**EXHIBIT A**

**SCOPE OF WORK**

**METROPLAN ORLANDO - TRAFFIC SIGNAL RETIMING CONTRACT**

**I GENERAL REQUIREMENTS**

The purpose of this contract is to provide MetroPlan Orlando with professional services for conducting needed corridor retiming efforts. The developed timing plans will be implemented directly in the field by the CONSULTANT, unless directed by the MetroPlan Orlando Project Manager or an authorized representative of the Maintaining Agency.

A major objective of this contract is to improve safety and efficiency along the corridors as expeditiously as possible while maintaining a high degree of thoroughness and professionalism. The CONSULTANT shall be aware that multiple Work Orders may be open concurrently.

The CONSULTANT shall ensure that all tasks and studies requiring field activities are conducted professionally and in a manner that utilizes accepted safety methods and practices. The safety of the traveling public and the CONSULTANT’S field staff shall be an essential goal of each field study activity.

**Acronyms: CADD** Computer Aided Design and Drafting

**FDOT** Florida Department of Transportation

**FHWA** Federal Highway Administration

**IMSA** International Municipal Signal Association

**MUTCD** Manual on Uniform Traffic Control Devices

**MUTS** Manual on Uniform Traffic Studies

**TMC** Turning Movement Counts

**TSMO** Transportation Systems Management and Operations

**Personnel**

The CONSULTANT's work shall be performed and/or directed by the key personnel identified in the technical/fee proposal by the CONSULTANT. Any changes in the indicated personnel or the CONSULTANT's office in charge of the work as identified in the CONSULTANT's proposal shall be subject to review and approval by MetroPlan Orlando.

**Subcontracting**

Should the CONSULTANT require the services of a specialist for specialty work, the CONSULTANT is authorized to subcontract these services under the provisions of the Standard Consultant Agreement. Firms selected for subcontracts must be approved in writing and be an FDOT-qualified firm prior to the CONSULTANT authorizing any such work. The CONSULTANT shall be fully responsible for the satisfactory performance, conclusions and recommendations of all subcontracted work.

**Issuance of Work Orders**

Authorization to perform one or more of the tasks described in this scope of services shall be conveyed to the CONSULTANT through a written work order or a verbal work order (followed by a faxed written or e-mailed work order) issued by the MetroPlan Orlando Project Manager. The work order shall specify the task to be conducted with a brief description; the location and project limits of each area; the desired tasks within the composite task; the date on which each task is to be completed and submitted to MetroPlan Orlando; and the total price to be paid to the consultant for each task type or additive. Each work order issued by the MetroPlan Orlando Project Manager shall serve as formal notice to proceed, effective on the date of the work order or on a subsequent date, if specified.

**Preliminary Report**

All tasks requiring a report shall have a preliminary report submitted to the Project Manager and Maintaining Agency prior to the submittal of the Final Report. The Project Manager and Maintaining Agency shall review and comment upon the Preliminary Report and return comments to the CONSULTANT. The Final Report will reflect the comments of the Project Manager and Maintaining Agency.

**Final Report**

All final reports submitted to the Project Manager and Maintaining Agency shall be signed, sealed, and dated by a Florida Registered Professional Engineer of the CONSULTANT (including all subcontracted work). Final documentation shall be submitted to the Project Manager and Maintaining Agency in electronic format, including an electronic copy of the final report in Adobe Acrobat PDF format, and any associated CADD files in DGN format, Synchro Files, and Spreadsheets.

**MetroPlan Staff Participation**

As a value‐added service, the CONSULTANT will be required to provide an opportunity (annually) for MetroPlan Orlando staff to join CONSULTANT staff on a “ride along” during the field reviews as a way to expand the knowledge base of MetroPlan Orlando staff – with respect to signal timing, modeling, data collection, and field studies – and to enhance the quality of the retiming program through shared knowledge of best practices.

**II STUDY TYPE**

This scope of work contains one (1) study type for which the CONSULTANT will be issued work orders. The study type and the work tasks associated are shown below:

##### Study Type I – Arterial Retiming

Task 1 - System Operation Review and Traffic Signal Equipment Inventory

Task 2 - Analysis, Implementation and Documentation

Task 3 - 8-Hour Turning Movement Count (with pedestrians, bicycles and trucks)

Task 4 - 6-Hour Turning Movement Count (with pedestrians, bicycles and trucks)

Task 5 - 4-Hour Turning Movement Count (with pedestrians, bicycles and trucks)

Task 6 - 24-Hour Traffic Count (Intersection)

Task 7 - 7-Day Continuous Traffic Count (Both Directions)

Task 8 - Public Presentation (OPTIONAL)

Task 9 - Miscellaneous Items

###### III DESCRIPTION OF STUDY TASKS

This section describes the study type included in this scope, the work required in each task and the task product(s). Also, the unit of payment for each work task is defined for the purpose of payment, and the period of performance typically expressed as a function of the number of units to be studied by the CONSULTANT. Payment for a supplemental work task is in addition to the payment for the study type.

**STUDY TYPE I: ARTERIAL RETIMING**

**1. Purpose**

This is intended to provide MetroPlan Orlando with specialized expertise in the retiming of arterials in Osceola, Orange and Seminole Counties upon request by members of the MetroPlan Orlando TSMO Advisory Committee or their representatives.

**2. Basis of Payment**

Payment is based upon the unit price for each arterial system (assuming a minimum of three intersections in the system) plus an additive for each additional intersection within that arterial/network. The established unit price for each system will be considered full compensation for all work required to perform this study. An additional established fee will be earned for each additive or supplemental work task if authorized by the Project Manager.

**3. Period of Performance**

The normal period allowed for the completion of an arterial retiming study is six (6) weeks (for a system of three intersections). For each additional signalized intersection an additional one (1) week of study time will be authorized. If multiple corridors are issued on a single work order, completion dates shall be specified on the task work order.

**4. Scope of Work**

This section specifies the work task to be performed by the CONSULTANT and the responsibilities of the CONSULTANT and MetroPlan Orlando.

**Task 1: SYSTEM OPERATION REVIEW AND TRAFFIC SIGNAL EQUIPMENT INVENTORY (**IMSA Level II certification required to complete this task)

Review and document the type, age, condition, capability of the equipment, and existing timing plan at each intersection within the arterial, existing phasing, number of lanes and lane assignments, and the coordinating medium on an agency of FDOT inspection form. Report to the Project Manager and Maintaining Agency any deficiencies noted upon discovery.

Task Products:

* Traffic signal equipment inventory.
* Existing traffic signal timing/phasing plan
* Sketch of lane configurations.

**Subtask 1A: Additive Intersection**

Additional intersection for same route and/or study.

**Task 2: ANALYSIS, IMPLEMENTATION AND DOCUMENTATION (**IMSA Level II certification required to complete this task)

Determine the optimum system timing pattern(s) for the optimum cycle length during different times of the day/week. When a system analysis is performed, the necessary settings to be developed will include but not limited to the following:

· Cycle Length · Splits · Offsets

· Force-offs · Permissives · TOD Plan

· Day-of-Week Plan

These parameters will be developed for the following timing plan periods:

* Day Plan: Inbound & Outbound Peak Hour(s) and Off-Peak Hour(s)
* Week Plan: Day plan to be implemented for each day of the week

For the purpose of this task, the following definitions apply:

A traffic control timing pattern is a set of cycle length(s), splits and offsets for a section.

A section is a portion of a traffic control system which can be controlled by a single set of timing parameters.

An analysis shall consist of at least the following steps:

1. Analyze and design local intersection timings for each intersection. Local timings to include all clearance intervals (yellow, all-red, and pedestrian clearance intervals).

1. Analyze and design coordinated intersection (system) timings with **Synchro (**or a similar design tool/software that is approved by MetroPlan Orlando and the Maintaining Agencywith Existing Phasing.

The CONSULTANT is responsible for selecting all input values required for the analysis. The CONSULTANT must use their own computer for all analyses to be performed under this study (the software used must be approved by the Project Manager and Maintaining Agency), and submit electronic files of all input/output timing development runs and data files (i.e., initial and final runs), along with any link/node diagrams. The format of the timing charts will be approved by MetroPlan Orlando and the appropriate Maintaining Agency.

All traffic count data required for the purpose of this study will either be provided by MetroPlan Orlando or will be obtained by the CONSULTANT under additional tasks (i.e. Task 3 – Task 6).

The CONSULTANT will obtain from the Maintaining Agency existing controller timings.

The CONSULTANT shall provide the Project Manager and Maintaining Agency two copies of the documentation for each of the timing patterns in an acceptable format. The report shall contain, but not limited to the following information:

1. Executive Summary
2. Optimum controller and coordination timing that can be implemented on existing hardware.
3. Master Clock Chart (Hardwire, TBC, UTCS, CLS)
4. Link/node diagrams
5. Data files on CD(s)
6. Arterial analysis and documentation.

After acceptance of the initial timings and patterns by the Project Manager and Maintaining Agency this task includes entering the intersection, system timings, developed by the CONSULTANT into the controller units, coordination units and master units by an IMSA - Level II signal technician. The CONSULTANT shall notify the Maintaining Agency prior to implementation and request their authorization during the implementation.

Also perform fine tuning of implemented timing(s) for each arterial based on field observation of the traffic operation during all developed peak hour patterns. The traffic engineer will observe the operation of the arterial for each timing pattern. *The traffic engineer shall be available to investigate and fine-tune any adjustments for a period of 30 days after the submittal of the final report.*

Should an existing controller, coordination unit, or master unit be inoperable or additional hardware or cabinet modifications be required at an intersection, the CONSULTANT will give verbal notification of the problem to the Project Manager and Maintaining Agency within the same day. Documentation in the report regarding the nature, extent and probable solution(s) to the problem(s) will be submitted to the Project Manager and Maintaining Agency within one week.

The CONSULTANT shall provide the Project Manager and Maintaining Agency two copies of the final documentation for each of the timing patterns in an acceptable format. The report shall contain, but not limited to the following information:

1. Final Implemented Timings

2. Day Plans

3. Week Plan

At the completion of the study, the CONSULTANT shall submit to the Project Manager and Maintaining Agency two (2) copies of a report (in an acceptable format) containing the following information:

1. Study Summary

2. Equipment Inventory

3. Final Intersection and System Timings

4. A table summarizing intersection delay (as reflected in Synchro)

5. Recommendations for other intersection/arterial improvements, where

applicable

6. 24‑hour, 7‑day counts arrayed in an acceptable format.

7. 8‑hour turning movement count arrayed in an acceptable format.

Task Product:

* Final report that is signed, sealed and dated by a professional engineer.

**Subtask 2A: Additive Intersection**

Additional intersection for System Timing Plan for same route and/or study.

**Subtask 2B: Additive Plan (Weekend)**

Additional System Timing Plan for same route and/or study on a weekend day (Saturday or Sunday), as determined by the Project Manager and Maintaining Agency.

**Subtask 2C: Additive Intersection (Weekend)**

Additional intersection for a Weekend System Timing Plan for same route and/or study.

**Task 3: 8-HOUR TURNING MOVEMENT COUNT/PEDESTRIANS AND BICYCLES**

An 8-Hour TMC shall be taken for those hours encompassing the morning, midday peak and afternoon traffic periods and/or peak periods during which warranting volumes exist in an off-peak period. Each period shall normally consist of a minimum of eight (8) consecutive 15-minute intervals (2 hours) during each period which yields the highest total volume of vehicles entering the intersection. Note that the 2-hour period could begin on any quarter hour. For example, the afternoon peak could be from 4:45 PM to 6:45 PM. Vehicles must be counted by personnel or other approved automated equipment as directed by the Project Manager and Maintaining Agency. They may use tally sheets or turning movement counter boards (mechanical/electronic) and must separately record the number of pedestrians and bicycles. The need for additional personnel to count traffic may be authorized as a supplemental (Task 3A).

A sketch of sufficient detail shall be made to show the approach lanes, left and right turn lanes, and whether there is a median or other type of separation. The traffic signal head arrangement and pedestrian features should be shown. The sketch should show whether the intersection is a "T" or a "Plus" type intersection, any offset, and the approximate skew if one exists. North shall be at the top of the page.

Task Products:

* 8-hour TMC providing hourly volume summaries.
* 8-hour TMC providing 15-minute volume summaries.
* 8-hour truck volume summaries.
* 8-hour pedestrian movement counts providing hourly summaries.
* Sketch of lane configurations.

If this data is provided as a separate document, it should include a title page, location map, the data presented on standard FDOT forms or as approved by the Project Manager, and any narrative necessary for the understanding or interpretation of the data.

**Subtask 3A: Additive - Additional Person**

One or more additional persons may be authorized by the Project Manager for the conduct of a TMC on an as needed basis.

**Task 4: 6-HOUR TURNING MOVEMENT COUNT/PEDESTRIANS AND BICYCLES**

A 6-Hour TMC shall be taken for those hours encompassing peak periods determined by the Project Manager and/or Maintaining Agency. Each period shall normally consist of a minimum of eight (8) consecutive 15-minute intervals (2 hours) during each period which yields the highest total volume of vehicles entering the intersection. Note that the 2-hour period could begin on any quarter hour. For example, the afternoon peak could be from 4:45 PM to 6:45 PM. Vehicles must be counted by personnel or other approved automated equipment as directed by the Project Manager and Maintaining Agency. They may use tally sheets or turning movement counter boards (mechanical/electronic) and must separately record the number of pedestrians and bicycles. The need for additional personnel to count traffic may be authorized as a supplemental (Task 4A).

A sketch of sufficient detail shall be made to show the approach lanes, left and right turn lanes, and whether there is a median or other type of separation. The traffic signal head arrangement and pedestrian features should be shown. The sketch should show whether the intersection is a "T" or a "Plus" type intersection, any offset, and the approximate skew if one exists. North shall be at the top of the page.

Task Products:

* 6-hour TMC providing hourly volume summaries.
* 6-hour TMC providing 15-minute volume summaries.
* 6-hour truck volume summaries.
* 6-hour pedestrian movement counts providing hourly summaries.
* Sketch of lane configurations.

If this data is provided as a separate document, it should include a title page, location map, the data presented on standard FDOT forms or as approved by the Project Manager, and any narrative necessary for the understanding or interpretation of the data.

**Subtask 4A: Additive - Additional Person**

One or more additional persons may be authorized by the Project Manager for the conduct of a TMC on an as needed basis.

**Task 5: 4-HOUR TURNING MOVEMENT COUNT/PEDESTRIANS AND BICYCLES (OPTIONAL)**

To be determined by the Project Manager or Maintaining Agency, a 4-Hour TMC shall be taken for a period of 4 hours encompassing the peak periods as determined by the Project Manager, which warranting volumes exist. Each period shall normally consist of a minimum of eight (8) consecutive 15-minute intervals (2 hours) during each period which yields the highest total volume of vehicles entering the intersection. Note that the 2-hour period could begin on any quarter hour. For example, the afternoon peak could be from 4:45 PM to 6:45 PM. Vehicles must be counted by personnel or other approved automated equipment. They may use tally sheets or turning movement counter boards (mechanical/electronic) and must separately record the number of pedestrians and bicycles. The need for additional personnel to count traffic may be authorized as a supplemental (Task 5A).

A sketch of sufficient detail shall be made to show the approach lanes, left and right turn lanes, and whether there is a median or other type of separation. The traffic signal head arrangement and pedestrian features should be shown. The sketch should show whether the intersection is a "T" or a "Plus" type intersection, any offset, and the approximate skew if one exists. North shall be at the top of the page.

Task Products:

* 4-hour TMC providing hourly volume summaries.
* 4-hour TMC providing 15-minute volume summaries.
* 4-hour truck volume summaries.
* 4-hour pedestrian movement counts providing hourly summaries.
* Sketch of lane configurations.

If this data is provided as a separate document, it should include a title page, location map, the data presented on standard FDOT forms or as approved by the Project Manager, and any narrative necessary for the understanding or interpretation of the data.

**Subtask 5A: Additive - Additional Person**

One or more additional persons may be authorized by the Project Manager for the conduct of a TMC on an as needed basis.

**Task 6: 24-HOUR TRAFFIC COUNT** (Intersection)

The CONSULTANT shall collect traffic count data on each approach to the intersection for a minimum period of 24 hours during typical weekday traffic conditions. In conducting the counts, the CONSULTANT shall utilize an automatic traffic counter which produces a written record of the traffic volumes and the time of day, either directly or through subsequent interconnection and processing with external electronic hardware. The count data shall be presented in an acceptable tabular form showing 15-minute interval volumes and hourly summaries.

Task Product:

* 24-hour approach volume counts.

If this data is provided as a separate document it should include a title page, location map, the data presented on standard FDOT forms or as approved by the Project Manager, and any narrative necessary for the understanding or interpretation of the data.

**Subtask 6A: Additive - 24-Hour Traffic Count** (Additional Approach)

When an intersection has more than 4 approaches or when there are adjacent legs or driveway openings that should be counted with the regular intersection the Project Manager may authorize the CONSULTANT to collect hourly traffic count data on one or more additional approaches to an intersection for a minimum period of 24 hours. In conducting these supplemental counts, the CONSULTANT shall utilize an automatic traffic counter which produces a written record of the traffic volume and the time of day as defined in Task 5 above.

**Task 7: 7-DAY CONTINUOUS TRAFFIC COUNT**

A count station is 1 location, 2 directions, or in the case of one-way pairs, 1 count for each direction.

To determine the volume of traffic utilizing a road, the Project Manager may authorize the collection of seven-day continuous traffic counts at select stations. In conducting the counts, the CONSULTANT shall utilize an automatic traffic counter which produces a written record of the traffic volume and the time of day, either directly or through subsequent interconnection and processing with external electronic hardware. From the count data, an acceptable tabular presentation of directional traffic volumes shall be developed showing 15-minute interval volumes and hourly summaries over the 7 consecutive day period. A graphical presentation shall be developed showing hourly interval volumes over the 7 consecutive day period. The 7-day period shall not include a holiday unless otherwise directed by the Project Manager and Maintaining Agency.

Task Product:

* 7-day graphs and tables.

If this data is provided as a separate document it should include a title page, location map, the data presented on standard FDOT forms or as approved by the Project Manager, and any narrative necessary for the understanding or interpretation of the data.

**Subtask 7A: ADDITIVE** (Additional Count Stations)

Additional 7-Day Continuous Traffic Count Stations requested for the same route and or study.

Task 8: PUBLIC PRESENTATION (OPTIONAL)

To be determined by the Project Manager and Maintaining Agency, the CONSULTANT shall prepare and present a PowerPoint (or approved alternative) presentation to summarize the scope of the project and steps taken to perform the retiming effort. The presentation shall summarize the improvements and show benefits in the forms of reduced delay to the corridor, improved end-to-end travel times along a corridor, increased crossing times for pedestrians, and/or other operational or safety benefits.

**Task 9: MISCELLANEOUS ITEMS**

This task shall involve items that are generally difficult to anticipate at the initiation of a work order. Compensation for tasks issued under this item shall be negotiated on a case by case basis. Work Orders to be issued under this task may include but are not limited to updating system retiming plans.