

**ITEM 630 - SIGNING MISC.: OVERHEAD MOUNTED SOLAR POWERED RECTANGULAR RAPID FLASHING BEACON**

**1. RRFB INDICATIONS**

- A. EACH RRFB INDICATION LENS SHALL BE A MINIMUM SIZE OF APPROXIMATELY 5" WIDE X 2" HIGH.
- B. THE RRFB INDICATIONS SHALL BE ALIGNED HORIZONTALLY, WITH THE LONGER DIMENSION OF THE INDICATION HORIZONTAL. THERE SHALL BE ONE LED LIGHT INDICATOR FACING THE TRAVEL DIRECTION FOR THE POLE MOUNTED RRFB, AND THERE SHALL BE TWO LED LIGHT INDICATORS, ONE FACING EACH DIRECTION, FOR THE MAST ARM LED LIGHT INDICATOR.
- C. EACH RRFB SHALL BE SUPPLIED WITH ALL REQUIRED HARDWARE TO INSTALL ASSEMBLY. ALL EXPOSED HARDWARE SHALL BE ANTI-VANDAL.
- D. EACH POLE MOUNTED RRFB LED LIGHT INDICATOR SHALL BE LOCATED BETWEEN THE BOTTOM OF THE CROSSING WARNING SIGN AND THE TOP OF THE SUPPLEMENTAL DOWNWARD DIAGONAL ARROW PLAQUE, AS SHOWN ON THE DETAIL.
- E. EACH OVERHEAD MOUNTED RRFB LED LIGHT INDICATOR SHALL BE LOCATED BELOW THE BOTTOM OF THE CROSSING WARNING SIGN, AS SHOWN ON THE DETAIL.
- F. THE LIGHT INTENSITY OF THE YELLOW INDICATIONS SHALL MEET THE MINIMUM CLASS 1 SPECIFICATIONS OF SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) STANDARD J595 (DIRECTIONAL FLASHING OPTICAL WARNING DEVICES FOR AUTHORIZED EMERGENCY, MAINTENANCE, AND SERVICE VEHICLES) DATED JANUARY, 2005.
- G. TO MINIMIZE EXCESSIVE GLARE DURING NIGHTTIME CONDITIONS, AN AUTOMATIC SIGNAL DIMMING DEVICE SHALL BE USED TO REDUCE THE BRILLIANCE OF THE RRFB INDICATIONS.
- H. THE PUSHBUTTON INTERGRAL TO THE RRFB SHALL BE INTERNALLY ILLUMINATED.

**2. SIGNS**

- A. ALL SIGN ASSEMBLIES SHALL USE ANTI-VANDAL FASTENERS TO MOUNT COMPONENTS TO SIGN AND SIGN TO FIXTURE.
- B. PEDESTRIAN PUSHBUTTONS SIGNS SHALL BE PROVIDED AND INCLUDE THE LEGEND "PUSH BUTTON TO TURN ON WARNING LIGHTS", SIGNS SHOULD BE MOUNTED ABOVE EACH PEDESTRIAN PUSHBUTTON.
- C. TWO SETS OF R1-9 SIGNS SHALL BE REQUIRED PER UNIT FOR VIEW FROM EACH APPROACH.
- D. ASSURE SIGN MEETS THE REQUIREMENTS OF C&MS 630.

**3. CONTROL CIRCUIT**

- A. THE CONTROL CIRCUIT SHALL HAVE THE CAPABILITY OF INDEPENDENTLY FLASHING UP TO TWO INDEPENDENT OUTPUTS. THE LED LIGHT OUTPUTS AND FLASH PATTERN SHALL BE COMPLETELY PROGRAMMABLE.
- B. THE CONTROL CIRCUIT SHALL BE SEALED WATERTIGHT TO ELIMINATE DIRT CONTAMINATION AND ALLOW FOR SAFE HANDLING IN ALL WEATHER CONDITIONS.
- C. THE LEDS SHALL BE SEALED AGAINST DUST AND MOISTURE INTRUSION AS PER THE REQUIREMENTS OF NEMA STANDARD 250-1991 FOR TYPE 4 ENCLOSURE AND TO PROTECT ALL INTERNAL LED AND ELECTRICAL COMPONENTS.

**ITEM 630 - SIGNING MISC.: OVERHEAD MOUNTED SOLAR POWERED RECTANGULAR RAPID FLASHING BEACON SIGN ASSEMBLY. CONTINUED**

**4. BATTERY AND SOLAR PANELS**

- A. BATTERY UNIT SHALL BE A 12VDC, 35 AHR MINIMUM, SEALED GEL OR AGM LEAD ACID BATTERY. BATTERIES SHALL HAVE A WRITTEN TWO YEAR FULL REPLACEMENT WARRANTY.
- B. THE SOLAR PANEL SHALL PROVIDE A MINIMUM OF 40 WATTS PEAK TOTAL OUTPUT.
- C. THE SOLAR PANEL SHALL BE MOUNTED TO AN ALUMINUM PLATE AND BRACKET AT AN ANGLE OF 45 DEGREES- 60 DEGREES TO PROVIDE MAXIMUM OUTPUT.
- D. ALL FASTENERS USED SHALL BE ANTI-VANDAL.

**5. WIRELESS RADIO**

- A. RADIO CONTROL SHALL OPERATE ON A 900 MHZ FREQUENCY HOPPING SPREAD SPECTRUM NETWORK, WI-FI OR APPROVED EQUAL.
- B. RADIO SHALL INTEGRATE COMMUNICATION OF RRFB CONTROL CIRCUIT TO ACTIVATE SIGN FROM PUSHBUTTON INPUT.
- C. THE RADIO SHALL BE SYNCHRONIZED SO ALL OF THE REMOTE RRFB LIGHT INDICATIONS WILL TURN ON WITHIN 120 MSEC OF EACH OTHER AND REMAIN SYNCHRONIZED THROUGH-OUT THE DURATION OF THE FLASHING CYCLE.

**6. PUSHBUTTON**

- A. THE PUSHBUTTON SHALL BE CAPABLE OF CONTINUOUS OPERATION OVER A TEMPERATURE RANGE OF -30 DEGREES F TO +165 DEGREES F.
- B. PUSHBUTTON SHALL BE ADA COMPLIANT

**7. OVERHEAD SUPPORT**

- A. MOUNT ON A STANDARD TC-16.21 DESIGN 5 SINGLE ARM OVERHEAD SUPPORT WITH A 21 FOOT ARM. FOUNDATION SHALL BE A STANDARD TC-21.20 FOR A STANDARD TC-16.21 DESIGN 5 SUPPORT.

**CONSTRUCTION**

THE RRFB SHALL BE ASSEMBLED AND CONSTRUCTED BY THE CONTRACTOR AS SHOWN AND SPECIFIED ON THE PLANS.

**WARRANTY**

WARRANTY SHALL BE TWO YEARS FROM THE DATE OF FINAL ACCEPTANCE.

**MEASUREMENT**

THE DEPARTMENT WILL MEASURE THE ITEM COMPLETE IN PLACE, INCLUDING ALL MATERIALS, TESTING, LABOR AND SOFTWARE FOR A FULLY FUNCTIONAL UNIT.

**PAYMENT**

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE PER EACH FOR ITEM 630 - SIGNING MISC.: OVERHEAD MOUNTED SOLAR POWERED RECTANGULAR RAPID FLASHING BEACON SIGN ASSEMBLY FOR ALL OF THE ITEMS LISTED IN THIS NOTE. THE R1-9 SIGNS AND THE 2 RIGID OVERHEAD SIGN SUPPORT FOUNDATIONS ARE PAID SEPARATELY FROM THIS PAY ITEM.

**ITEM 632 - REMOVAL OF MISCELLANEOUS TRAFFIC SIGNAL ITEM: PEDESTRIAN HEADS, PUSHBUTTONS AND WIRING**

THE REMOVAL AND DISPOSAL OF THESE ITEMS SHALL INCLUDE THE REMOVAL FROM THE EXISTING SIGNAL POLE ALONG THE NORTHWEST CORNER OF COLERAIN AVENUE AND EARL AVENUE 2 PEDESTRIAN HEADS AND ONE PUSH BUTTON. THE REMOVAL FROM THE EXISTING SIGNAL POLE ALONG THE SOUTHWEST CORNER OF COLERAIN AVENUE AND EARL AVENUE, ONE PEDESTRIAN HEAD AND ONE PUSH BUTTON. THE REMOVAL FROM THE EXISTING SIGNAL POLE ALONG TH NORTHEASTERN CORNER OF COLERAIN AVENUE AND BYRNESIDE DRIVE, ONE PEDESTRIAN HEAD AND ONE PUSHBUTTON. THIS ITEM ALSO INCLUDES THE REMOVAL OF THE RUNS OF SIGNAL CABLE FROM THE 4 PEDESTRIAN HEADS TO THE CONTROLLER CABINET. ANY HOLES LEFT IN THE EXISTING SIGNAL POLES SHALL BE PLUGGED.

**PAYMENT**

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE PER EACH FOR ITEM 632 - REMOVAL OF MISCELLANEOUS TRAFFIC SIGNAL ITEM: PEDESTRIAN HEADS, PUSHBUTTONS AND WIRING.

- 4 PEDESTRIAN HEADS
- 3 PUSH BUTTONS
- 1 WIRING
- 8 ITEMS

**ITEM 632 - MESSENGER WIRE MISC.: UNLASH AND RELASH**

THE EXISTING MESSENGER WIRE AND ASSOCIATED WIRING ON THE NORTHEAST AND NORTHWEST CORNERS OF COLERAIN AVENUE AND BYRNESIDE/ EARL INTERSECTION SHALL BE UNLASHED AND RELASED FOR THE INSTALLATION OF THE NEW CONDUCTOR.

**PAYMENT**

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE PER FOOT FOR ITEM 632 - MESSENGER WIRE MISC.: UNLASH AND RELASH

**ITEM 659 - 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 246 CU. YD.
- 659, SEEDING AND MULCHING 2230 SQ. YD.
- 659, REPAIR SEEDING AND MULCHING 111 SQ. YD.
- 659, INTER-SEEDING 111 SQ. YD.
- 659, COMMERCIAL FERTILIZER 0.3 TON
- 659, LIME 0.5 ACRES
- 659, WATER 12 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.



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| SHEET NUM. |    |   |    |    |    |    |    |    |    |       | PART.     |           | ITEM    | ITEM EXT  | GRAND TOTAL | UNIT                             | DESCRIPTION   | SEE SHEET NO. |
|------------|----|---|----|----|----|----|----|----|----|-------|-----------|-----------|---------|-----------|-------------|----------------------------------|---|---------------|
| 4          | 5  | 6 | 10 | 11 | 12 | 13 | 14 | 15 | 38 | 67    | 01/SAF/OT | 02/SAF/OT |         |           |             |                                  |   |               |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | SPECIAL | 638E86000 | 2           | EACH                             | WATER WORK<br>SPECIAL-FIRE HYDRANT REMOVED (CIN. 1114)                                |               |
|            |    |   |    |    |    |    |    |    |    | 63    |           | 63        | SPECIAL | 638E87200 | 63          | FT                               | SPECIAL-3/4" COPPER WATER SERVICE LINE, W/ AQUA SHIELD (CIN. 1126)                    | 67            |
|            |    |   |    |    |    |    |    |    |    | 1     |           | 1         | SPECIAL | 638E88700 | 1           | EACH                             | SPECIAL-FURNISHING AND INSTALLING CURB AND ROADWAY BOX (RENEW) (CIN. 1131)            | 67            |
|            |    |   |    |    |    |    |    |    |    | 1     |           | 1         | SPECIAL | 638E86100 | 1           | EACH                             | SPECIAL-FURNISHING AND INSTALLING FIRE HYDRANT EXTENTION, (12" LONG) (CIN. 1115)      | 67            |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | SPECIAL | 638E86100 | 2           | EACH                             | SPECIAL-FURNISHING AND INSTALLING FIRE HYDRANT EXTENTION, (6" LONG) (CIN. 1115)       | 67            |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | SPECIAL | 638E86300 | 2           | EACH                             | SPECIAL-FURNISHING AND INSTALLING VALVE BOX COMPLETE (CIN. 1116)                      | 67            |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | SPECIAL | 638E85700 | 2           | EACH                             | SPECIAL-HAULING AND INSTALLING FIRE HYDRANT (CIN. 1112)                               | 67            |
|            |    |   |    |    |    |    |    |    |    | 1     |           | 1         | SPECIAL | 638E89296 | 1           | EACH                             | SPECIAL-RELOCATING EXISTING 5/8" FROST-PROOF METER SETTING (CIN. 1134)                | 67            |
|            |    |   |    |    |    |    |    |    |    | 57    |           | 57        | SPECIAL | 638E80600 | 57          | FT                               | SPECIAL-FURNISHING AND LAYING 6" DUCTILE IRON PIPE & FITTINGS (CIN. 1101)             | 67            |
|            |    |   |    |    |    |    |    |    |    |       |           |           |         |           |             |                                  | OTHER UTILITIES   |               |
|            | 4  |   |    |    |    |    |    |    |    |       |           | 4         | SPECIAL | 61199700  | 4           | EACH                             | GAS VALVE BOX ADJUSTED TO GRADE   | 5             |
|            |    |   |    |    |    |    |    |    |    |       |           |           |         |           |             |                                  | TRAFFIC CONTROL   |               |
|            |    |   |    |    |    |    |    |    |    | 70    |           | 70        | 630     | 03100     | 70          | FT                               | GROUND MOUNTED SUPPORT, NO. 3 POST  |               |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | 630     | 79500     | 2           | EACH                             | SIGN SUPPORT ASSEMBLY, POLE MOUNTED   |               |
|            |    |   |    |    |    |    |    |    |    | 107   |           | 107       | 630     | 80100     | 107         | SF                               | SIGN, FLAT SHEET  |               |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | 630     | 84510     | 2           | EACH                             | RIGID OVERHEAD SIGN SUPPORT FOUNDATION  |               |
|            |    |   |    |    |    |    |    |    |    | 1     |           | 1         | 630     | 84900     | 1           | EACH                             | REMOVAL OF GROUND MOUNTED SIGN AND DISPOSAL   |               |
|            |    |   |    |    |    |    |    |    |    | 1     |           | 1         | 630     | 86002     | 1           | EACH                             | REMOVAL OF GROUND MOUNTED POST SUPPORT AND DISPOSAL                                   |               |
|            | LS |   |    |    |    |    |    |    |    |       | LS        | 630       | 95000   | LS        |             |                                  | SIGNING, MISC.: OVERHEAD MOUNTED SOLAR POWERED RRFB ASSEMBLY                          | 5             |
|            | LS |   |    |    |    |    |    |    |    |       | LS        | 630       | 95000   | LS        |             |                                  | SIGNING, MISC.: POLE MOUNTED SOLAR POWERED RRFB ASSEMBLY                              | 5             |
|            |    |   |    |    |    |    |    |    |    | 840   |           | 840       | 642     | 30000     | 840         | FT                               | REMOVAL OF PAVEMENT MARKING   |               |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | 642     | 30020     | 2           | EACH                             | REMOVAL OF PAVEMENT MARKING   |               |
|            |    |   |    |    |    |    |    |    |    | 0.02  |           | 0.02      | 644     | 00300     | 0.02        | MILE                             | CENTER LINE   |               |
|            |    |   |    |    |    |    |    |    |    | 57    |           | 57        | 644     | 00404     | 57          | FT                               | CHANNELIZING LINE, 12"  |               |
|            |    |   |    |    |    |    |    |    |    | 56    |           | 56        | 644     | 00500     | 56          | FT                               | STOP LINE   |               |
|            |    |   |    |    |    |    |    |    |    | 1,083 |           | 1,083     | 644     | 00600     | 1,083       | FT                               | CROSSWALK LINE  |               |
|            |    |   |    |    |    |    |    |    |    | 281   |           | 281       | 644     | 00700     | 281         | FT                               | TRANSVERSE/DIAGONAL LINE  |               |
|            |    |   |    |    |    |    |    |    |    | 1     |           | 1         | 644     | 01300     | 1           | EACH                             | LANE ARROW  |               |
|            |    |   |    |    |    |    |    |    |    | 96    |           | 96        | 644     | 20800     | 96          | FT                               | YIELD LINE  |               |
|            |    |   |    |    |    |    |    |    |    |       |           |           |         |           |             |                                  | TRAFFIC SIGNALS   |               |
|            |    |   |    |    |    |    |    |    |    | 30    |           | 30        | 625     | 25400     | 30          | FT                               | CONDUIT, 2", 725.04   |               |
|            |    |   |    |    |    |    |    |    |    | 30    |           | 30        | 625     | 29000     | 30          | FT                               | TRENCH  |               |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | 625     | 32000     | 2           | EACH                             | GROUND ROD  |               |
|            |    |   |    |    |    |    |    |    |    | 30    |           | 30        | 625     | 36000     | 30          | FT                               | PLASTIC CAUTION TAPE  |               |
|            |    |   |    |    |    |    |    |    |    | 3     |           | 3         | 632     | 20720     | 3           | EACH                             | PEDESTRIAN SIGNAL HEAD (LED), TYPE D2   |               |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | 632     | 20750     | 2           | EACH                             | ACCESSIBLE PEDESTRIAN PUSHBUTTON  |               |
|            |    |   |    |    |    |    |    |    |    | 3     |           | 3         | 632     | 25010     | 3           | EACH                             | COVERING OF PEDESTRIAN SIGNAL HEAD  |               |
|            |    |   |    |    |    |    |    |    |    | 166   |           | 166       | 632     | 30500     | 166         | FT                               | MESSANGER WIRE, MISC.: UNLASH AND RELASH  | 6             |
|            |    |   |    |    |    |    |    |    |    | 256   |           | 256       | 632     | 40300     | 256         | FT                               | SIGNAL CABLE, 3 CONDUCTOR, NO. 14 AWG   |               |
|            |    |   |    |    |    |    |    |    |    | 256   |           | 256       | 632     | 40500     | 256         | FT                               | SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG   |               |
|            |    |   |    |    |    |    |    |    |    | 6     |           | 6         | 632     | 64020     | 6           | EACH                             | PEDESTAL FOUNDATION   |               |
|            |    |   |    |    |    |    |    |    |    | 2     |           | 2         | 632     | 89900     | 2           | EACH                             | PEDESTAL, 8', TRANSFORMER BASE  |               |
|            |    |   |    |    |    |    |    |    |    | 8     |           | 8         | 632     | 90020     | 8           | EACH                             | REMOVAL OF MISCELLANEOUS TRAFFIC SIGNAL ITEM: PEDESTRIAN HEAD, PUSHBUTTON, AND WIRING | 6             |
|            |    |   |    |    |    |    |    |    |    |       |           |           |         |           |             |                                  | MISCELLANEOUS STRUCTURE   |               |
|            | LS |   |    |    |    |    |    |    |    |       | LS        | 202       | 11201   | LS        |             |                                  | PORTIONS OF STRUCTURE REMOVED, AS PER PLAN  | 4             |
|            | 1  |   |    |    |    |    |    |    |    |       | 1         | 608       | 98200   | 1         | EACH        | WALKWAY, MISC.: 4" CONCRETE WALK | 4   |               |
|            |    |   |    |    |    |    |    |    |    |       |           |           |         |           |             |                                  | INCIDENTALS   |               |
|            |    |   |    |    |    |    |    |    |    |       | LS        | LS        | 614     | 11000     | LS          | LS                               | MAINTAINING TRAFFIC   |               |
|            |    |   |    |    |    |    |    |    |    |       | LS        | LS        | 623     | 10000     | LS          | LS                               | CONSTRUCTION LAYOUT STAKES AND SURVEYING  |               |
|            |    |   |    |    |    |    |    |    |    |       | LS        | LS        | 624     | 10000     | LS          | LS                               | MOBILIZATION  |               |

GENERAL SUMMARY

HAM-27-10.39

