

**PROJECT UNDERSTANDING**

Kimley-Horn understands the LFUCG, Division of Traffic Engineering desires a consultant to develop new traffic signal timing plans for nineteen (19) intersections along two (2) specified corridors in the Fayette Mall area of Lexington (see attached intersection list) in an effort to improve traffic flow and reduce emissions. A detailed description of our methodology and scope of services is provided below.

**SCOPE OF SERVICES**

Kimley-Horn will provide the services specifically set forth below.

**Task 1 Project Coordination and Meetings**

Project Startup, Approach, Scheduling - Kimley-Horn will coordinate with LFUCG via phone/email as required to schedule meetings and for other joint activities. Kimley-Horn will work with LFUCG to identify the approach for the project. Kimley-Horn will prepare a project schedule and will respond to one set of comments from LFUCG.

Kick-off Meeting - Kimley-Horn will schedule and lead a kick-off meeting with LFUCG and will prepare an agenda, provide copies of the scope of services, provide the draft project schedule, and provide a meeting summary if requested.

Milestone Meeting - Kimley-Horn will prepare for and lead up to one (1) milestone meeting with LFUCG and will prepare an agenda, provide copies of the most recent progress report, and provide a meeting summary if requested. This milestone meeting is anticipated to consist of a cycle length review meeting.

Progress Reports and Invoicing - Kimley-Horn will prepare and submit monthly progress reports to accompany project invoices.

Subconsultant and Project Team Coordination - Kimley-Horn will maintain coordination with LFUCG via phone and email as required through the anticipated duration of this project (8 months). Kimley-Horn will revise the project schedule as directed by LFUCG for the anticipated duration of this project.

**Task 2 Data Collection**

Turning Movement Counts - Kimley-Horn will provide vehicular turning movement counts at up to twelve (12) intersections through our subconsultant, Abbie Jones Consulting (Disadvantaged Business Enterprise (DBE)). The turning movement counts on Saturday will be for 16 hours and the counts on Sunday will be for 11 hours. Utilizing signal system traffic count data from LFUCG and the turning movement counts, Kimley-Horn will review the provided and collected traffic information and provide balanced traffic volume figures for each day along each corridor (anticipated to be up to eight (8) figures).

Field Inventory - Kimley-Horn will perform a field visit to the project intersections. During the visit, Kimley-Horn will review aerial imagery of each intersection for information that may include intersection geometrics, street names, speed limits, traffic signal equipment locations, pedestrian crossing distances, turn lane storage lengths, and signal phasing.

As part of the field inventory effort, Kimley-Horn will observe existing platooning and progression of the traffic, confirm existing timing plans (cycle lengths, phasing sequences), observe queueing patterns, identify and monitor traffic flow patterns, and monitor sub-peaks within the weekend peak periods.

Travel Time Runs - Kimley-Horn will review and analyze the before and after travel time data provided by LFUCG. Kimley-Horn understands that the provided travel time data will be probe data from INRIX. The before travel time run data will be used to evaluate existing progression and locations where existing stops occur. It is assumed that the travel time data provided by LFUCG will include, at a minimum, overall travel time, overall stopped delay, and average speed. The after travel time run data will be analyzed for inclusion in the executive summary.

**Task 3            Timing Plan Development**

Synchro Update - Kimley-Horn will compare the information collected in Task 2 with the Synchro base files provided by LFUCG to verify the coding of intersection geometrics, street names, speed limits, turn lane storage lengths, and traffic signal phasing. Kimley-Horn will update and revise the Synchro base files as necessary to complete the signal timing plan development.

Cycle Length Evaluation - Kimley-Horn will conduct a cycle length evaluation using Synchro to evaluate the natural cycle of each project intersection. This evaluation will be supplemented using Poisson's distribution methodology to analyze uniform arrival requirements for each movement at each project intersection to determine total split requirements. The cycle length evaluation will be performed for up to eight (8) new timing plans or variable timing schemes. Cycle lengths will be sent to LFUCG for review and approval.

Split Development - Kimley-Horn will use the uniform arrival information from the cycle length evaluation to determine the optimal splits for each movement at each project intersection. The amount of green time to allocate to each movement will be based on intersection laneage, signal phasing, pedestrian accommodations, and an assumed uniform arrival of vehicles. Kimley-Horn will input the optimized splits into Synchro. The split development process will be performed for up to eight (8) new timing plans or variable timing schemes.

Offset and Phasing - Kimley-Horn will evaluate the overall project network to identify a recommended offset and phase sequencing in an effort to provide bidirectional progression. Using information developed during the kick-off meeting about intersections where phase sequencing must remain constant throughout the day, Kimley-Horn will review project intersections for lead/lag changes or flashing yellow arrow (FYA) changes. Offset and phasing recommendations will be provided for up to eight (8) new timing plans or variable timing schemes.

Time of Day Plans - Kimley-Horn will prepare a time-of-day (TOD) schedule based on the observed traffic volumes and the following schedule provided by LFUCG:

- Plan 11 Morning            (8:00am to 1:00pm)    -    Saturday
- Plan 13 MIDDAY            (1:00pm to 6:00pm)    -    Saturday
- Plan 15 Early Evening    (6:00pm to 9:00pm)    -    Saturday
- Plan 19 Late Evening    (9:00pm to 12:00am)   -    Saturday
- Plan 21 Morning            (9:00am to 1:00pm)    -    Sunday
- Plan 23 MIDDAY            (1:00pm to 4:00pm)    -    Sunday
- Plan 25 Early Evening    (4:00pm to 9:00pm)    -    Sunday
- Plan 27 Late Evening    (9:00pm to 10:00pm)   -    Sunday

Traffic Responsive - Kimley-Horn, with support from our subconsultant, Intelight, will prepare traffic responsive plans for the nineteen (19) project intersections. The Consultant will analyze volume data along the corridor to identify thresholds for the plans to be enacted. This task includes time for programming system detectors and programming the traffic responsive parameters for up to eight (8) plans. Finally, the corridor will be remotely monitored for up to three (3) weekends for further fine tuning and refinement.

#### **Task 4           Field Implementation**

Database Coding - Kimley-Horn, with support from our subconsultant, Intelight, will code the proposed timing plans into the converted MaxTime databases. During the development of the database for the new signal timing settings, the database will be reviewed and tested by Intelight.

Field Notebooks - Kimley-Horn will prepare signal timing notebooks to support the field implementation. The notebooks are anticipated to include pertinent correspondence, traffic counts, volume maps, cycle length evaluation, timing plans, time-space diagrams, intersection diagrams, and photos of key issues. Up to five (5) hard copies of the field notebooks will be prepared.

Field Controller Downloads – After database coding, Kimley-Horn will work with LFUCG to load the newly developed database files to the field controllers. The download is anticipated to occur remotely from the Division of Traffic Engineering office. LFUCG will provide staff as needed at the local intersections during this process to troubleshoot potential problems that may arise from the download process.

Fine-tuning - Kimley-Horn, with support from our subconsultant, Intelight, will provide two (2) teams of two (2) people (four (4) total staff) for fine-tuning of the weekend signal timing plans. These teams will monitor each of the TOD scheduled events and make adjustments, as needed, so that each TOD event is operational; they will observe new traffic operations at the project intersections and along corridors; they will drive the system to evaluate travel time, stops, and delay; and they will fine-tune the timings as necessary. Any changes made to the signal timing plans during fine-tuning will be noted in the field notebooks and provided to LFUCG.

#### **Task 5           Final Reporting**

Executive Summary - Kimley-Horn will develop an executive summary document for distribution to technical and non-technical audiences. The summary will provide information about the benefits and travel time reductions of the project. Kimley-Horn will prepare a draft summary and respond to one (1) set of consolidated review comments from LFUCG. After revising the summary, Kimley-Horn will submit the final executive summary to LFUCG. Kimley-Horn will provide up to ten (10) hardcopies of the executive summary.

### **ADDITIONAL SERVICES**

Any services not specifically provided for in the above scope will be billed as additional services and performed at our then current hourly rates. Additional services we can provide include, but are not limited to, the following:

- Weekday Peak Hour Signal Timing Plans;
- Special Event Signal Timing Plans;
- Environmental Services;
- Traffic Studies;
- Roadway and Signal Design and Permitting;
- Roadway Lighting Design.

### **INFORMATION PROVIDED BY CLIENT**

We shall be entitled to rely on the completeness and accuracy of all information provided by the Client or the Client's consultants or representatives. The Client shall provide all information requested by Kimley-Horn during the project, including but not limited to the following:

- Existing timing plan information
- As-built / record drawings of signal plans
- Traffic count data from field detection hardware
- Synchro 10 base files for study intersections
- Travel time data
- MaxTime and MaxView User Manuals
- Example tables of the expected new tables for Phases Sequence, Scheduler, Timing Plan Numbering Scheme, etc.
- Other documents relative to the execution of the project.

### **SCHEDULE**

We will provide our services as expeditiously as practicable to meet the mutually agreed upon schedule. The executive summary is anticipated to be submitted to LFUCG no later than May 15, 2019.

### **FEE AND EXPENSES**

Kimley-Horn will perform the services in **Tasks 1-5** for the total lump sum fee of **\$120,500**, as summarized in the following table. Individual task amounts are informational only. All permitting, application, and similar project fees will be paid directly by the Client.

Lump sum fees will be invoiced monthly based upon the overall percentage of services performed. Payment will be due within 25 days of your receipt of the invoice and should include the invoice number and Kimley-Horn project number.

Labor Task / Task Description:		Task Hour Subtotals	Task Fee Subtotals
<b>Task 1</b>	<b>Project Coordination and Meetings</b>	<b>76.0</b>	<b>\$ 14,000.00</b>
1.1	Project Startup, Approach, Scheduling	16.0	\$ 2,500.00
1.2	Kick-off meeting	12.0	\$ 2,000.00
1.3	Milestone meeting (1)	12.0	\$ 2,000.00
1.4	Progress reports and invoicing	16.0	\$ 2,000.00
1.5	Subconsultant/Project Team coordination	20.0	\$ 3,500.00
<b>Task 2</b>	<b>Data Collection</b>	<b>66.0</b>	<b>\$ 10,000.00</b>
2.1	Turning Movement Counts	10.0	\$ 1,500.00
2.2	Field Inventory	20.0	\$ 2,500.00
2.3	Before Travel Time Runs	18.0	\$ 2,500.00
2.4	After Travel Time Runs	18.0	\$ 2,500.00
<b>Task 3</b>	<b>Timing Plan Development</b>	<b>296.0</b>	<b>\$ 49,250.00</b>
3.1	Synchro update	20.0	\$ 3,000.00
3.2	Cycle length evaluation	32.0	\$ 5,000.00
3.3	Split development	20.0	\$ 5,000.00
3.4	Offset and phasing	32.0	\$ 5,000.00
3.5	Time of day plans	24.0	\$ 4,000.00
3.6	Traffic Responsive	168.0	\$ 25,000.00
<b>Task 4</b>	<b>Field Implementation</b>	<b>176.0</b>	<b>\$ 29,000.00</b>
4.1	Database coding and testing	60.0	\$ 9,000.00
4.2	Field notebooks	12.0	\$ 1,000.00
4.3	Field controller downloads	8.0	\$ 1,500.00
4.4	Fine-tuning	96.0	\$ 14,500.00
<b>Task 5</b>	<b>Final Reporting</b>	<b>36.0</b>	<b>\$ 5,250.00</b>
5.1	Executive summary	36.0	\$ 5,000.00
<i>Labor Tasks</i>		<i>650.0</i>	<i>\$ 99,000.00</i>
<i>Traffic Counts (Abbie Jones Consulting)</i>			<i>\$ 13,000.00</i>
<i>Project Expenses</i>			<i>\$ 8,500.00</i>
<b>Project Total</b>			<b>\$ 120,500.00</b>