAVEMENT CROSS SLOPE READY TO RECEIVE A SURFACE COURSE.

REMOVAL, MISC.

IN ADDITION TO THE REQUIREMENTS OF ITEM 202, THE FOLLOWING REQUIREMENTS APPLY. PRIOR TO REMOVAL, THE CONTRACTOR SHALL OFFER TO RETURN THE ITEMS TO THE ADJACENT PROPERTY OWNER. ITEMS NOT ACCEPTED BY THE OWNER SHALL BE REMOVED AND PROPERLY DISPOSED. PAYMENT SHALL BE MADE AT THE UNIT PRICE BID AND SHALL BE CONSIDERED FULL COMPENSATION FOR THE LABOR, MATERIAL, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.

ITEM 202, REMOVAL MISC.: 24 INCH ROCK AND OVER, PER EACH
ITEM 202, REMOVAL MISC.: WOOD POST REMOVED, PER EACH

EARTHWORK CALCULATIONS

EXCAVATION AND EMBANKMENT QUANTITIES WERE DETERMINED FROM THE TOP OF EXISTING GROUND SURFACE TO THE BOTTOM OF THE PAVEMENT BASE/TOP OF SUBGRADE OR THE FINISHED GRADE. SOIL STABILIZATION IS NOT INCLUDED IN THE EARTHWORK QUANTITIES AND IS PAID FOR SEPARATELY. ADJUSTMENTS FOR TOPSOIL STRIPPING / PLACEMENT HAVE NOT BEEN MADE. CONTRACTOR MAY ELECT TO STRIP AND STOCKPILE TOPSOIL FOR REUSE. NO ADDITIONAL PAYMENT SHALL BE MADE, BEYOND THAT MADE FOR ITEM 659 TOPSOIL, FOR STRIPPING, STOCKPILING, FURNISHING, SPREADING, PLACING, HAULING AND/OR DISPOSING TOPSOIL. EXCAVATION FOR OTHER MISCELLANEOUS ITEMS (E.G. DRAINAGE STRUCTURES, PIPES, ETC.) IS INCLUDED IN THE COST OF THAT ITEM UNLESS OTHERWISE NOTED IN THE PLANS.

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CALCULATED
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GENERAL NOTES

GEA-COUNTY
WIDE SAFETY

ITEM 630 SIGNING, MISC.: REMOVAL AND REERECTION OF SIGN FLASHER ASSEMBLY, AS PER PLAN [CONTINUED]

SHALL REINSTALL THE EXISTING EQUIPMENT ON NEW SUPPORTS AS SHOWN ON THE PLANS.

PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH OF ITEM 630 SIGNING, MISC.: REMOVAL AND REERECTION OF SIGN FLASHER ASSEMBLY, AS PER PLAN IN PLACE. THIS ITEM SHALL INCLUDE ANY ADDITIONAL CABLE/WIRING NECESSARY TO RECONNECT THE SYSTEM ON THE PROPOSED SUPPORTS AND SHALL RESULT IN A FULLY FUNCTIONAL FLASHING INSTALLATION.

ITEM 631 SIGN FLASHER ASSEMBLY, AS PER PLAN (ICWS, SR 608)

THE CONTRACTOR SHALL INSTALL A FULLY FUNCTIONING SIGN FLASHER ASSEMBLY, INCLUDING POLE ATTACHMENTS, WIRING TO THE NEAREST PULL BOX (1 3/4 C CABLE), STATIC SIGNS, AND EDGE LED-LIT FLASHING SIGNS (INTEGRAL WITH SIGN). THE FLASHER SHALL FOLLOW THE SIGN FLASHER ASSEMBLY DETAIL AND DIMENSIONS WITHIN THE CONSTRUCTION PLANS. THE EDGE-LIT LED SIGN SHALL FLASH IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND SHALL BE POWERED FROM THE CONTROLLER CABINET. THE SIGN SHALL ONLY FLASH WHEN COMMANDED BY THE CONTROLLER AND SHALL REMAIN ACTIVE FOR A PERIOD OF 10 SECONDS AFTER A VEHICLE LEAVES THE DETECTION ZONE ON BURTON-WINDSOR ROAD.

ALL WORK AND MATERIALS NECESSARY TO INSTALL THE FULLY FUNCTIONING FLASHER ASSEMBLY AS OUTLINED ABOVE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 631 SIGN FLASHER ASSEMBLY, AS PER PLAN (ICWS, SR 608).

ITEM 631 SIGN FLASHER ASSEMBLY, AS PER PLAN (ICWS, BURTON-WINDSOR ROAD)

THE CONTRACTOR SHALL INSTALL A FULLY FUNCTIONING SIGN FLASHER ASSEMBLY, INCLUDING POLE ATTACHMENTS, WIRING TO THE NEAREST PULL BOX (1 3/4 C CABLE, AND 1 4/4 C CABLE), STATIC SIGNS, AND BRACKET ASSEMBLY FOR THE 1-SECTION HEADS. THE FLASHER SHALL FOLLOW THE SIGN FLASHER ASSEMBLY DETAIL AND DIMENSIONS WITHIN THE CONSTRUCTION PLANS. THE FLASHERS SHALL BE MOUNTED ABOVE THE SIGN, TO THE LEFT AND RIGHT, AND SHALL FLASH IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. THEY SHALL BE POWERED FROM THE CONTROLLER CABINET. THE FLASHERS SHALL ONLY FLASH WHEN COMMANDED BY THE FLASHER CONTROLLER AND SHALL REMAIN ACTIVE FOR THE TIME WHEN A VEHICLE OCCUPIES THE DETECTION ZONE ON SR 608.

ALL WORK AND MATERIALS NECESSARY TO INSTALL THE FULLY FUNCTIONING FLASHER ASSEMBLY AS OUTLINED ABOVE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 631 SIGN FLASHER ASSEMBLY, AS PER PLAN (ICWS, BURTON-WINDSOR ROAD).

ITEM 631 SIGN FLASHER ASSEMBLY, AS PER PLAN (ABWDS)

THIS ITEM SHALL MEET ALL THE REQUIREMENTS OF ITEM 631 SIGN FLASHER ASSEMBLY, AS PER PLAN (SR 608 ICWS) WITH THE FOLLOWING EXCEPTION: THE AMISH BUGGY WARNING SIGN SHALL USE LED FLASHERS INTEGRAL TO THE EDGE OF THE TRAFFIC SIGN AND SHALL BE POWERED THROUGH THE FLASHER CABINET.

ALL WORK AND MATERIALS NECESSARY TO INSTALL THE FULLY FUNCTIONING FLASHER ASSEMBLY AS OUTLINED ABOVE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 631 SIGN FLASHER ASSEMBLY, AS PER PLAN (ABWDS).

ITEM 631 SIGN FLASHER ASSEMBLY, AS PER PLAN, SOLAR POWERED (PED WARNING)

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A CROSSING SIGN ASSEMBLY, WITH SUPPLEMENTAL WARNING BEACON, POWERED BY BATTERIES AND RECHARGED BY SOLAR PANELS.

THE SIGN ASSEMBLY AND FLASHER SHALL MEET THE REQUIREMENTS SET FORTH IN THE ODOT CD. THE SIGN SIZE SHALL BE 36" X 36" AND SIGN CODE W11-2-30.

THE FLASHER CONTROL AND BATTERY SHALL BE HOUSED IN ONE OR MORE STAINLESS STEEL OR ALUMINUM ENCLOSURES WITH A NEMA RATING OF AT LEAST 3R. ENCLOSURE EXTERIOR

SURFACES SHALL BE BARE OR POWDER COAT ALUMINUM OR STAINLESS STEEL. THE ENCLOSURE INTERIOR SURFACES SHALL BE THE SAME AS THE EXTERIOR.

IF CONTAINED IN A SINGLE ENCLOSURE, THE CONTROL ELECTRONICS AND BATTERY SHALL BE SEPARATED IN A MANNER TO PREVENT DAMAGE TO THE CONTROL ELECTRONICS IF THE BATTERY ENVELOPE IS COMPROMISED. 900 BICYCLE FACILITIES TRAFFIC ENGINEERING MANUAL 9-8 OCTOBER 23, 2002 REVISED JULY 18, 2014 LED SIGNAL BEACONS MEETING THE CURRENT ITE VEHICLE TRAFFIC CONTROL SIGNAL HEADS (VTCSH) STANDARD SHALL BE USED UNLESS OTHERWISE SPECIFIED. THE MANUFACTURER OF THE SIGNAL BEACON SHALL BE LISTED ON THE DEPARTMENT'S QUALIFIED PRODUCTS LIST FOR LED SIGNAL LAMPS. A MINIMUM 8-INCH BEACON SHALL BE USED.

THE SOLAR PANEL OR SOLAR PANEL CONTROLLER MANUFACTURER SHALL PROVIDE SIGNED COPIES OF CALCULATIONS USED TO SIZE THE SOLAR PANEL AND BATTERIES. INCLUDED IN THESE CALCULATIONS SHALL BE THE INSOLATION VALUE USED AND ITS SOURCE, THE SOLAR PANEL EFFICIENCY, CHARGER/CONTROLLER EFFICIENCY, INVERTER EFFICIENCY, PROPOSED LED LAMP LOAD, AND A FIGURE REPRESENTING ANTICIPATED MISCELLANEOUS LOSSES.

THE SOLAR PANEL MANUFACTURER SHALL TEST THE PANELS ACCORDING TO IEC61215 OR EQUIVALENT APPROVED STANDARD. SOLAR PANEL MOUNTING MUST BE RATED FOR 90 MPH DESIGN WIND.

RUN REQUIREMENTS FOR ASSEMBLIES ARE 24 HOURS PER DAY FOR TWO WEEKS UNDER CONTINUOUS WORST-CASE (MINIMUM) INSOLATION FIGURES (USUALLY DECEMBER) FOR THE PROPOSED GEOGRAPHIC LOCATION, USING A PANEL ELEVATION ANGLE APPROPRIATE TO THE SITE LATITUDE, AT A SUSTAINED TEMPERATURE OF 25 DEGREES FAHRENHEIT (-4 DEGREES CELSIUS).

IF VOLTAGES OVER 50V AC OR DC ARE PRESENT, GROUNDING AND BONDING REQUIREMENTS SPECIFIED IN THE ODOT TEM SHALL BE FOLLOWED.

THE SOLAR PANELS SHALL BE PLACED SUCH THAT EACH RECEIVES FULL AVAILABLE SUNLIGHT AT ALL TIMES, AND SHALL NOT BE OBSTRUCTED BY TREES, SIGNS OR OTHER OBJECTS.

PAYMENT FOR ITEM 631 SIGN FLASHER ASSEMBLY, AS PER PLAN, SOLAR POWERED (PED WARNING) SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS AND OTHER INCIDENTALS NECESSARY TO FURNISH THE SOLAR POWERED PED WARNING FLASHER COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE, WIRING COMPLETE, TESTED AND ACCEPTED.

ITEM 631 SCHOOL SPEED LIMIT SIGN ASSEMBLY, SOLAR-POWERED, AS PER PLAN

THIS SPECIFICATION APPLIES TO SCHOOL SIGN FLASHERS POWERED BY BATTERIES AND RECHARGED BY SOLAR PANELS.

THE ENTIRE SCHOOL ZONE FLASHER AND SIGN ASSEMBLY SHALL CONFORM TO THE CONTRACT DOCUMENTS AND MEET THE REQUIREMENTS SET FORTH IN THE ODOT CD. THE SIGN SIZE SHALL BE 24" X 48" AND SIGN CODE S5-H1-24.

THE FLASHER CONTROL AND BATTERY WILL BE HOUSED IN ONE OR MORE STAINLESS STEEL OR ALUMINUM ENCLOSURES WITH A NEMA RATING OF AT LEAST 3R. ENCLOSURE EXTERIOR SURFACES SHALL BE BARE OR POWDER COAT ALUMINUM OR STAINLESS STEEL. THE ENCLOSURE INTERIOR SURFACES SHALL BE THE SAME AS THE EXTERIOR.

IF CONTAINED IN A SINGLE ENCLOSURE, THE CONTROL ELECTRONICS AND BATTERY SHALL BE SEPARATED IN A MANNER TO PREVENT DAMAGE TO THE CONTROL ELECTRONICS IF THE BATTERY ENVELOPE IS COMPROMISED.

A PAIR OF LED SIGNAL BEACONS, ONE ABOVE AND ONE BELOW THE SIGN, MEETING THE CURRENT ITE VEHICLE TRAFFIC CONTROL SIGNAL HEADS (VTCSH) STANDARD WILL BE USED UNLESS OTHERWISE SPECIFIED. THE MANUFACTURER OF THE SIGNAL BEACON SHALL BE LISTED ON THE DEPARTMENT'S QUALIFIED PRODUCT LIST FOR LED SIGNAL LAMPS.

THE SOLAR PANEL AND/OR CONTROLLER MANUFACTURER WILL

PROVIDE SIGNED COPIES OF CALCULATIONS USED TO SIZE THE SOLAR PANEL AND BATTERIES. INCLUDED IN THESE CALCULATIONS WILL BE THE INSOLATION VALUE USED AND ITS SOURCE, THE SOLAR PANEL EFFICIENCY, CHARGER/CONTROLLER EFFICIENCY, INVERTER EFFICIENCY, PROPOSED LED LAMP LOAD, AND A FIGURE REPRESENTING ANTICIPATED MISCELLANEOUS LOSSES.

SOLAR PANEL MANUFACTURER MUST TEST PANEL ACCORDING IEC61215 OR EQUIVALENT APPROVED STANDARD. SOLAR PANEL MOUNTING MUST BE RATED FOR 90 MPH DESIGN WIND.

RUN REQUIREMENTS ARE 4 HOURS PER DAY FOR TWO WEEKS UNDER CONTINUOUS WORST-CASE (MINIMUM) INSOLATION FIGURES (USUALLY DECEMBER) FOR THE PROPOSED GEOGRAPHIC LOCATION, USING A PANEL ELEVATION ANGLE APPROPRIATE TO THE SITE LATITUDE, AT A SUSTAINED TEMPERATURE OF 25 DEGREES FAHRENHEIT (-4 DEGREES CELSIUS).

IF VOLTAGES OVER 50V AC OR DC ARE PRESENT, GROUNDING AND BONDING REQUIREMENTS SPECIFIED IN THE ODOT CMS WILL BE FOLLOWED.

ANY TIMER INCLUDED IN THE ASSEMBLY MUST SATISFY THE REQUIREMENTS OF 731.10 AND BE LISTED ON THE DEPARTMENT'S QUALIFIED PRODUCTS LIST.

PAYMENT FOR 631 SCHOOL SPEED LIMIT SIGN ASSEMBLY, SOLAR POWERED, AS PER PLAN, SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS AND OTHER INCIDENTALS NECESSARY TO FURNISH THE SOLAR POWERED SCHOOL ZONE FLASHER COMPLETE IN PLACE, INCLUDING THE SIGN, ALL CONNECTIONS MADE, WIRING COMPLETE, TESTED AND ACCEPTED.

ITEM 631 TIMER WITH ENCLOSURE, AS PER PLAN (ABWDS)

IN ADDITION TO ODOT ITEM 631 AND ITEM 731 FOR THE TIMER, THE PROGRAMMABLE INTERFACE SHALL BE COMPATIBLE WITH THE STOP LINE RADAR DETECTION NOTED IN THE PLANS. THIS SPECIFICATION SHALL GOVERN WHERE DIFFERENCES OCCUR IN THE ODOT STANDARD CONSTRUCTION AND MATERIAL SPECIFICATION. THE PROGRAMMABLE INTERFACE SHALL BE FURNISHED WITH THE MOST RECENT SOFTWARE, AND PROVIDE ALL FEATURES OF THE LATEST MODEL AVAILABLE. THE PROGRAMMABLE INTERFACE SHALL OPERATE AND POWER THE FLASHING BEACON SIGN ASSEMBLY(IES) AS OUTLINED BELOW.

THE PROGRAMMABLE INTERFACE SHALL HAVE A MINIMUM OF ONE ETHERNET PORT USED FOR SETUP OF THE CONTACT CLOSURES.

CABINET EQUIPMENT THE CABINET EXTERIOR SHALL BE COMMERCIALY SMOOTH AND FREE OF DEFECTS THAT WOULD IMPAIR SERVICEABILITY OR DETRACT FROM GENERAL APPEARANCE. THE CABINET SHALL BE FURNISHED FULLY EQUIPPED WITH THE FOLLOWING FEATURES READY FOR CONTROLLER INSTALLATION AS REQUIRED:

1. ALL CABINETS SHALL BE FURNISHED WITH 2 REMOVABLE SHELVES MOUNTED ON ADJUSTABLE CHANNELS. ALL MOUNTING HARDWARE SHALL BE INCLUDED.

2. THE CABINET SHALL BE EQUIPPED WITH THE APPROPRIATE EQUIPMENT, FIELD TERMINALS AND LOAD SWITCHES TO CONNECT THE INPUTS AND OUTPUTS FROM THE STOP LINE RADAR DETECTORS AND THE SIGN FLASHERS.

3. A DOOR ALARM/LIGHT SWITCH SHALL BE FURNISHED AND INSTALLED IN THE CABINET. FLAT LEDS SHALL BE MOUNTED ON TOP OF THE CABINET TO ILLUMINATE THE INSIDE OF THE CABINET. THE LEDS SHALL BE WIRED TO EITHER AN ON/OFF TOGGLE SWITCH MOUNTED ON THE POWER PANEL OR TO A DOOR-ACTIVATED SWITCH MOUNTED NEAR THE TOP OF THE DOOR.

4. ALL CABLES SHALL BE OF SUFFICIENT LENGTH TO ALLOW THE PROGRAMMABLE INTERFACE TO BE PLACED ON EITHER SHELF, SIDE MOUNTED DIN RAIL, OR ON THE TOP OF THE CABINET IN THE OPERATING MODE. CONNECTING CABLES SHALL BE SLEEVED IN A BRAIDED NYLON MESH OR CABLE MANAGEMENT WRAP.

5. ALL CABINET CONFIGURATIONS SHALL BE PROVIDED WITH ENOUGH RS-485 PORT I COMMUNICATION CABLES TO ALLOW FULL CAPABILITIES OF THAT CABINET.

6. THE CABINETS SHALL BE INCLUDE A CORBIN TYPE TUMBLE LOCK KEYED FOR A #2 KEY ON THE MAIN DOOR. A RESEALABLE POUCH SHALL BE SECURELY MOUNTED TO THE INSIDE DOOR OF THE CABINET AND SHALL BE SUFFICIENT TO ACCOMMODATE ONE COMPLETE SET OF WIRING, SIGNAL, AND TIMING PLANS.

7. THE PROGRAMMABLE INTERFACE SHALL BE CAPABLE OF OPERATING THE CONNECTED FLASHING BEACON INSTALLATIONS BASED OFF AN INPUT FROM THE WAVETRONIX STOP LINE RADAR DETECTION UNIT. THE PROGRAMMABLE INTERFACE/RADAR UNIT SHALL BE PROGRAMMED TO TAKE ONLY INPUTS FROM THE WAVETRONIX UNIT FOR VEHICLES TRAVELING BELOW 15 MPH AS A TRIGGER FOR ACTIVATION OF THE ASSOCIATED FLASHING BEACONS.

8. THE PROGRAMMABLE INTERFACE SHALL BE CAPABLE OF DELAYING THE FLASH OPERATION FROM THE TIME OF CALL/INPUT AS SPECIFIED IN THE PLANS AND UNIQUE TO EACH LOCATION. THE PROGRAMMABLE INTERFACE SHALL ALSO BE CAPABLE OF EXTENSION OF THE FLASHING OPERATION FOR A TIME PERIOD SPECIFIED IN THE PLANS AND UNIQUE TO EACH LOCATION.

THE CABINET SHALL BE POLE MOUNTED AS SPECIFIED IN THE PLANS AND FURNISHED WITH POLE MOUNTING HARDWARE.

CONTROLLER AND CABINET TESTING THE CONTRACTOR SHALL PERFORM BENCH TESTING OF THE COMPONENTS OF THIS SECTION ON THE CONTROLLER CABINET. SOFTWARE AND FIRMWARE SHALL BE LOADED ON THE SYSTEM/CONTROLLER AND CHECKED FOR CORRECT OPERATION OF TIMING PLANS, PHASING SCHEMES, AND FLASHING PATTERNS. THE SUCCESSFUL TESTING SHALL BE DEMONSTRATED TO THE ENGINEER PRIOR TO INSTALLATION IF REQUESTED. TESTING OF COMPONENTS BY THE CONTRACTOR FOR PROPER OPERATION SHALL INCLUDE THE FOLLOWING MINIMUM REQUIREMENTS:

- TERMINAL SCREWS TIGHTENED
- CORRECT TERMINAL JUMPERS
- FAN & THERMOSTAT OPERATION
- DOOR CLOSER SWITCH OPERATION
- GFI RECEPTACLE TEST
- DETECTORS
- SHELVES, MOUNTING
- ALL PANELS, MOUNTING
- PROPER FLASH SEQUENCE
- AUXILIARY EQUIPMENT OPERATION
- CABINET LAMP
- SIGNAL OUTPUTS ARE TO BE TESTED WHILE CONNECTED TO A MINIMUM 60-WATT LOAD ON EACH SIGNAL INDICATION.

A WRITTEN REPORT STATING THE CABINET INTERSECTION NUMBER, DATE AND TIME OF TEST, SIGNED OFF BY THE TECHNICIAN WHO PERFORMED THE TESTS, SHALL BE SUBMITTED TO THE ENGINEER UPON SUCCESSFUL COMPLETION OF THE ABOVE TESTS. THE CONTROLLER AND ALL RELATED COMPONENTS SHALL BE IN PERFECT WORKING ORDER AND READY FOR INSTALLATION/OPERATION AT THE SPECIFIED INTERSECTION AS A RESULT OF THE WORK DESCRIBED IN THIS ITEM. THE TEST AREA MAY BE ERECTED AT A LOCATION DETERMINED BY THE CONTRACTOR. THE COST FOR THE CONTROLLER AND CABINET TESTING SHALL BE INCLUDED IN THE PRICE OF THE CONTROLLER FURNISHED COMPLETE.

DOCUMENTATION TWO (2) COMPLETE SETS OF DOCUMENTATION SHALL BE FURNISHED WITH EACH CABINET FOR EACH UNIT OF EQUIPMENT THAT INCLUDES THE FOLLOWING MATERIAL:

- A) USER MANUALS
- B) DEVICE PROGRAMMING MANUALS
- C) WIRING DIAGRAMS AND PARTS LISTS WHICH SHOW BOTH THE MANUFACTURERS PART NUMBER AND THE GENERIC EQUIVALENT PART OF REFERENCE NUMBER AND DESCRIPTION TO ALLOW FOR PURCHASE AT A LOCAL ELECTRONIC SUPPLY HOUSE.
- D) INSTALLATION AND DIAGNOSTIC MANUALS

SOFTWARE OR FIRMWARE UPDATES SHALL BE ACCOMPANIED BY COMPLETE DOCUMENTATION THAT REFERENCES AN UPGRADE VERSION, PROVIDES A LIST OF IMPROVED CAPABILITIES WITH THE UPGRADE, AND PROVIDES A LIST OF PROBLEMS RESOLVED WITH THE UPGRADE (IF APPLICABLE). ALL FUNCTIONS, FEATURES, AND CAPABILITIES NOT ADDRESSED SHALL OPERATE AS INTENDED BEFORE THE UPGRADE WAS IMPLEMENTED.

PAYMENT FOR ITEM 631 TIMER WITH ENCLOSURE, AS PER PLAN (ABWDS) WILL BE AT THE CONTRACT BID PRICE PER EACH COMPLETE AND IN PLACE INCLUDING ALL CONNECTIONS TESTED AND ACCEPTED.

633 UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN [CONTINUED]

THAT SECURELY CLOSES OVER THE POWER CORD.

THE UPS OUTPUT NOTIFICATIONS FOR ON BATTERY, BATTERY 2-HOUR TIMER, AND LOW BATTERY SHALL BE WIRED INTO THE TRAFFIC SIGNAL CABINET BACK PANEL TO PROVIDE SPECIAL STATUS ALARMS FOR EACH OUTPUT INTO THE SIGNAL CONTROLLER.

THIS ITEM SHALL INCLUDE A RED LED STATUS INDICATOR LAMP TO ALLOW MAINTENANCE PERSONNEL AND LAW ENFORCEMENT TO QUICKLY ASSESS WHETHER A TRAFFIC SIGNAL CABINET IS BEING POWERED BY A UPS. THE LED HOUSING SHALL BE NEMA 4X, IP65 OR IP66, RATED FOR OUTDOOR USE AND BE TAMPER/SHATTER RESISTANT. IT SHALL BE A DOMED ENCLOSURE CONTAINING A RED LENS WITH LED THAT IS VISIBLE FROM 100 FOOT MINIMUM. THE ENCLOSURE AND LED MODULE SHOULD BE PLACED AND CENTERED ON THE TOP SURFACE OF THE UPS CABINET AND SEALED FROM WATER INTRUSION. IT SHOULD BE WIRED USING MINIMUM 20GA STRANDED, INSULATED HOOKUP WIRE TO THE STATUS RELAY OUTPUTS OF THE UPS. THE WIRES SHALL BE TERMINATED BY LUGS AT THE DISPLAY END AND PERMANENTLY LABELED "BACKUP POWER STATUS DISPLAY," WITH WIRE POLARITY INDICATED. THE RED LED SHALL ONLY ILLUMINATE TO INDICATE THE CABINET IS OPERATING UNDER UPS BACKUP POWER (THE "BACKUP" OPERATING CONDITION).

THIS ITEM INCLUDES PROGRAMMING THE UPS STATUS RELAY OUTPUTS TO PRODUCE THE LAMP STATUS DISPLAYS. THESE STATUS DISPLAYS WILL BE SOLID 100% DUTY CYCLE (NOT FLASHING) DISPLAYS. THE OPERATING VOLTAGE OF THE LED LAMP SHALL BE 120V AC UNLESS OTHERWISE INDICATED.

ITEM 633 COMMUNICATIONS, AS PER PLAN

FURNISH A CELLULAR MODEM, TWO ANTENNAS WITH 10-FOOT CABLES, AND A 10' ETHERNET CABLE FOR REMOTE WIRELESS CELLULAR COMMUNICATION.

FOR NETWORK CONSISTENCY, CELLULAR MODEMS SHALL BE THE SIERRA WIRELESS MODEM, AIRLINK GX450 ETHERNET WITH DC POWER CABLE - VERIZON - MODEL 1102361.

THIS ITEM SHALL INCLUDE THE FURNISHING OF A CONTROL ROCKETLINX ES8105 ETHERNET SWITCH OR APPROVED EQUAL WITH ALL AC POWER SUPPLIES NECESSARY TO FUNCTION.

THIS ITEM SHALL INCLUDE THE FURNISHING OF A MOUNTING BRACKET FOR THE ANTENNA WITH ALL NECESSARY HARDWARE INCLUDING BUT NOT LIMITED TO SPRING NUTS, WASHERS AND BOLTS, THAT INSTALLS TO THE MOUNTING CHANNELS ON THE SIDE OF THE SIGNAL CABINET.

THE CELLULAR MODEM EQUIPMENT AND ETHERNET SWITCH SHALL BE DELIVERED TO ODOT DISTRICT 12 TRAFFIC FOR PROGRAMMING AND INSTALLATION.

THE CONTRACTOR SHALL PROVIDE THE MODEM SERIAL NUMBERS AND NECESSARY ESN NUMBERS FOR ODOT TO ESTABLISH WIRELESS SERVICE.

THE DEPARTMENT WILL MEASURE "COMMUNICATIONS, AS PER PLAN" BY THE NUMBER OF COMPLETE UNITS FURNISHED, RECEIVED, AND ACCEPTED BY ODOT DISTRICT 12 TRAFFIC.

ITEM 809 STOP LINE RADAR DETECTION

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A STOP-LINE RADAR DETECTION UNIT MANUFACTURED BY WAVETRONIX. THE DETECTION UNIT SHALL INCLUDE THE FOLLOWING:

1. POWER SHALL BE PROVIDED FROM THE CABINET (TRAFFIC SIGNAL/ ICWS) OR ENCLOSURE (ABWDS).
2. ALL REQUIRED INPUTS CARDS SHALL BE INCLUDED IN THE TRAFFIC CABINET AND SHALL BE COMPATIBLE WITH CALTRANS, NEMA TS1 AND NEMA TS2 DETECTOR RACKS. THE CARDS SHALL PROVIDE TRUE PRESENCE DETECTOR CALLS OR CONTACT CLOSURE TO THE TRAFFIC CONTROLLER.
3. THE UNIT SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM, AS RECOMMENDED BY THE MANUFACTURER. CABLE(S) SHALL BE PROVIDED AS REQUIRED AND RECOMMENDED BY THE MANUFACTURER.
4. SURGE PROTECTION DEVICES, AS RECOMMENDED BY THE MANUFACTURER SHALL BE INCLUDED BOTH AT THE POLE WHERE THE UNIT IS LOCATED TO PROTECT THE UNIT AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.
5. THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE

ONSITE TRAINING ON THE SETUP, OPERATION AND MAINTENANCE OF THE UNIT.

6. A SERIAL TO ETHERNET COMMUNICATIONS MODULE AND ETHERNET CABLE (MINIMUM 7 FEET).
7. THE POWER SUPPLY AND COMMUNICATION MODULES SHALL BE SECURED TO A SINGLE PANEL THAT CAN BE MOUNTED INTERIOR TO THE TRAFFIC CABINET/ ENCLOSURE. THE PANEL SHALL INCLUDE MODULAR-PLUG STYLE CONNECTIONS FOR UP TO FOUR (4) SENSOR CABLES. ADDITIONAL SENSORS MAY BE HARD-WIRED TO THE COMMUNICATION MODULES, AS NECESSARY.
8. FOR THE AMISH BUGGY WARNING DETECTION SYSTEM (ABWDS), THE RADAR DETECTOR SHALL BE CAPABLE OF DETECTING A VEHICLE TRAVELING LESS THAN 15 MPH AND PROVIDING A CALL TO THE PROGRAMMABLE INTERFACE ONLY FOR VEHICLES TRAVELLING BELOW THIS SPEED. THIS CALL SHALL BE USED TO ACTIVATE THE EDGE-LIT LED SIGN.

PAYMENT FOR ITEM 809 STOP LINE RADAR DETECTION SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET/ ENCLOSURE HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT AND CONNECTIONS TESTED AND ACCEPTED.

ITEM 809 ADVANCE RADAR DETECTION

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN ADVANCE RADAR DETECTION UNIT FURNISHED BY WAVETRONIX. THE DETECTION UNIT SHALL INCLUDE THE FOLLOWING:

1. POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET.
2. ALL REQUIRED INPUTS CARDS SHALL BE INCLUDED IN THE TRAFFIC CABINET AND SHALL BE COMPATIBLE WITH CALTRANS, NEMA TS1 AND NEMA TS2 DETECTOR RACKS. THE CARDS SHALL PROVIDE TRUE PRESENCE DETECTOR CALLS OR CONTACT CLOSURE TO THE TRAFFIC CONTROLLER.
3. THE UNIT SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM, AS RECOMMENDED BY THE MANUFACTURER. CABLE(S) SHALL BE PROVIDED AS REQUIRED AND RECOMMENDED BY THE MANUFACTURER.
4. SURGE PROTECTION DEVICES, AS RECOMMENDED BY THE MANUFACTURER SHALL BE INCLUDED BOTH AT THE POLE WHERE THE UNIT IS LOCATED TO PROTECT THE UNIT AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.
5. THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE ON-SITE TRAINING ON THE SETUP, OPERATION AND MAINTENANCE OF THE UNIT.
6. THE POWER SUPPLY AND COMMUNICATION MODULES SHALL BE SECURED TO A SINGLE PANEL THAT CAN BE MOUNTED INTERIOR TO THE TRAFFIC CABINET. THE PANEL SHALL INCLUDE MODULAR-PLUG STYLE CONNECTIONS FOR UP TO FOUR (4) SENSOR CABLES. ADDITIONAL SENSORS MAY BE HARD-WIRED TO THE COMMUNICATION MODULES, AS NECESSARY.

PAYMENT FOR ITEM 809 ADVANCE RADAR DETECTION SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, CONNECTIONS TESTED AND ACCEPTED, AND ANY OTHER NECESSARY HARDWARE TO ESTABLISH A FULLY FUNCTIONAL DETECTION SYSTEM.

ITEM 809 ATC V6.24 CONTROLLER, AS PER PLAN (SR 87)

THE CONTROLLER UNIT SHALL BE FURNISHED AND INSTALLED PER SUPPLEMENTAL SPECIFICATION 809 AND SHALL BE LISTED ON THE TRAFFIC AUTHORIZED PRODUCTS (TAP) LIST.

THE CONTROLLER SHALL BE AN ECONOLITE COBALT AND COMPATIBLE WITH THE CABINET TYPE BEING INSTALLED.

PAYMENT FOR ITEM 809 ATC V6.24, CONTROLLER, AS PER PLAN (SR 87) WILL BE AT THE CONTRACT BID PRICE PER EACH COMPLETE AND IN PLACE INCLUDING ALL CONNECTIONS TESTED AND ACCEPTED.

ITEM 809 ATC V6.24 CONTROLLER, AS PER PLAN (SR 608)

THE CONTROLLER UNIT SHALL BE FURNISHED AND INSTALLED PER SUPPLEMENTAL SPECIFICATION 809 AND SHALL BE LISTED ON THE TRAFFIC AUTHORIZED PRODUCTS (TAP) LIST. THE CONTROLLER SHALL BE CAPABLE OF OPERATING THE

INTERSECTION CONFLICT WARNING SYSTEM (ICWS) BY USING THE LOGIC PROCESSOR TO TAKE INPUTS FROM THE LOOP DETECTORS AND WAVETRONIX RADAR DETECTORS AND OUTPUTTING FLASHING PATTERNS TO THE APPROPRIATE BEACON ASSEMBLIES. THE BEACON ASSEMBLIES SHALL FLASH FOR THE LENGTH OF TIME A VEHICLE IS PRESENT IN THE ASSOCIATED DETECTION ZONES, WITH A 3 SECOND ADDITIONAL PASSAGE TIME AFTER THE VEHICLE HAS LEFT THE ZONE.

THE CONTROLLER SHALL BE AN ECONOLITE COBALT AND COMPATIBLE WITH THE CABINET TYPE BEING INSTALLED.

PAYMENT FOR ITEM 809 ATC V6.24, CONTROLLER, AS PER PLAN (SR 608) WILL BE AT THE CONTRACT BID PRICE PER EACH COMPLETE AND IN PLACE INCLUDING ALL CONNECTIONS TESTED AND ACCEPTED.

GROUNDING AND BONDING

THE REQUIREMENTS OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (CMS) AND THE TC SERIES OF STANDARD CONSTRUCTION DRAWINGS ARE MODIFIED AS FOLLOWS:

1. ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDED CONDUCTOR IN THE POWER SERVICE DISCONNECT SWITCH.
 - A. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN METALLIC CONDUITS (725.04) IN ADDITION TO THE CONDUCTORS SPECIFIED AND BOND THE CONDUIT TO THIS GROUNDING CONDUCTOR.
 - B. WHEN AN EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN PLASTIC CONDUIT (725.05), THE INSTALLATION SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ADDITION TO THE CONDUCTORS SPECIFIED.
 - C. METALLIC CONDUIT CARRYING THE LOOP WIRES FROM IN THE PAVEMENT TO THE PULL BOX SPLICE LOCATION WILL ONLY BE BONDED AT THE PULL BOX END AND WILL NOT CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR.
 - D. IF MULTIPLE CONDUIT RUNS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
 - E. IF AN EQUIPMENT GROUNDING CONDUCTOR IS NEEDED IN CONDUIT BETWEEN SIGNALIZED INTERSECTIONS FOR UNDERGROUND INTERCONNECT CABLE, THE GROUNDING SYSTEM FOR EACH SIGNALIZED INTERSECTION WILL BE SEPARATED ABOUT MIDWAY BETWEEN THE INTERSECTIONS.
 - F. THE MESSENGER WIRE AT SIGNALIZED INTERSECTIONS WILL BE USED AS THE CONDUCTIVE PATH FROM CORNER TO CORNER IF CONDUIT IS NOT PROVIDED UNDER THE ROADWAY. WHEN CONDUIT CONNECTS THE CORNERS OF AN INTERSECTION, AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE USED IN THE CONDUIT.
2. CONDUITS
 - A. THE 725.04 CONDUIT SHALL HAVE GROUNDING BUSHINGS INSTALLED AT ALL TERMINATION POINTS. THE BUSHING MATERIAL SHALL BE COMPATIBLE WITH GALVANIZED STEEL CONDUIT AND THE GROUNDING LUG MATERIAL SHALL BE COMPATIBLE FOR USE WITH COPPER WIRE. THREADED OR COMPRESSION TYPE BUSHINGS MAY BE USED.
 - B. THE 725.05 CONDUIT SHALL HAVE THE INSIDE AND OUTSIDE DIAMETERS OF THE CONDUIT DEBURRED AT ALL TERMINATION POINTS. C. BOTH ENDS OF METALLIC CONDUIT SHALL BE BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
 - D. METALLIC CONDUIT MAY BE BONDED TO METALLIC BOXES THROUGH THE USE OF CONDUIT FITTINGS UL APPROVED FOR THIS TYPE OF CONNECTION, WITH THE BOX BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
3. WIRE FOR GROUNDING AND BONDING
 - A. USE INSULATED, COPPER WIRE FOR THE EQUIPMENT GROUNDING CONDUCTOR. BONDING JUMPERS IN BOXES AND ENCLOSURES MAY BE BARE OR INSULATED COPPER WIRE. WIRE SIZE SHALL BE AS FOLLOWS: I. USE 4 AWG BETWEEN THE POWER SERVICE AND SUPPORTS, POLES, PEDESTALS, CONTROLLER OR FLASHER CABINETS. II. USE A MINIMUM 8 AWG BETWEEN LOOP DETECTOR PULL BOXES AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE. III. USE A MINIMUM 8 AWG BETWEEN THE "PREPARE TO STOP WHEN FLASHING" INSTALLATION (INCLUDING SUPPORT) AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE. IV. THE INSULATION SHALL BE GREEN OR GREEN WITH YELLOW STRIPE(S). FOR 4 AWG OR LARGER, INSULATION MAY ALSO BE BLACK WITH GREEN TAPE/LABELS INSTALLED AT ALL ACCESS POINTS.
 - B. IN A HIGHWAY LIGHTING SYSTEM, THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE THE SAME WIRE SIZE AS THE

DUCT CABLE OR DISTRIBUTION CABLE CIRCUIT CONDUCTORS, WITH THE MINIMUM CONDUCTOR SIZE OF 4 AWG. BONDING JUMPERS WILL BE MINIMUM SIZE 4 AWG.

4. GROUND ROD
A. A 3/4 INCH SCHEDULE 40 PVC CONDUIT WILL BE USED IN FOUNDATIONS AND CONCRETE WALLS FOR THE GROUNDING CONDUCTOR (GROUND WIRE) RACEWAY TO THE GROUND ROD. SHOULD METALLIC CONDUIT BE USED, BOTH ENDS OF THE CONDUIT SHALL BE BONDED TO THE GROUNDING CONDUCTOR.

B. THE TYPICAL GROUNDING CONDUCTOR (GROUND WIRE) SHALL BE 4 AWG INSULATED, COPPER.

5. THE GREEN CONDUCTOR IN SIGNAL CABLES (CONDUCTOR #4) SHALL NOT BE USED TO SUPPLY POWER TO A SIGNAL INDICATION. IT WILL BE CONNECTED TO THE SIGNAL BODY AS AN EQUIPMENT GROUND IN ALUMINUM HEADS AND IT WILL BE UNUSED IN PLASTIC HEADS. UNUSED CONDUCTORS SHALL BE GROUNDED IN THE CABINET. TYPICAL USE OF CONDUCTORS IS AS FOLLOWS:

- COND. NO./COLOR/VEHICLE SIGNAL/PEDESTRIAN SIGNAL
- 1/BLACK/GREEN BALL/#1 WALK
 - 2/WHITE/AC NEUTRAL/AC NEUTRAL
 - 3/RED/RED BALL/#1 DW/FDW
 - 4/GREEN/EQUIPMENT GROUND/EQUIPMENT GROUND
 - 5/ORANGE/YELLOW BALL/#2 DW FDW
 - 6/BLUE/GREEN ARROW/#2 WALK
 - 7/WHITE WITH BLACK STRIPE/YELLOW ARROW/NOT USED

6. POWER SERVICE AND DISCONNECT SWITCH
A. AT THE POWER SERVICE LOCATION, THE GROUNDING CONDUCTOR (GROUND WIRE) FROM THE DISCONNECT SWITCH NEUTRAL (AC-) BAR TO THE GROUND ROD SHALL BE A CONTINUOUS, UNSPLICED CONDUCTOR. IF SPLICED, IT SHALL BE AN EXOTHERMIC WELD BUTT SPLICE.

B. THE SERVICE NEUTRAL (AC-) SHALL ONLY BE CONNECTED TO GROUND AT THE PRIMARY POWER SERVICE DISCONNECT SWITCH.
I. NEMA CONTROLLER CABINETS: IF A POWER SERVICE DISCONNECT SWITCH IS LOCATED BEFORE THE CONTROLLER CABINET, THE NEUTRAL (AC-) AND THE GROUNDING BARS IN THE CONTROLLER CABINET SHALL NOT BE CONNECTED TOGETHER AS SHOWN IN NEMA TS-2, FIGURE 5-4.
II. IF SECONDARY DISCONNECT SWITCHES ARE CONNECTED AFTER THE PRIMARY DISCONNECT SWITCH, THE NEUTRAL (AC-) SHALL ONLY BE GROUNDED AT THE PRIMARY SWITCH. EQUIPMENT GROUNDING CONDUCTORS SHALL BE BROUGHT TO THE PRIMARY SWITCH BUT SHALL BE GROUNDED AT BOTH SECONDARY AND PRIMARY SWITCHES.

7. PAYMENT - ALL MATERIALS AND WORK REQUIRED TO COMPLETE THE EFFECTIVE GROUND FAULT CURRENT PATH SYSTEM ARE INCIDENTAL TO THE CONDUCTORS INSTALLED BY CONTRACT.

GUARANTEE

THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF 90 DAYS FOLLOWING COMPLETION OF THE 10-DAY PERFORMANCE TEST. IN THE EVENT OF UNSATISFACTORY OPERATION THE CONTRACTOR SHALL CORRECT FAULTY INSTALLATIONS, MAKE REPAIRS AND REPLACE DEFECTIVE PARTS WITH NEW PARTS OF EQUAL OR BETTER QUALITY. EQUIPMENT, MATERIAL AND LABOR COSTS INCURRED IN CORRECTING AN UNSATISFACTORY OPERATION SHALL BE BORNE BY THE CONTRACTOR.

THE GUARANTEE SHALL COVER THE FOLLOWING ITEMS OF THE TRAFFIC CONTROL SYSTEM: FLASHER CONTROLLERS AND ASSOCIATED EQUIPMENT, DETECTOR UNITS, AND SIGN BEACON ASSEMBLY ITEMS.

CUSTOMARY MANUFACTURER'S GUARANTEES FOR THE FOREGOING ITEMS SHALL BE TURNED OVER TO THE MAINTAINING AGENCY FOLLOWING ACCEPTANCE OF THE EQUIPMENT.

THE COST OF GUARANTEEING THE TRAFFIC CONTROL SYSTEM WILL BE INCIDENTAL TO AND INCLUDED IN THE CONTRACT UNIT PRICE OF THE VARIOUS ITEMS MAKING UP THE SYSTEM.

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TRAFFIC SPECIFICATIONS

GEA-COUNTY
WIDE SAFETY