

# GENERAL NOTES

CALCULATED  
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GENERAL NOTES

LAKE COUNTY  
LAK-20-22.916/VARIOUS

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

1. THE SYSTEMS ENGINEER'S PROFESSIONAL REGISTRATION AND EDUCATION IN SIGNAL SYSTEM DESIGN.
2. THE SYSTEMS ENGINEER'S FAMILIARITY WITH "CLOSED LOOP" TYPE SYSTEMS TO BE USED ON THE PROJECT AND EXPERIENCE IN SETTING UP AND FINE TUNING A SYSTEM OF THIS TYPE.
3. A BRIEF DESCRIPTION OF PROPOSED METHODOLOGY OF:
  - A. DATA COLLECTION AND ANALYSIS
  - B. SYSTEM PARAMETER USAGE IN SYSTEM EVALUATION
  - C. FREQUENCY AND MEASUREMENTS OF TRAVEL TIME AND DELAY
  - D. COMPARING ACTUAL VERSUS SYSTEM MEASUREMENTS OF DELAYS (LEVEL OF SERVICE)

THE SYSTEMS ENGINEER, UNDER THE AUTHORITY OF THE GENERAL CONTRACTOR, SHALL BE RESPONSIBLE FOR THE OPERATION OF THE SYSTEM, FROM THE START OF THIS WORK UNTIL COMPLETION AND ACCEPTANCE OF THE SUMMARY REPORT BY THE ENGINEER. THE SYSTEMS ENGINEER SHALL PROVIDE A TWENTY-FOUR (24) HOUR EMERGENCY PHONE NUMBER AND SHALL RESPOND TO SYSTEMS RELATED PROBLEMS AS DEEMED NECESSARY BY THE ENGINEER OR DESIGNATE, TWENTY-FOUR (24) HOURS A DAY, SEVEN (7) DAYS PER WEEK.

THE ENGINEER RESERVES THE RIGHT TO REQUEST THAT THE CONTRACTOR PROVIDE A NEW SYSTEMS ENGINEER SHOULD THE CURRENT SYSTEMS ENGINEER 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.

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

1. THREE (3) INBOUND PREFERENTIAL
2. THREE (3) OUTBOUND PREFERENTIAL
3. THREE (3) AVERAGE  
NOTE: THE THREE AVERAGE PROGRAMS SHOULD UTILIZE VARYING CYCLE LENGTHS BASED UPON TRAFFIC VOLUME, DENSITY AND OCCUPANCY TO MINIMIZE OVERALL INTERSECTION APPROACH DELAY TIME.
4. TWO (2) SPECIAL PROGRAMS FOR EITHER HIGH CONGESTION OR QUEUE BACKUP
5. A MINIMUM OF FOUR (4) TIMING PLANS FOR A BACK UP TIME BASE COORDINATION SYSTEM SHALL BE DEVELOPED AND PROGRAMMED INTO THE SYSTEM, TO SUPPLEMENT THE TIMING PLANS SHOWN IN THE PLANS.
6. DEFINE SYSTEM PARAMETERS WHICH WILL ENABLE THE SYSTEM TO AUTOMATICALLY TRANSFER INTO A "FREE OPERATION" MODE DURING LIGHT TRAFFIC VOLUME PERIODS.

THE FOLLOWING SYSTEM PARAMETERS SHALL BE ESTABLISHED:

1. VOLUME, OCCUPANCY AND DIRECTIONALITY THRESHOLDS
2. TRANSITION SMOOTHING FACTORS
3. SYSTEM DETECTOR ASSIGNMENT
4. SYSTEM DETECTOR WEIGHING

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

THE SYSTEMS ENGINEER SHALL CONDUCT A SERIES OF TRAVEL TIME AND DELAY STUDIES FOR EACH SYSTEM OR SUB-SYSTEM ARTERY CONSTRUCTED AS PART OF THIS PROJECT. THE STUDY SHALL CONFORM TO THE PROCEDURES OUTLINED IN THE LATEST EDITION OF THE MANUAL OF TRAFFIC ENGINEERING STUDIES FROM THE INSTITUTE OF TRANSPORTATION ENGINEERS. THE STUDY SHALL BE PERFORMED USING THE "TEST CAR" METHOD. SAMPLES SHALL BE TAKEN PRIOR TO THE CONSTRUCTION OF SIGNAL SYSTEM TIMING AND PARAMETERS AND AFTER THE INSTALLATION AND REFINEMENT OF THE PARAMETERS TO DOCUMENT BEFORE AND AFTER CONDITIONS. DATA SHALL BE COLLECTED DURING THE MORNING, NOON AND EVENING PEAK PERIODS ON AN AVERAGE WEEKDAY. A WRITTEN REPORT SHALL BE PROVIDED DOCUMENTING THE DATE OF SURVEY, DAY OF WEEK, TIME OF DAY, TOTAL TRAVEL TIME AND TOTAL STOPPED DELAY.

A DRAFT SYSTEM SUMMARY REPORT SHALL BE PREPARED AND THREE (3) COPIES SHALL BE SUBMITTED FOR THE EVALUATION, REVIEW AND APPROVAL OF THE SYSTEM PROGRAMMING, OPERATION AND EFFICIENCY. THE REPORT SHALL SUMMARIZE THE SIGNAL PROGRESSION AND TIMING PROGRAMS THAT WERE ENTERED INTO THE SYSTEM. COPIES OF ALL DATA AND ANALYSIS CALCULATIONS FOR THE SYSTEM TIMING SHALL BE INCLUDED IN THE REPORT. THE SUMMARY REPORT SHALL INCLUDE AN EVALUATION OF THE SYSTEM OPERATION, EFFICIENCY AND PERFORMANCE. TWO COPIES SHALL BE SUBMITTED TO THE ENGINEER AND THE MAINTAINING AGENCY(S) OF THE SIGNAL SYSTEM FOR THE EVALUATION AND REVIEW OF THE SYSTEM PROGRAMMING, OPERATION AND EFFICIENCY.

AFTER THE DRAFT SYSTEM SUMMARY REPORT HAS BEEN SUBMITTED, THE ENGINEER WILL SCHEDULE A MEETING WHICH WILL INCLUDE THE SYSTEMS ENGINEER, THE CONTRACTOR, THE ENGINEER AND REPRESENTATIVES OF THE MAINTAINING AGENCY TO DISCUSS THE OPERATION OF THE TRAFFIC RESPONSIVE CLOSED LOOP SIGNAL SYSTEM. THIS MEETING SHALL OCCUR WITHIN FOUR (4) WEEKS AFTER THE DRAFT SYSTEM SUMMARY REPORT HAS BEEN SUBMITTED TO THE ENGINEER AND MAINTAINING AGENCY(S).

THE PURPOSE OF THE MEETING IS TO DISCUSS THE OPERATION OF THE TRAFFIC RESPONSIVE CLOSED LOOP SYSTEM CONSTRUCTED AND PROGRAMMED UNDER THIS PROJECT AND TO RECEIVE COMMENTS AND RECOMMENDATIONS FROM THE ENGINEER AND/OR MAINTAINING AGENCY(S) REGARDING POTENTIAL MODIFICATIONS TO THE OPERATION OF THE SYSTEM. THE SYSTEMS ENGINEER SHALL ANSWER ANY QUESTIONS REGARDING THE SYSTEM SUMMARY REPORT AS WELL AS THE OPERATION OF THE CLOSED LOOP SYSTEM.

FINAL ADJUSTMENTS SHALL BE MADE AS DIRECTED BY THE ENGINEER TO ADDRESS ANY CONCERNS WHICH ARE DISCUSSED AT THIS MEETING. ONE COPY OF A FINAL SYSTEM SUMMARY REPORT SHALL BE SUBMITTED TO THE ENGINEER AND ONE (1) ADDITIONAL COPY SHALL BE SUBMITTED FOR EACH MAINTAINING AGENCY FOR REVIEW AND APPROVAL. THE FINAL REPORT SHALL INCLUDE ANY REVISIONS TO THE DRAFT REPORT THAT ARE REQUESTED AS A RESULT OF THE SYSTEM OPERATION MEETING.

PAYMENT FOR 633 CONTROLLER ITEM MISC.: SYSTEMS TIMING AND EVALUATION WILL BE MADE AT THE CONTRACT PRICE AS A LUMP SUM FOR ALL TIMING PREPARATIONS, LOADING INTO THE SYSTEM, SYSTEM EVALUATIONS, TIME DELAY STUDIES AND ASSOCIATED REPORTS, SYSTEM OPERATION MEETING AND FINAL SYSTEM SUMMARY REPORT COMPLETELY SUPPLIED AND ACCEPTED.

#### 633 CONTROLLER, ACTUATED, BY PHASE, SOLID STATE, DIGITAL MICROPROCESSOR, MODEL: ASC\2-1000 ECONOLITE - ALTERNATE BID

THE CONTROLLER SHALL BE A MODEL: ASC\2-1000 ECONOLITE WITH INTERNAL TRANSCIEVER MODULE AS MANUFACTURED BY ECONOLITE CONTROL PRODUCTS AND SHALL INCORPORATE OR BE FURNISHED WITH ALL THE DESIGN FEATURES, AUXILIARY EQUIPMENT, ACCESSORIES, AND PREWIRED CABINET FEATURES AS REQUIRED IN THE STANDARD BID ITEM.

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE FOR EACH, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

#### 633 CONTROLLER, MASTER, TRAFFIC RESPONSIVE, MODEL: ASC\2M ECONOLITE - ALTERNATE BID

THE CONTROLLER SHALL BE A MODEL: ASC\2M ECONOLITE MASTER AS MANUFACTURED BY ECONOLITE CONTROL PRODUCTS AND SHALL INCORPORATE OR BE FURNISHED WITH ALL THE DESIGN FEATURES, AUXILIARY EQUIPMENT AND ACCESSORIES AS REQUIRED IN THE STANDARD BID ITEM.

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE FOR EACH, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

#### 633 CONTROLLER ITEM, MISC.: PREEMPTION, OPTICOM - ALTERNATE BID

THE PREEMPTION SHALL BE AN OPTICOM PREEMPTION EQUIPMENT, AS MANUFACTURED BY THE 3M COMPANY OF MINNEAPOLIS, MINNESOTA, AND SHALL INCORPORATE OR BE FURNISHED WITH ALL THE DESIGN FEATURES, AUXILIARY EQUIPMENT AND ACCESSORIES AS REQUIRED IN THE STANDARD BID ITEMS.

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE FOR EACH, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

#### 633 CONTROLLER ITEM, MISC.: PREEMPTION DETECTORS, OPTICOM MODEL 711 - ALTERNATE BID

THE PREEMPTION DETECTORS SHALL BE A MODEL: OPTICOM 711 AS MANUFACTURED BY 3M COMPANY AND SHALL INCORPORATE OR BE FURNISHED WITH ALL THE DESIGN FEATURES, AUXILIARY EQUIPMENT, ACCESSORIES AND CABINET FEATURES AS REQUIRED IN THE STANDARD BID ITEM.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

#### 633 CONTROLLER ITEM, MISC.: PREEMPT PHASE SELECTOR, OPTICOM MODEL 754 - ALTERNATE BID

THE PREEMPT PHASE SELECTOR SHALL BE A MODEL(S): OPTICOM 754 AS MANUFACTURED BY 3M COMPANY AND SHALL INCORPORATE OR BE FURNISHED WITH ALL THE DESIGN FEATURES, AUXILIARY EQUIPMENT, ACCESSORIES AND CABINET FEATURES AS REQUIRED IN THE STANDARD BID ITEM.

THIS ITEM SHALL BE MEASURED AS ONE ITEM PER INTERSECTION EVEN THOUGH MULTIPLE SELECTORS MAY BE NEEDED TO FULLFILL THE REQUIREMENTS OF THE PLANS FOR THE PROPER OPERATION OF THE INTERSECTION.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE FOR THE REQUIRED NUMBER OF PHASE SELECTORS NEEDED FOR EACH INTERSECTION, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

#### 632 SIGNAL CABLE, MISC.: PREEMPT DETECTOR CABLE OPTICOM MODEL 138 - ALTERNATE BID

THE PREEMPT DETECTOR CABLE SHALL BE A MODEL: OPTICOM 138 AS MANUFACTURED BY 3M COMPANY AND SHALL INCORPORATE OR BE FURNISHED WITH ALL THE DESIGN FEATURES, AUXILIARY EQUIPMENT, ACCESSORIES AND CABINET FEATURES AS REQUIRED IN THE STANDARD BID ITEM.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

#### 632 SIGNALIZATION, MISC.: MICROWAVE DETECTOR UNIT

THE CONTRACTOR SHALL FURNISH AND INSTALL A MAST ARM OR POLE MOUNTED DOPPLER RADAR MICROWAVE VEHICLE DETECTOR AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE DETECTOR FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

THE DETECTOR SHALL BE LIMITED TO THE FOLLOWING MANUFACTURERS AND MODEL OR EQUAL:

- A) MICROWAVE SENSORS, INC.  
7885 JACKSON ROAD  
ANN ARBOR, MICHIGAN 48103  
PHONE: (800) 521-0418  
FAX: (800) 874-5762  
DEVICE: TC-20 MICROWAVE RADAR DETECTOR
- B) WHELEN ENGINEERING CO.  
ROUTE 14, WINTRHOP ROAD  
CHESTER, CONN. 06412-0684  
PHONE: (860) 526-9504  
FAX: (860) 526-4078  
DEVICE: TDW-10 WIDE BEAM VEHICLE DETECTOR