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IN: 098666bur.nip
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633 CONTROLLER, MASTER, TRAFFIC RESPONSIVE, AS PER PLAN

THE MASTER CONTROLLER SHALL BE A 170E TIMER IN CONFORMANCE WITH THE PLAN SPECIFICATIONS. THE MASTER CONTROLLER SHALL BE MOUNTED IN THE INTERSECTION OF STATE ROUTE 44 AND AUBURN ROAD. SUFFICIENT ROOM SHALL BE PROVIDED IN THE CABINET RACK ASSEMBLY FOR MOUNTING THE CONTROLLER. INCLUDED WITH THE MASTER CONTROLLER SHALL BE A HAYES COMPATIBLE DIAL-UP MODEM THAT CAN BE USED FOR COMMUNICATING WITH THE CENTRAL OFFICE MONITOR.

412C PROM MODULE FOR THE MASTER SHALL BE CONFIGURED TO SUPPORT THE OS7 MASTER PROGRAM CONFIGURATION. DETAILS AVAILABLE UPON REQUEST.

ODOT WILL SUPPLY THE CONTRACTOR WITH THE MASTER PROGRAM.

SYSTEM TIMING ANALYSIS SHALL BE INCLUDED IN THIS PAY ITEM.

SYSTEM TIMING AND ANALYSIS

A. GENERAL DESCRIPTION

THE PURPOSE OF THIS WORK IS TO FURNISH ALL MATERIALS, LABOR, TOOLS AND EQUIPMENT NECESSARY TO PLACE INTO FULL OPERATION A TRAFFIC RESPONSIVE, CLOSED LOOP TRAFFIC SIGNAL COORDINATION SYSTEM.

THIS WORK SHALL CONSIST OF PREPARING SIGNAL TIMING AND TRAFFIC PROGRESSION PROGRAMS, LOADING THE PROGRAMS INTO THE SIGNAL SYSTEM, EVALUATING THE PERFORMANCE OF THE SYSTEM AND REFINING THE PROGRAMS AS NECESSARY TO OPTIMIZE TRAFFIC FLOW AND OPERATION. THE WORK SHALL INCLUDE TRAFFIC DATA COLLECTION AND EVALUATION, TRAFFIC SIGNAL PROGRESSION AND TIMING ANALYSES, DEVELOPMENT OF TRAFFIC ADJUSTED PATTERN SELECTION PARAMETERS, PERFORMING THE SYSTEM EVALUATION AND REFINEMENT OF THE SYSTEM OPERATION AND PREPARING AND SUBMITTING A SUMMARY REPORT FOR REVIEW AND APPROVAL BY THE ENGINEER.

IT IS THE INTENT OF THIS ITEM OF WORK TO OPTIMIZE ONLY CYCLE LENGTHS, PHASE SPLITS, PERMISSIVES AND OFFSETS AND NOT TO CHANGE THE ACTUAL PHASING (AS DEPICTED IN THE PHASE DIAGRAM) THAT IS PROVIDED IN THE PLAN.

AS PART OF THIS ITEM OF WORK, TRAFFIC COUNTS AND TURNING MOVEMENT COUNTS SHALL BE REQUIRED AT EACH INTERSECTION FOR THE FOUR (4) TIME PERIODS LISTED UNDER PART D - "SYSTEM TRAVEL STUDIES". THIS INFORMATION SHALL BE INCLUDED IN THE REPORT.

B. SYSTEMS ENGINEER OR TECHNICIAN:

THE WORK SHALL BE PERFORMED BY A PERSON EXPERIENCED IN TRAFFIC ENGINEERING OR TRAFFIC ENGINEERING TECHNOLOGY. THE SYSTEMS ENGINEER OR TECHNICIAN SHALL HAVE A MINIMUM OF FIVE (5) YEARS EXPERIENCE IN TRAFFIC ENGINEERING OR TRAFFIC ENGINEERING TECHNOLOGY (SPECIFICALLY RELATED TO THIS ITEM OF WORK) AND SHALL BE KNOWLEDGEABLE WITH THE DESIGN AND OPERATION OF "CLOSED LOOP" TRAFFIC CONTROL AND SURVEILLANCE SYSTEMS. THE SYSTEMS ENGINEER OR TECHNICIAN SHALL BE FAMILIAR WITH THE TYPE OF "CLOSED LOOP" SYSTEM INSTALLED AS PART OF THIS PROJECT AND SHALL HAVE PREVIOUSLY SET-UP AND FINED-TUNED A MINIMUM OF FIVE (5) SYSTEMS OF THIS TYPE.

THREE (3) COPIES OF A RESUME DOCUMENTING THE FOLLOWING SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL:

THE SYSTEM ENGINEER OR TECHNICIAN'S EDUCATION INCLUDING TRAINING IN TRAFFIC ENGINEERING TECHNOLOGY AND COMPLEX SIGNAL SYSTEM DESIGN.

THE SYSTEM ENGINEER OR TECHNICIAN'S FAMILIARITY WITH THE "CLOSED LOOP" TYPE SYSTEM TO BE USED ON THIS PROJECT AND EXPERIENCE IN SETTING UP AND FINE TUNING A SYSTEM OF THIS TYPE. A LISTING OF OTHER CLOSED LOOP SYSTEMS THAT THE SYSTEM ENGINEER OR TECHNICIAN HAS PROGRAMMED INTO THE TRAFFIC RESPONSIVE MODE SHALL BE PROVIDED TO THE ENGINEER FOR DOCUMENTATION PURPOSES.

A BRIEF DESCRIPTION OF PROPOSED METHODOLOGY OF DATA COLLECTION AND ANALYSIS, OF SYSTEM PARAMETER USAGE IN SYSTEM EVALUATION, OF FREQUENCY AND MEASUREMENT OF TRAVEL TIME AND DELAY, AND COMPARING ACTUAL VERSES SYSTEM MEASUREMENTS OF DELAYS - LEVEL OF SERVICE.

THE SYSTEMS ENGINEER OR TECHNICIAN UNDER AUTHORITY OF THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE OPERATION OF THE SYSTEM, FROM THE START OF THE 90 DAY PERFORMANCE GUARANTEE PERIOD (AS NOTED IN THE "GUARANTEE" PLAN NOTE SHOWN ON SHEET 175) UNTIL COMPLETION AND ACCEPTANCE OF THE FINAL SUMMARY REPORT BY THE ENGINEER. THE SYSTEMS ENGINEER OR TECHNICIAN SHALL PROVIDE A TWENTY FOUR (24) HOUR EMERGENCY PHONE NUMBER AND SHALL RESPOND TO SYSTEM RELATED PROBLEMS AS DEEMED NECESSARY BY THE ENGINEER TWENTY FOUR (24) HOURS A DAY, SEVEN DAYS A WEEK. THE ENGINEER RESERVES THE RIGHT TO REQUEST A SYSTEMS ANALYSIS THROUGHOUT THE ENTIRE DURATION OF THE 90 DAY GUARANTEE PERIOD, SHOULD NEW OR CONTINUING PROBLEMS OCCUR WITH THE OPERATION OF THE TRAFFIC RESPONSIVE SYSTEM.

THE ENGINEER RESERVES THE RIGHT TO REQUEST THAT THE CONTRACTOR PROVIDE A NEW SYSTEMS ENGINEER OR TECHNICIAN SHOULD THE CURRENT SYSTEMS ENGINEER OR TECHNICIAN FAIL TO PERFORM THE REQUIRED DUTIES IN A TIMELY AND PROFESSIONAL MANNER OR FAIL TO HAVE A FIRM UNDERSTANDING OF THE OPERATION AND PROGRAMMING OF THE CLOSED LOOP SYSTEM CONSTRUCTED UNDER THIS PROJECT.

THE SYSTEMS ENGINEER OR TECHNICIAN MAY DELEGATE NONTECHNICAL TASKS (I.E. TRAVEL TIME RUNS, INTERSECTION TRAFFIC COUNTS, ETC...) TO PERSONNEL UNDER HIS/HER DIRECT SUPERVISION, PROVIDED THAT APPROVAL IS RECEIVED BY THE ENGINEER PRIOR TO COMMENCING THIS WORK. THE SYSTEMS ENGINEER OR TECHNICIAN SHALL SUBMIT TO THE ENGINEER IN WRITING A LIST OF THOSE TASKS WHICH ARE TO BE PERFORMED BY OTHER PERSONNEL. THE ENGINEER RESERVES THE RIGHT TO DENY PART OR ALL OF THE REQUEST FOR WORK TO BE PERFORMED BY PERSONNEL OTHER THAN THE SYSTEMS ENGINEER OR TECHNICIAN.

C. TRAFFIC PROGRAMS:

SIGNAL PROGRESSION AND TIMING PROGRAMS SHALL BE DEVELOPED BY THE SYSTEMS ENGINEER OR TECHNICIAN FROM COUNT AND OCCUPANCY DATA OBTAINED FROM THE LOCAL INTERSECTION AND SYSTEM LOOP DETECTORS, SUPPLEMENTED BY FIELD COUNTS AND MEASUREMENTS AS REQUIRED. THE SIGNAL PROGRESSION PROGRAMS TO BE DEVELOPED SHALL BE AS FOLLOWS:

- THREE (3) INBOUND PREFERENTIAL (A.M. PEAK)
- THREE (3) OUTBOUND PREFERENTIAL (P.M. PEAK)
- THREE (3) AVERAGE (OFF PEAK)

NOTE: THE THREE AVERAGE PROGRAMS SHOULD UTILIZE VARYING CYCLE LENGTHS BASED ON TRAFFIC VOLUME, DENSITY AND OCCUPANCY TO MINIMIZE OVERALL INTERSECTION APPROACH DELAY TIME.

TWO (2) SPECIAL PROGRAMS FOR EITHER HIGH CONGESTION OR QUEUE BACKUP.

A MINIMUM OF THREE (3) TIMING PLANS FOR A BACK UP TIME BASE COORDINATED SYSTEM SHALL BE DEVELOPED AND PROGRAMMED INTO THE SYSTEM, TO REPLACE OR SUPPLEMENT THE TIMING PLANS SHOWN IN THE PLANS.

FOR THIS PROJECT, THE SYSTEM MUST REMAIN IN COORDINATION AT ALL TIMES, EVEN THOUGH THE MASTER CONTROLLER IS CAPABLE OF TRANSFERRING INTO A "FREE OPERATION" MODE.

THE FOLLOWING SYSTEM PARAMETERS SHALL BE ESTABLISHED:

- VOLUME, OCCUPANCY AND DIRECTIONALITY THRESHOLDS
- TRANSITION SMOOTHING FACTORS
- SYSTEM DETECTOR ASSIGNMENT
- SYSTEM DETECTOR WEIGHING

THE SYSTEMS ENGINEER OR TECHNICIAN MAY USE THE SOFTWARE PROVIDED WITH THE CENTRAL OFFICE MONITOR TO HELP ASSIST IN HIS/HER ANALYSIS OF THE OPERATION OF THE CLOSED LOOP SYSTEM.

D. SYSTEM TRAVEL TIME STUDIES:

THE SYSTEMS ENGINEER OR TECHNICIAN SHALL CONDUCT A SERIES OF TRAVEL TIME STUDIES FOR THE SYSTEM CONSTRUCTED AS PART OF THE PROJECT. THE STUDIES WILL MEASURE THE TIME IT TAKES TO TRAVEL FROM THE BEGINNING OF THE SYSTEM TO THE END OF THE SYSTEM, IN EACH DIRECTION. THE TRAVEL TIME STUDY PARAMETERS SHOULD BE BASED ON THE POSTED SPEED LIMIT; HOWEVER, DURING PEAK PERIODS IT MAY NOT BE POSSIBLE TO OBTAIN THE POSTED SPEED DUE TO LARGER TRAFFIC VOLUMES.

EACH SET OF TRAVEL TIME STUDIES SHALL INCLUDE A MINIMUM OF FIVE (5) RUNS THROUGH THE SYSTEM PER DIRECTION. TRAVEL TIME STUDIES SHALL BE CONDUCTED DURING "IDEAL" WEATHER CONDITIONS (I.E. NO SNOW, RAIN OR FOG, ETC...). THE FOUR (4) SEPARATE SETS OF TRAVEL TIME STUDIES SHALL INCLUDE THE FOLLOWING:

1. THE FIRST SET OF TRAVEL TIME STUDIES SHALL BE CONDUCTED BETWEEN THE HOURS OF 7:00 A.M. AND 9:00 A.M. ON WEEKDAYS.
2. THE SECOND SET OF TRAVEL TIME STUDIES SHALL BE CONDUCTED BETWEEN THE HOURS OF 12:00 NOON AND 1:00 P.M. WEEKDAYS.
3. THE THIRD SET OF TRAVEL TIME STUDIES SHALL BE CONDUCTED BETWEEN THE HOURS OF 4:30 P.M. AND 6:00 P.M. WEEKDAYS.
4. THE FOURTH SET OF TRAVEL TIME STUDIES SHALL BE CONDUCTED DURING ANY OF THE FOLLOWING NON-PEAK HOUR PERIODS:
 - A. 9:00 A.M. TO 11:00 A.M. MONDAY THROUGH SATURDAY
 - B. 7:00 P.M. TO 10:00 P.M. MONDAY THROUGH SATURDAY
 - C. 7:00 A.M. TO 10:00 P.M. SUNDAY

CALCULATED
ACB
CHECKED
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TRAFFIC SIGNAL
GENERAL NOTES

LAK-44-0.01