




FINANCIAL IMPACT

There is no impact to the General Fund. The proposed street improvements will be funded by OCTA Measure M and Proposition 1B funds.

RECOMMENDATION

It is recommended that the City Council:

- Approve the Brookhurst Street Traffic Light Synchronization Program project MOU between OCTA and the City of Garden Grove.
- Authorize the Mayor to execute the Brookhurst Street Traffic Light Synchronization Program project MOU between OCTA and the City of Garden Grove.

  
KEITH G. JONES  
Director of Public Works

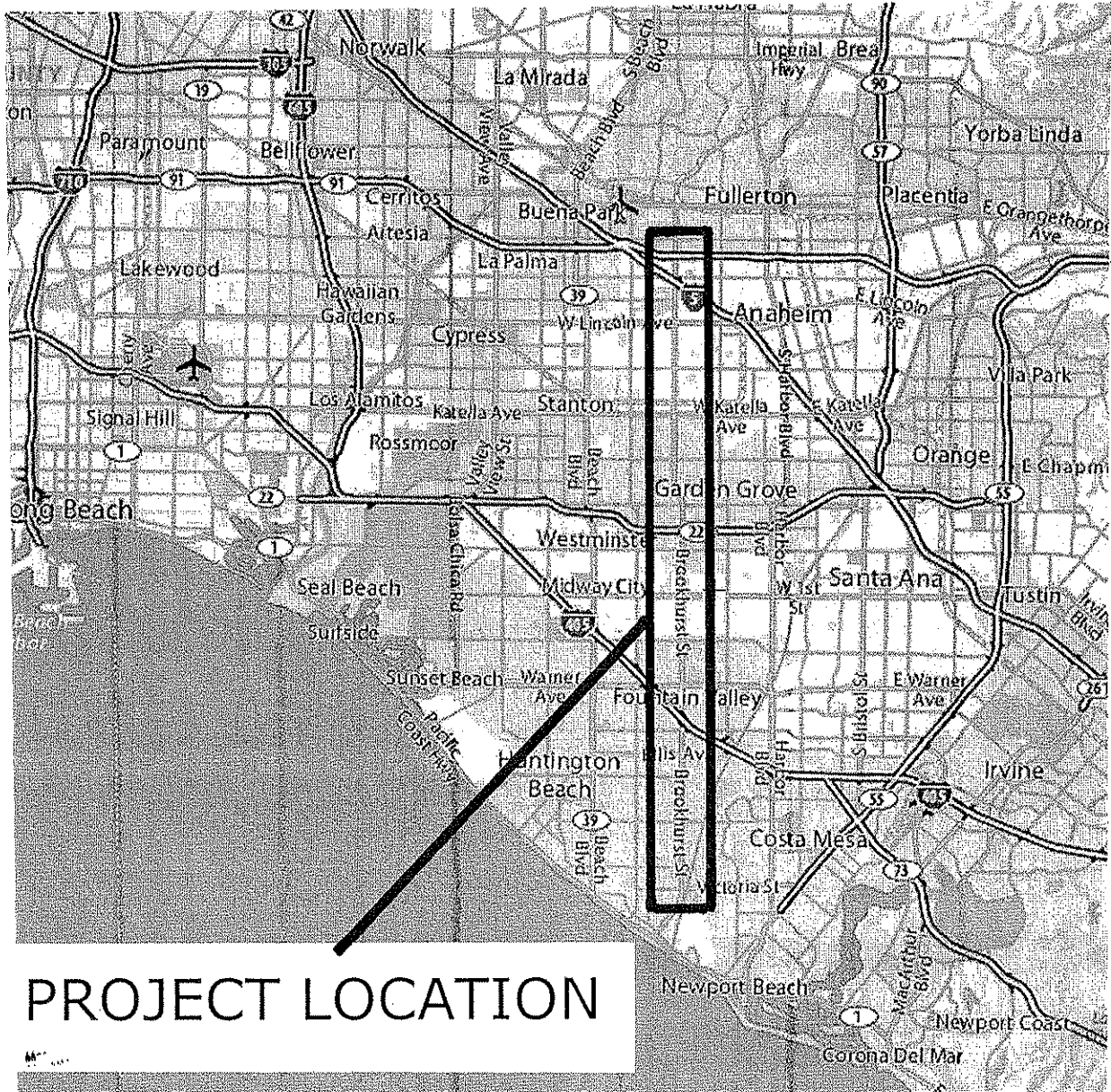
By: Dan Candelaria, P.E., T.E.  
City Traffic Engineer

**Recommended for Approval**

  
**Matthew Feral**  
City Manager

Attachment 1: Vicinity Map  
Attachment 2: Agreement

# VICINITY MAP



PROJECT LOCATION

MEMORANDUM OF UNDERSTANDING C-9-0622

BY AND BETWEEN

ORANGE COUNTY TRANSPORTATION AUTHORITY

AND THE CITIES OF

ANAHEIM, FOUNTAIN VALLEY, FULLERTON, GARDEN GROVE,

HUNTINGTON BEACH, WESTMINSTER

AND

THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

FOR

THE BROOKHURST STREET TRAFFIC LIGHT SYNCHRONIZATION PROGRAM PROJECT

The following Memorandum of Understanding (hereinafter, "MOU") is effective \_\_\_\_\_ day of \_\_\_\_\_, 2011 is entered by and between the Orange County Transportation Authority (hereinafter, "OCTA"), the City of Anaheim, the City of Fountain Valley, the City of Fullerton, the City of Garden Grove, the City of Huntington Beach, the City of Westminster, and the State of California Department of Transportation (Caltrans) hereinafter jointly referred to as the "AGENCIES" and severally as "AGENCY"; with regard to the following matters:

WHEREAS, coordinating traffic signals across cities' boundaries is a major component in enhancing countywide traffic flow and reducing congestion; and

WHEREAS, OCTA has successfully completed two interjurisdictional traffic signal synchronization demonstration projects (one located in the northern part of the Orange County and the other located in the southern part of Orange County); and

WHEREAS, OCTA has combined the Signal Improvement Program funds from Measure M with equal funds from Proposition 1B to create the Traffic Light Synchronization Program (hereinafter, "TLSP") of ten (10) countywide interjurisdictional corridors to be synchronized; and

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**MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT**

1           **WHEREAS**, the TLSP PROJECTS shall consist of corridors that will span a minimum of two  
2 jurisdictions, not require immediate street widening, and have sufficient traffic volumes to show a  
3 measurable benefit of interagency signal synchronization through cooperative time-based coordination;  
4 and

5           **WHEREAS**, OCTA and AGENCIES agree to the implementation of the Brookhurst Street Traffic  
6 Light Synchronization TLSP PROJECT (hereinafter, "PROJECT") as one of the ten (10) corridors for  
7 TLSP signal synchronization PROJECTS for Orange County; and

8           **WHEREAS**, the PROJECT will include approximately fifty seven (57) traffic signals located from  
9 the City of Fullerton to the City of Huntington Beach as illustrated in the PROJECT Scope of Work and  
10 associated Brookhurst Street TLSP Work by Location which is attached herein as Attachments A and  
11 B, respectively; and

12           **WHEREAS**, the PROJECT will also include hardware and software upgrades to traffic  
13 controllers, traffic telecommunications and inter-tie systems, central traffic master controllers and  
14 associated systems, (hereinafter collectively referred to as "traffic control elements"), and these traffic  
15 control elements will be constructed and/or installed and implemented as part of the PROJECT as  
16 identified in the PROJECT Scope of Work; and

17           **WHEREAS**, OCTA agree to work with AGENCIES to coordinate the inclusion of other traffic  
18 control elements that must be installed at the same time as the construction of the PROJECT that are  
19 NOT included in the PROJECT Scope of Work and will be the responsibility of the AGENCY owning  
20 each and any of those traffic control elements during the course of the project; and

21           **WHEREAS**, OCTA and AGENCIES acknowledge that other TLSP corridor projects are  
22 currently underway or completed which intersect the Brookhurst Street TLSP Project, and that these  
23 other TLSP corridor timing operations must be incorporated into the design and completion of the  
24 Brookhurst TLSP Project, and

25 /

26 / .

**MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT**

1           **WHEREAS**, OCTA and AGENCIES desire to enter into this MOU to demonstrate their  
2 commitment to improving transportation opportunities for Orange County and to develop and implement  
3 the Brookhurst Street TLSP Project;

4           **NOW, THEREFORE**, the AGENCIES and OCTA enter into the following Memorandum of  
5 Understanding with respect to the matters set forth herein:

6           **ARTICLE 1. COMPLETE AGREEMENT:**

7 This MOU, including all exhibits and documents incorporated herein and made applicable by reference,  
8 constitutes the complete and exclusive statement of the terms and conditions of the MOU between  
9 OCTA and AGENCIES concerning the PROJECT and supersedes all prior representations,  
10 understandings and communications between the parties. The above-referenced Recitals are true and  
11 correct and are incorporated by reference herein. The invalidity in whole or part of any term or condition  
12 of this MOU shall not affect the validity of other term(s) or condition(s).

13           **ARTICLE 2. RESPONSIBILITIES OF OCTA:**

14           OCTA agrees to the following responsibilities for PROJECT:

15           1. To retain oversight of the PROJECT by establishing PROJECT milestones and  
16 overseeing the PROJECT development.

17           2. OCTA shall maintain interface with the AGENCIES and outreach for the PROJECT.

18           3. OCTA shall assist in building consensus among the AGENCIES with respect to the  
19 required services for the PROJECT.

20           4. The AGENCIES and OCTA agree that PROJECT signal synchronization efforts shall  
21 focus on those time periods as specified in the PROJECT scope of work (see Attachments A and B).  
22 OCTA shall provide and collect all data necessary for the analysis and optimization of traffic signal  
23 of traffic signal timing specified in the PROJECT Scope of Work (see Attachments A and B).

24           6. OCTA shall develop new timing plans optimized for signal synchronization.

25           7. OCTA shall provide on-site support to implement the timing plans as necessary.

26           Timing plans are subject to each AGENCY'S review and approval.

MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT

1           8.           OCTA shall provide updated timing plans and all relevant data acquired for the  
2 signal timing analysis to the AGENCIES in Synchro format upon request.

3           9.           OCTA shall provide for all items required and specified in the Scope of Work and  
4 Brookhurst Street TLSP Work by Location (See Attachments A and B) to facilitate coordination and  
5 synchronization along Brookhurst Street TLSP Project including Caltrans specific installation of 2070  
6 Intersections Controllers and 170E Field Master Controllers.

7           10.          To prepare "before" and "after" studies of the PROJECT conditions. The "before"  
8 studies shall be completed by end of autumn 2010 and the "after" studies shall be completed by end  
9 of spring 2011.

10          11. To designate a technical lead person for liaison among the AGENCIES

11           **ARTICLE 3. RESPONSIBILITIES OF AGENCIES:**

12           AGENCIES agrees to the following responsibilities for PROJECT

13          1. To provide OCTA current intersection, local field master, and/or central control system  
14 timing plans and related data no later than thirty (30) days subsequent to the execution of this MOU,  
15 and updates as they occur within 7 days of the event.

16          2. To provide appropriate PS & E documentation for the Consultant to utilize in the  
17 construction of infrastructure required to implement the desired coordinated and synchronized  
18 systems and operations.

19          3. To waive all costs and fees related to any and all AGENCY required encroachment and  
20 inspection permits for the construction phase of the PROJECT

21          4. To give Brookhurst Street TLSP Project related signal and telecommunications  
22 equipment a high maintenance priority during the PROJECT.

23          5. To take reasonable steps to keep signal controls, inter-tie, and detection systems and  
24 equipment in proper working order during the PROJECT.

25          6. To maintain and repair the signal control inter-tie, and detection systems and equipment  
26 located within their jurisdiction.

MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT

1           7. To work with OCTA to determine which of the AGENCIES shall provide on-site support  
2 for timing plan changes and upgrades to all synchronization systems, components, equipment, and  
3 infrastructure systems as specified in the PROJECT scope of work. Each AGENCY's Traffic  
4 Engineer or authorized designee (which in some cases may be OCTA) shall be authorized to make  
5 changes or adjustments to the signal timing plans when required.

6           8. To perform the changes required at central or field control locations and/or intersection  
7 controller assemblies. When OCTA is required to make such changes, AGENCIES shall provide  
8 OCTA access to all necessary equipment.

9           9. To designate a technical lead person for liaison among the AGENCIES

10           **ARTICLE 4. MUTUAL RESPONSIBILITES OF OCTA AND AGENCIES:**

11           OCTA and AGENCIES agrees to the following mutual responsibilities for PROJECT:

12           1. PROJECT signal synchronization efforts shall focus on those time periods specified in  
13 the PROJECT scope of work, and/or as determined through the course of the PROJECT.

14           2. To attend and participate in all joint agencies related PROJECT meetings.

15           3. To cooperate and coordinate with all other agencies, their staff, contractors, consultants,  
16 vendors, in providing the services and responsibilities required under this MOU to the extent  
17 practicable with respect to the performance of the PROJECT.

18           4. The owning AGENCY shall be responsible for coordinating the construction and/or  
19 installation of traffic control elements and other items that are not included in the PROJECT Scope  
20 of Work but, by necessity, must be built concurrent, with the PROJECT.

21           5. To work together in good faith, using reasonable efforts to resolve any unforeseen issues  
22 and disputes arising out of the performance of this MOU.

23           6. This MOU may only be modified or amended upon written mutual consent of all  
24 AGENCIES. All modifications, amendments, changes and revisions of this MOU in whole or part,  
25 and from time to time, shall be binding upon the AGENCIES, so long as the same shall be in writing  
26 and executed by the AGENCIES.



**MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT**

1           7. This MOU shall be governed by all applicable federal, state and local laws. The  
2 AGENCIES warrant that in the performance of this MOU, each shall comply with all applicable  
3 federal, state and local laws, statutes and ordinances and all lawful orders, rules and regulations  
4 promulgated there under.

5           8. Each AGENCY agrees to defend, indemnify and hold harmless the other AGENCIES,  
6 their officers, agents, elected officials, and employees, from all liability, claims, losses and demands,  
7 including defense costs and reasonable attorneys' fees, whether resulting from court action or  
8 otherwise, arising out of the acts or omissions of the defending AGENCY, its officers, agents, or  
9 Employees, in the performance of this MOU. When acts or omissions of one AGENCY are directed  
10 by another AGENCY, the AGENCY directing the acts or omissions shall owe this defense and  
11 indemnity obligation to the AGENCY following the directions. The provisions of this paragraph 8  
12 shall survive termination of this MOU.

13           9. Each AGENCY shall be excused from performing its obligations under this MOU during  
14 the time and to the extent that it is prevented from performing by an unforeseeable cause beyond its  
15 control, including but not limited to: any incidence of fire, flood; acts of God; commandeering of  
16 material, products, plants or facilities by federal, state or local government; national fuel shortage; or  
17 a material act or omission by any other agency; when satisfactory evidence of such cause is  
18 presented to the other agencies, and provided further such nonperformance is unforeseeable,  
19 beyond the control and is not due to the fault or negligence of the agency not performing.

20           10. Any notice sent by first class mail, postage paid, to the address and addressee, shall be  
21 deemed to have been given when in the ordinary course it would be delivered. The representatives  
22 of the agencies who are primarily responsible for the administration of this MOU, and to whom  
23 notices, demands and communications shall be given are as detailed in Attachment C.

24           11. This MOU shall continue in full force and effect through December 31, 2011, unless  
25 terminated earlier by OCTA. The AGENCIES may elect to extend the term of this MOU for an  
26 additional six (6) months commencing January 1, 2012 and ending June 30, 2012.

**MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT**

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12. The term of this MOU may only be extended upon mutual written MOU by all AGENCIES.  
/End of Articles

MEMORANDUM OF UNDERSTANDING

AGREEMENT C-9-0622

BROOKHURST STREET T.L.S.P.

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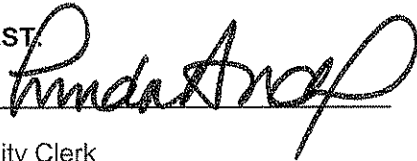
IN WITNESS WHEREOF, the AGENCIES hereto have caused this MOU No. C-9-0622 to be executed on the date first above written.

CITY OF ANAHEIM

By: 

Mayor

ATTEST

By: 

City Clerk

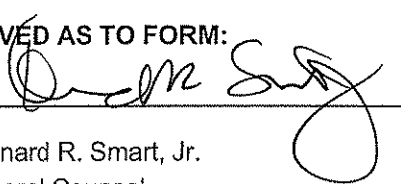
ORANGE COUNTY TRANSPORTATION AUTHORITY

By: \_\_\_\_\_

Meena Katakia, Manager

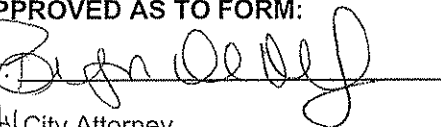
Capital Projects Contracts Administration

APPROVED AS TO FORM:

By: 

Kennard R. Smart, Jr.  
General Counsel

APPROVED AS TO FORM:

By: 

Deputy City Attorney



MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT

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**CITY OF FOUNTAIN VALLEY**

By: \_\_\_\_\_

Mayor

**ATTEST:**

By: \_\_\_\_\_

City Clerk

**APPROVED AS TO FORM:**

By: \_\_\_\_\_

City Attorney

MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT

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**CITY OF FULLERTON**

By: \_\_\_\_\_

Mayor

**ATTEST:**

By: \_\_\_\_\_

City Clerk

**APPROVED AS TO FORM:**

By: \_\_\_\_\_

City Attorney

MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT

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**CITY OF GARDEN GROVE**

By: \_\_\_\_\_

Mayor

**ATTEST:**

By: \_\_\_\_\_

City Clerk

MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
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**CITY OF HUNTINGTON BEACH**

By: \_\_\_\_\_

Mayor

**ATTEST:**

By: \_\_\_\_\_

City Clerk

**APPROVED AS TO FORM:**

By: \_\_\_\_\_

City Attorney

MEMORANDUM OF UNDERSTANDING  
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BROOKHURST STREET T.L.S.P.  
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**CITY OF WESTMINSTER**

By: \_\_\_\_\_

Mayor

**ATTEST:**

By: \_\_\_\_\_

City Clerk

**APPROVED AS TO FORM:**

By: \_\_\_\_\_

City Attorney



MEMORANDUM OF UNDERSTANDING  
AGREEMENT C-9-0622  
BROOKHURST STREET T.L.S.P.  
TRAFFIC LIGHT SYNCHRONIZATION PROJECT

1 CALIFORNIA DEPARTMENT OF TRANSPORTATION

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3 By: \_\_\_\_\_  
4 James Pinheiro  
5 Deputy District Director  
6 Operations and Maintenance  
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**Orange County Transportation Authority  
Traffic Light Synchronization Program (TLSP) Projects  
Scope of Work  
CONTRACT TASK ORDER  
For  
Brookhurst Street Corridor**

**February 15, 2010**



**1. INTRODUCTION**

The Orange County Transportation Authority (OCTA) has entered into contracts with eight (8) separate pre-qualified traffic engineering (A & E) firms to provide On-call Traffic Engineering Services. The scope of the services will support the specific traffic engineering needs of OCTA, primarily to construct and implement signal synchronization as part of the OCTA Traffic Light Signal Synchronization Program (TLSP). Other traffic engineering related tasks are also included as part of these contracts.

The comprehensive countywide signal synchronization program targets the synchronization of more than 533 signalized intersections along ten (10) regionally significant corridors throughout Orange County. The initial program of 10 corridor projects is a means of improving traffic flow and optimizes travel on high volume, regional arterials spanning 158 miles. The program is consistent with the countywide multi-jurisdictional signal synchronization goals as identified in the *2006 Orange County Signal Synchronization Program Report*.

The TLSP Projects are funded by matching funds from the Signal Improvement Program (SIP) of Measure M and the Proposition 1B Traffic Light Synchronization Program (TLSP). This Program is scheduled to last for 3 years. This Scope of Work is for the Brookhurst Street Corridor to be constructed in Year 2 of the 3 Year Program.

For clarification, the following terms are defined as:

- ✚ OCTA or AUTHORITY = Orange County Transportation Authority
- ✚ CTO = Contract Task Order
- ✚ MOU = Memorandum of Understanding
- ✚ COOP = Cooperative Agreement
- ✚ Caltrans = California Department of Transportation
- ✚ County = County of Orange
- ✚ TLSP = Traffic Light Synchronization Program
- ✚ PROJECT = Any one of the ten (10) TLSP corridor projects – CTO specific
- ✚ AGENCY = Any one of the 34 cities, the County of Orange, or Caltrans
- ✚ AGENCIES = Each and every individual agency cooperating, participating, and acting in concert with one another, via MOU and/or COOP, in one of the specified projects
- ✚ APM = AUTHORITY Project Manager
- ✚ CONSULTANT = Consulting Engineering firm selected to construct a specific PROJECT
- ✚ CPM or PM = CONSULTANT Project Manager

### **1.1 Project Limits – Corridors**

This corridor project limits are:

- ✚ Brookhurst Street – Valencia Avenue (City of Fullerton) to Pacific Coast Highway (SR – 1 (City of Huntington Beach)).

The Brookhurst Street TLSP Project corridor is approximately 16 miles in length and has 57 signalized intersections on Brookhurst Street proper or on crossing arterials that have additional signalized intersections that are in close proximity to the corridor and therefore must be operated within the proposed network(s).

The cooperating AGENCIES for this corridor are the Cities of Anaheim, Fountain Valley, Fullerton, Garden Grove, Huntington Beach, and Westminster, respectively; Caltrans; and OCTA, hereinafter referred to collectively as the AGENCIES.

### **1.2 Minimum Requirements – CONSULTANT**

The Contracted CONSULTANT/Engineer, in order to adequately complete the PROJECT per the intent and requirements of the Proposition 1B rules and regulations and the OCTA TLSP, shall construct the PROJECT to include the following minimum items on a per corridor basis:

- ✦ Construction Support as required and determined by the APM and approved by the AGENCIES on the respective projects.
- ✦ Signal Synchronization, Control Systems Studies, Analysis, Review, and Recommended Strategies.
- ✦ Furnishing, Modifying, and/or Upgrading including the installation of specified or required Systems and associated communications equipment.
- ✦ Furnishing, Modifying, and/or Upgrading including the installation of specified or required to system compatible intersection signal controller assemblies, controller units, and communications equipment, including software, firmware, and all required hardware.
- ✦ Furnishing and Installing newer and/or and upgrades to compatible Central Supervisory Control and Data Acquisition Systems (CSCADAS); their respective Communication Systems and Work Stations.
- ✦ Training on all modified or installed equipment and systems (1 day minimum on local systems – 5 day minimum on Closed Loop or CSCADAS).
- ✦ Creation of System and Intersection Graphics for CSCADAS or Closed Loop Systems for all corridor and integrated intersections. (If not present and/or accounted for on other projects).
- ✦ Furnishing and Installing Video Surveillance and associated telemetry equipment.
- ✦ See Attachment B which gives project locations and areas to specify work to be done either at each location or system/corridor wide.
  - CONSULTANT shall investigate other suitable and possibly cost effective or value added components or features to the above bulleted items that will enhance or improve project performance
  - If approved by the APM and the AGENCIES, these items may be installed during the course of the PROJECT
  - CONSULTANT shall investigate all PROJECT locations and provide the needs, if not shown, revisions or proposed modifications to the work on Attachment B

## **2. BACKGROUND**

OCTA's Regional Modeling and Traffic Operations section employees are currently fully engaged and do not have the capacity to meet the anticipated demand for professional traffic engineering services to complete any of the TLSP Project Corridors without additional staff resources. OCTA has selected and entered into contract with eight qualified consulting traffic engineering firms as On – Call Consultants specifically dedicated to the TLSP projects and related items. The selected CONSULTANT for each project is to provide OCTA the additional staff and technical resources to fully meet the expected workload.

### **3. SERVICES REQUIRED**

The scope of work is to provide Traffic Engineering Services for implementation and construction of the Brookhurst Street TLSP corridor, corresponding with the ongoing signal synchronization efforts at OCTA. Each TLSP PROJECT will be similar to the recent signal synchronization demonstration projects that OCTA conducted on Euclid Street and Oso Parkway/Pacific Park Drive, and the first year TLSP projects of Alicia Parkway, Beach Boulevard, and Chapman Avenue, respectively. The contract will be issued by Contract Task Order (CTO).

**Note: Brookhurst Street TLSP corridor Project has been declared categorically exempt for Environmental.** OCTA has filed the appropriate documents and recorded them with the County of Orange.

In order to accomplish this, the PROJECT will consist of CONSULTANT procurement of goods and services, and to furnish, modify, upgrade and install and construct the TLSP corridor coordination system and components. This construction shall consist of but not be limited to the following items:

- ✦ Isolated GPS units interfaced to internal time-based signal coordinators integral to intersection controller units
- ✦ GPS unit interfaced to PC Based Central System Servers and Networks for each AGENCY as required
- ✦ New or modified Central Supervisory Control and Data Acquisition Systems (CSCADAS) and interconnected related communications systems.
- ✦ Furnishing and installing and/or modifying Controller Assemblies, Controller Units, and associated communication equipment.
- ✦ Signal synchronization and optimization of every intersection for each respective corridor.
  - This may include adjacent intersections that are not on the corridor but within proximity to the corridor that obviously must be included in the modeling effort to create a cohesive system.
  - These proposed locations are indicated in the Attachment B or shall be recommended by the CONSULTANT and added to the Attachment B and incorporated into the proposal.
- ✦ Timing plans and operational features for each system and local intersection controller for pre-determined time-of-day operation.
- ✦ Implementation and Fine Tuning
- ✦ Observation and Continued Field Support for minimum 9 months
- ✦ Optional – if it can be proven that a special operational technique will improve the corridor/network operations, real-time traffic actuated and/or traffic adaptive operations may be proposed and implemented by CONSULTANT if approved by APM and AGENCIES as a part of this PROJECT.

- Adaptive Operations is considered a risk due to previous attempts with lackluster or sub – standard performance in previous local endeavors.
- CONSULTANT shall be required to analyze and implement standard background cycle coordination if the proposed implemented Adaptive Operations does not meet or exceed Performance Measures that can be derived from traditional background cycle coordination, and no additional compensation shall be allowed, therefore.

- ✚ All work performed will be subject to the rules, policies, standards, and specifications of Section 86 of the State of California Standard Specifications (SSS) and State of California Standard Plans (SSP) and each AGENCY's respective standards and specifications, and policies.

This synchronization PROJECT may be combined with AGENCY selected and required signal system upgrades including:

- ✚ New compatible systems traffic controller units and/or assemblies,
- ✚ Communication modifications and additions
- ✚ Electrical and Telemetry Service Enclosures or Pedestals
- ✚ Battery Backup Systems (APM must approve)
- ✚ Installation of newer Central Supervisory Control and Data Acquisition Systems that are NTCIP compatible, and will upgrade and/or enhance existing legacy systems; and, other project related enhancements as specified herein.

### **3.1 On – Call Services – Signal Synchronization – TASKS**

OCTA's TLSP signal timing projects are multi-agency in nature and require the CONSULTANT to be a consensus builder. Each agency owns, controls, and maintains and is ultimately responsible for their respective traffic signalized systems and intersections. The successful CONSULTANT shall demonstrate a full knowledge of the entire corridor, its problems and needs, and shall propose or suggest possible solutions or mitigations to those defined problems and needs. Therefore, with an understanding of required consensus building on the part of the CONSULTANT, the PROJECT will require, at a minimum, the following tasks:

#### **a. Project Management**

- ✚ The CONSULTANT shall be responsible for the overall administration of the project, including but not limited to:
  - Day to day Project Management
  - Meetings
  - Progress Reports
  - Tracking of Schedules
  - Invoicing

#### **b. Data Collection**

The CONSULTANT shall collect the following data necessary to thoroughly understand existing traffic conditions for the corridor and be able to develop optimal time-of-day traffic signal coordination plans, as applicable.

- ✦ From each AGENCY, the CONSULTANT shall collect existing timing sheets, existing coordination plans, traffic as-built drawings, aerial photos, maps, traffic collision data as available, including collision diagrams for the analysis of existing intersection conditions and operations. Plans, Specifications, Special Provisions (PSS) for construction of facilities related to or that could affect this PROJECT shall also be collected. CONSULTANT, if requested by the involved agency, will provide their own staff to review available records/plans and request copies of needed records/plans with a minimum of disruption to the involved agency.
- ✦ From the AGENCIES, the CONSULTANT shall determine signal timing and preferences, including, but not limited to, those related to pedestrian and bicycle timing, left-turn phasing and phase sequencing such as fully protected leading, lead – lag, lagging, split, and protected – permissive (PPLT), and additional coordination functions such as preferred or conditional phase re-service, as well as the AGENCIES preferred timing optimization software.
- ✦ The CONSULTANT shall conduct seven-day 24-hour machine counts. (ADTs). Data obtained from Saturday and Sunday counts will determine the necessity of weekend signal timing locations, and respective analysis, optimization and implementation. of all new signal timing.
- ✦ The CONSULTANT shall conduct weekday and weekend peak period turning movement counts at all study intersections, including pedestrian and bicycle counts. Weekday counts shall be conducted for two hours of each peak period (AM, mid-day, and PM). If needed, weekend counts shall be conducted for those peak periods determined from the ADTs on both Saturday and Sunday. The length of the period for weekend data collection shall be determined from the ADT and information provided by the AGENCY and field observations. Turning movement counts for minor intersections where it can be demonstrated that pedestrian or other factors will always govern the operations may be eliminated if approved by the APM.
- ✦ For intersections with more than two through lanes in any of the approaches, a minimum of two count technicians per intersection shall be required.
- ✦ Alternative counting approaches using electronic capture methods in lieu of field personnel to manually count the data shall be approved by the APM prior to the counts being performed.

- ✚ All count data for each location shall be provided to OCTA in one of the two following digital formats: 1) NDS/Southland Car Counters style Excel spreadsheet; or 2) JAMAR comma separated value style text file.
- ✚ Each count data file shall adhere to the following file naming conventions:
  - Agency\_ *SouthBoundStreetName-EastBoundStreetName\_RoadsID.xls*
  - Agency\_ *SouthBoundStreetName-EastBoundStreetName\_RoadsID.csv*.
  - Example: a turning movement count file for the intersection of Brookhurst Street at Katella Avenue in the City of Anaheim would be given the filename *Anaheim\_Brookhurst-Katella\_801.csv*.
- ✚ Copies of the raw data count sheets shall be provided to each involved agency.
- ✚ Data shall then be able to be loaded into the OCTA Roadway Operations and Analysis Database System (ROADS).
- ✚ Any data files containing numeric intersection or node identifiers shall use the same node ID numbers as is stored in the ROADS database.
- ✚ OCTA shall provide a map and list of intersections and corresponding unique ROADS node ID numbers. These include external node numbers (See Attachment B).
- ✚ All traffic signal synchronization data collected and compiled by the CONSULTANT for both existing (before) and optimized (after) conditions shall be provided to OCTA in Synchro version 6.csv UTDF format and version 7 combined data UTDF format. This data shall include the network layout, node, link, lane, volume, timing, and phase data for all coordinated times. All such data shall be consistent with the OCTA ROADS database. The CONSULTANT shall work with OCTA to identify any needed updates to the ROADS or project data to ensure full compatibility.
- ✚ CONSULTANT shall collect and utilize existing plans, specifications, and special provisions from each agency for installation and implementation of all traffic signal systems central and local necessary to complete the construction and implementation of the Brookhurst Street TLSP Corridor Project.

#### c. Field Review

The CONSULTANT shall review the geometric layout, verify and/or inventory existing traffic signal control and telemetry/ITS equipment, and identify any deficiencies for each intersection and road segment along each of the corridors. The review shall include an assessment of the existing intersection lane geometry, link lane geometries (add-drop), traffic conditions, and traffic signal or ITS/telemetry control equipment along the corridor and at each intersection.



Techniques utilized shall include but not be limited to visual inspection, available as-built plans, agency consultation; agency provided aerial photos, and PSS.

Upon permission from the controlling local agency, CONSULTANT will inspect and inventory the interior of each traffic controller assembly and ITS/telemetry cabinets, identify and report deficiencies to the agency and the OCTA respective operations staff.

Equipment upgrades needed to complete the PROJECT will be noted and included as Construction Support to the existing PSS as part of the PROJECT. Photographic and written inventories shall be submitted to OCTA in electronic format only. If specific locations require a physical photo, the APM will notify the CONSULTANT to provide such documentation.

CONSULTANT shall also include an identification of all planned and programmed improvements (widening projects, intersection improvements, etc.) on the study corridor. The identification of these projects shall at least include a list, summarizing all improvements.

Key components of the corridor review shall include the following:

- ✦ Existing corridor/street and lane geometries including lane widths and configurations curb to curb distances, and median dimensions, if any;
- ✦ Upcoming improvements to the corridor (i.e. construction and/or delineation modifications);
- ✦ Traffic signal control and telemetry device information, such as type of device, manufacturer and condition, provide visual documentation (electronic format);
- ✦ Existing time source equipment and Master zero ( $T_0$ ) time reference reset;

CONSULTANT shall observe special characteristics such as proximity to adjacent intersections, location of schools, bus stops, driveways, parking prohibitions, unusual traffic generating conditions, and other factors that may impact the efficiency of operation at each intersection.

CONSULTANT shall adhere to each Agency's policy on signal operations and characteristics of signal phasing and rotation or sequence (lead-lead, lead-lag, lag-lag, protected vs. protected/permissive (cycle lengths, PPLT)), etc.

CONSULTANT shall note factors that impact or affect signal progression including, but not limited to: intersections with high pedestrian or bicyclist volumes; over-saturated intersections; closely spaced signalized intersections, uneven lane distribution; high volume percentage of trucks and/or buses; existence (Y/N) of turn-

outs at bus stops, high side street volumes at intersecting un-signalized locations, interchanges, and parking maneuvers.

CONSULTANT shall identify any deficiencies of the existing traffic signal control equipment and geometric layout, and provide recommendations towards simple, low-cost solutions that may be implemented to correct such deficiencies.

CONSULTANT shall identify any deficiencies in the existing traffic signal control timing parameters or settings at each PROJECT intersection including: Pedestrian Walk and Pedestrian Clearance intervals; and Bicycle and/or Automobile/Truck timing for Minimum Green,; Yellow Change; and, All Red Clearance intervals as required by the MUTCD, CA MUTCD, Traffic Operations Policy Directives (TOPD), or enacted laws governing such issues. These deficiencies shall be submitted to the AUTHORITY APM and the AGENCY for review and comment.

Each local AGENCY shall be solely responsible for, and provide direction to CONSULTANT, AUTHORITY, and APM in the methods and formulas used to calculate the correct time settings for these respective timing intervals. These policies will be on file with the AUTHORITY.

CONSULTANT shall identify any crossing arterial coordination efforts that are in place or that are to be in place prior to implementation of the optimized timing on this PROJECT.

CONSULTANT shall prepare and submit a report summarizing the findings of the field review. The report shall include a detailed description of the CONSULTANT' S approach to the synchronization of the corridor, the methods and equipment to be used, including collected PSS, with detailed construction estimate, and PROJECT schedule. The selected CONSULTANT shall provide detailed quotes or estimates from vendors for any goods and services required to complete the PROJECT to the APM and/or OCTA staff.

d. Corridor 'Before' Study

The CONSULTANT shall conduct a 'Before' field study representative of the times and days for which synchronization plans will be developed. The resultant CONSULTANT report shall identify Measures of Effectiveness (MOE) to evaluate the effects of the synchronization plans. MOE's should include traffic flow, actual real time travel, average speed, stops, fuel consumption reduction, pollution reduction, green house gas reductions, the newly developed Corridor Synchronization Performance Index or CSPI, which quantifies average speed, number of stops, and number of intersections passed on a green vs. the number of intersections where stopped by a red, and other pertinent items. The identified MOE's shall be compiled for the corridor using the floating car method (GPS interfaced Tru – Traffic TS/PP or PC – Travel runs) and from Synchro 7.0. For the 'Before' field study, a minimum of five (5) floating car 'runs' shall be conducted in each direction and during all periods

in which synchronization plans shall be developed. The corridor may be segregated into zones that can be easily run and that have significant inter – relating intersections. The zones must be approved by the APM prior to commencement of data collection.

The report shall address optimization strategies for improved signal synchronization, specifically focusing on how the corridor should be operated; end-to-end or in coordinated subsystems (zones or sectors). Special consideration shall be given to existing operations on crossing arterial systems (existing or near future implementation). Ideally, the analysis should include the floating car data and data collected as part of Task 2. However, draft versions of the report may include previously collected traffic, travel time, or other data available. The evaluation report shall provide a very clear and accurate understanding of traffic patterns on the corridor throughout all times of the day and week. The report shall also identify the current Corridor Synchronization Performance Index or CSPI which is the proposed new rating system to be used on all TLSP and future OCTA sponsored TSS projects. The CSPI combines Average Speed, Number of Stops, and Number of Greens per Red. Additive scores from each category are combined into an index from 33 to 109. A CSPI of 70 is considered the minimum level of acceptable performance. A CSPI under 70 indicates a need for improvement in signal operations or the mitigation of other influences.

**Corridor Synchronization Performance Index (CSPI)**

Speed (mph)		Green/ Red		Stops per Mile	
	Score		Score		Score
34	36	5.0	40	0.7	33
32	33	4.5	36	0.9	31
30	30	4.0	32	1.1	29
28	27	3.5	28	1.3	27
26	24	3.0	24	1.5	25
24	21	2.5	20	1.7	23
22	18	2.0	16	1.9	21
20	15	1.5	12	2.1	19
15	8	1.0	8	2.3	17

Note: CSPI is the sum of each of the three component scores. Scores shall not exceed highest values for each performance measure.

The CONSULTANT shall prepare a brief memorandum and present the findings to the OCTA and the AGENCIES outlining the findings of the 'Before' field study. The CONSULTANT shall finalize the memorandum based on comments received from the APM and the AGENCIES.

e. Signal Timing Optimization and Implementation

The CONSULTANT shall work with the APM to develop a model of the study area and calibrate the model based on field observations of existing conditions. Signal synchronization optimization shall be conducted in Synchro 7.0. In addition, optimization shall be augmented with Tru – Traffic TS/PP version 8.0. The CONSULTANT shall calibrate the model based on travel time, delay studies, field observations of queue lengths, and saturation flows for heavy movements at key intersections.

If the CONSULTANT elects to use alternative methodologies to augment or replace certain aspects of the Synchro model such as pre – processing of certain data sets or split analysis, and/or other types of processes, the CONSULTANT shall describe these operations in detail in the report with supporting documentation as to why these processes were used in lieu of or in augmentation to the Synchro model. These methodologies shall also be described in detail in the CONSULTANTS proposal for this PROJECT.

The CONSULTANT shall develop an operational microscopic model within SimTraffic. The SimTraffic model will identify those local areas or portions of the PROJECT that need special operational analysis of queue interactions such as starvation or spillback. The operational analysis will be used to understand the effects of planned corridor improvements, fine tune timing plans prior to implementation and to analyze the additional operational improvements as suggested by the CONSULTANT in the Field Review. The entire corridor does not have to be micro – simulated. Analysis shall be performed on corridor segments that have queuing, starvation, spillback, or others problems which can be mitigated by the SimTraffic program.

The CONSULTANT shall then develop revised optimized signal timings recommending any changes to the signal phasing at each signalized intersection that may improve the efficiency of operations. The recommended signal timing plans shall be reviewed by the APM and local agency staff.

The CONSULTANT shall evaluate signal timing and coordination parameters with consideration for the following:

- ✦ Optimum intersection cycle length and offset to maximize corridor throughput (bandwidth), harmonic background cycles at minor or major intersections, left-turn phasing rotation as deemed appropriate (except at Protected/Permissive

locations, where phasing will be lead-lead or lag-lag only, unless with FHWA approval the proposed yellow flashing arrow technique is employed where lead – lag phasing is allowed), non - coordinated phase re-service, and other such techniques;

- ✦ Timing parameters, which fully accommodate those unique users with mandated timing parameters within the split time. CONSULTANT shall take into consideration the mandated timing parameters used and adopted by the local agency on a case by case basis. If the local intersection controller has the ability to modify or ignore the coordination split during unique or infrequent user events and can fast – track transition to be in step with the local coordinator after exceeding the split time, that technique may be utilized where deemed appropriate by CONSULTANT and approved by the respective local agency.
- ✦ Appropriate cycle lengths consistent with the goals of this effort. Additionally, the CONSULTANT shall recommend time-of-day start and stop intervals for the various timing plans; and,
- ✦ CONSULTANT shall prepare, at minimum, timing plans that consider the following peak periods: AM PEAK, MID-DAY PEAK, PM PEAK and a WEEKEND PEAK. Timing plans should be in both Synchro format and the preferred timing chart format of each local agency.
- ✦ The CONSULTANT shall also prepare timing plans for AM PEAK, MID-DAY PEAK, PM PEAK and a WEEKEND PEAK based on the upcoming improvements for the corridor as identified in Task 3. Timing plans should be in Synchro format.

CONSULTANT shall implement, or assist local agencies staff in the implementation of, new signal timings either through the central or closed loop traffic signal system (if available) or direct implementation in the controllers in the field. CONSULTANT shall use new, modified, or existing traffic signal interconnection systems, where they exist. And, because of the inter-jurisdictional nature of the project, shall either implement time-based signal coordination techniques between signalized intersections that are controlled by different agencies; or, if adjacent agencies are sharing system resources and hardware, CONSULTANT shall develop and implement plans through those complimentary systems.

The project shall require the CONSULTANT to purchase, furnish, and install, at a minimum, the following items:

- ✦ Brookhurst Street – See Attachment B and the following items:
- ✦ All required communication equipment and interface devices for Central Supervisory Control and Systems Controller Units; Ethernet Switches or Extenders and other Communications Devices needed for proper system operation

- # System Integration will be the responsibility of the CONSULTANT. CONSULTANT shall either perform the integration or assist with the integration depending on policy and/or capability of each participating AGENCY
- # Systems Controller Assemblies including cabinet, systems controller unit, communications interface, BIU, MMU, Detection Systems, and all other appurtenances per agency specifications.
- # Modification of existing Central Systems including any licensing agreement modifications between the AGENCY and equipment vendor.
- # Conversion of Legacy Closed Loop Systems to newer Central NTCIP Systems
- # System Integration of PROJECT controllers into existing, new, or modified systems.
- # I – 5, I – 405, SR – 22, and SR - 91 Interchanges
  - o Consultant shall through specialized Caltrans procurement and installation practices
    - furnish and/or install one Type 170E Field Master Controller Unit with TRFM firmware per Freeway Interchange Networked Systems
    - furnish and install one GPS Clock at Caltrans selected Ramp intersection with Field Master Unit
    - Furnish for installation One (1) or Two (2) new Type 2070 Controller Units with current approved TSCP firmware shall be installed at existing ON - OFF Ramp intersections
  - o Removal and Installation of controller units shall be performed by Caltrans forces. Consultant shall install GPS Clock.
  - o Consultant shall interface systems to CTNET utilizing Ethernet network for connection to the D12 TMC.
- # Other needs assessed as a result of Construction Support and approved by AGENCIES and APM

The CONSULTANT shall use due diligence with regard to the Brookhurst Street Project. CONSULTANT shall perform all tasks needed to determine Construction Support and Procurement issues for the construction, installation, and implementation of the project. The report required (see **3.1 On – Call Services – Signal Synchronization**, c: Field Review ) for the project listing the items to be procured, furnished, and installed shall include detailed line item estimates which, may or may not be modified or amended, and subsequently approved by the APM, OCTA, and/or the owning AGENCIES. CONSULTANT shall accomplish this by modifying line items and also Specific Requirements Section of each Participating Agency on Attachment B.

The need for plans and specifications of this equipment will be determined early in the project by the APM, AGENCIES, and CONSULTANT. The following items are included for clarity:

1. AGENCY shall be responsible for local intersection inspection services on the installation of field work and equipment. AGENCY shall be responsible for the inspection and installation of any Central Master, Field Master, Controller Units or Assemblies and any related communications systems with oversight by the APM. CONSULTANT shall work under the constraints of construction specifications and standards of each local agency and Caltrans. Caltrans personnel will be responsible for the removal and installation of any Caltrans owned or operated intersection controller systems. CONSULTANT will be responsible for all other intersection systems modifications, removal, installations, etc.
2. All permits and fees required by the AGENCIES in the PROJECT shall be *included* in the firm fixed price for the PROJECT and no additional compensation for fees will be allowed, therefore. OCTA will endeavor but not guarantee to have permit requirements and associated fees removed or waived.
3. CONSULTANT shall provide onsite assistance for turn-on of any new or modified equipment.
4. Upon final approval by the APM and the respective AGENCY, 1 hard copy and 1 electronic format timing chart, per intersection, shall be provided to the AGENCY. 1 timing chart per intersection, in electronic format, shall be provided to the AUTHORITY. Timing sheets shall be provided by CONSULTANT at time of turn on.

As the project will likely be using time-based signal coordination, the CONSULTANT shall evaluate the current time-referencing of all traffic signal controllers and recommend a corridor-wide strategy (such as GPS time referencing units) to ensure that all traffic signal controllers are on synchronized time clocks. Upon approval by the AGENCIES, the CONSULTANT shall purchase and install, or assist local agency staff, in installing any devices that are part of the time-referencing strategy. This may include devices installed at the agency TMC or at intersection traffic signal controller assemblies.

The CONSULTANT shall fine-tune, or assist local agency staff in the fine-tuning of, the new settings and timings. The CONSULTANT shall fine-tune timings in the field and record all changes. Fine-tuning shall be conducted during times and days that are representative of the times and days for which coordination plans were developed. To eliminate multiple runs, Video is recommended for use in the fine tuning function; and, to determine and provide mitigation to certain conditions that may have been ignored or gone unnoticed in the evaluation and analysis process.

## f. Corridor 'After' Study

The CONSULTANT shall conduct an 'After' field study representative of the times and days for which synchronization plans will be developed. The 'After' study must be conducted in the same manner and contain the same MOE's as the 'Before' study in order to evaluate the improvements of the synchronization plans. MOE's should be calculated for the optimized corridor from compiled data using the floating car method (for instance, GPS interfaced Tru – Traffic TS/PP runs) and from Synchro 7.0 Output. For the 'After' field study, the same number of floating car 'runs' during the same time periods as was done in the 'Before' field study shall be conducted for each direction. The CONSULTANT SHALL provide a synchronized video with the "Before" and "After" travel time runs to augment the study. This video shall cover the entire length of the corridor and concentrate on the most congested areas of the corridor around freeways and high density commercial and business uses. The CONSULTANT shall prepare a memorandum detailing the results of the signal timing optimization and implementation, time-referencing system and fine tuning components, and comparing the results of the 'Before' and 'After' field study with reference to the specific MOE's. The CONSULTANT shall finalize the memorandum based on comments received from the APM and the AGENCIES.

## g. Project Report

The CONSULTANT shall prepare a Final Timings and Evaluation Technical Report with an executive summary. The report shall provide complete documentation of the project, including, but not limited to, project objectives, project locations, project scope, findings, recommendations, implementation schedule, improvements accomplished, and procedures for continuing maintenance, surveillance, and evaluation of the coordinated signal system, work performed, data collected: 'before' and 'after' studies and project benefits achieved in terms of fuel savings, travel time, CSPI and other measurable parameters. **The report shall include graphical and table formats for each type of documentation for clarity purposes.** The report shall also equate or quantify any savings in travel time, reduction in delay and emissions with type of emissions measured into a monetary figure consistent with current publications. The report shall document all planned, programmed, and constructed improvements on the study corridor as well as recommendations for further infrastructure improvements that would likely improve the corridor signal coordination project results. The CONSULTANT shall submit and present the final report and results of the project to the Board and to any city councils, commissions or committees as requested. Report formats, including style and content of graphs and tables, shall be approved by the APM prior to submission.

The report shall include for each intersection the lane configurations; signal phasing, turning movement data, and cycle lengths for existing and proposed timings for all peak periods. In addition, in a separate binder, all the traffic signal phase sequences, signal timing plans, and pedestrian timings shall be documented.



Finally, the report shall provide recommendations with cost and benefit estimates for future improvements to traffic signal infrastructure (signal controllers, vehicle detection, communications, etc.), intersection capacity (appropriate signal phasing, lane geometrics, and alleviation of physical bottlenecks that curtail arterial capacity), and traffic management strategies. These proposed improvements are beyond the scope of this project but should be useful in determining future enhancements to the corridor.

The Report format shall consist of a Table of Contents, Executive Summary, with technical appendices giving the Background, Methodologies, Before Conditions, After Conditions, Before and After Analysis and Study Results, Elements of Construction, Special Demonstration of Equipment and Results, Conclusions, Recommendations and Lessons Learned, followed by Appendices. As each corridor has unique properties and functionality, prior to the Report being written, the CONSULTANT shall meet with the APM to discuss format and content for each of the respective corridors.

h. As – Built Drawings

The CONSULTANT shall supply As – Built drawings of all systems constructed during the PROJECT. As – Built drawings shall be in the format required by each of the AGENCIES. As – Built drawings shall be included in the firm fixed price for the PROJECT. No additional compensation will be allowed, therefore.

i. this section left blank intentionally

j. Continuing Signal Timing Support

The CONSULTANT shall provide continuing signal timing support to monitor, observe, fine-tune, and optimize the signal timing and phasing operations of all the intersections for a minimum period of nine (9) months upon completion of the implementation. During this period, the CONSULTANT shall proactively survey the corridor on a weekly basis, observe the traffic, and fine-tune (or recommend fine-tuning) the signal timing based on the survey.

k. Warranties and Guarantees

Attention is directed to

Section 86 – 1.05 WARRANTIES, GUARANTIES, AND INSTRUCTION SHEETS of the State Standard Specifications.

CONSULTANT shall provide the following:

All equipment furnished, installed, and/or modified shall have a 1 year guaranty on labor and material. Firmware and Software Upgrades for Control and Communications

Systems for Central, Field Master, and Local intersection controller units for installed specified systems are included in the installed price for a period of 3 years.

New software for new features not originally installed nor specified is excluded from this contract. Standard Warranties or Guarantees for new software or new features are the responsibility of the Agency receiving such equipment and the standard warranties or guarantees supplied by the manufacturer or vendor.

Removal of existing equipment and appurtenances is included in the “furnish and install or modify existing” installation price.

## BROOKHURST STREET TLSP by Agency

Agency	Brookhurst Road @	Location	ROADS Node #	Description of Work This Location
Fullerton	Common Wealth Ave	1	3521	
Fullerton	Valencia Drive	2	3532	
Fullerton	Orangethorpe Avenue	3	3544	
Fullerton	Page Avenue/Roberta	4	3458	
Caltrans	SR - 91 WB Ramps	5	5	170 FM cu, GPS
Caltrans	SR - 91 E/B Ramps	6	8	2070 cu, GPS
<b>Brookhurst Street @</b>				
Anaheim	Falmouth Avenue	7	640	2070 cu, GPS, C
Anaheim	La Palma Avenue	8	695	⊗, C
Caltrans	I - 5 S/B - N/B Ramps	9	12	2070 cu
Anaheim	Sequoia Avenue	10	828	C
Anaheim	Crescent Avenue	11	718	C
Anaheim	Catalina Avenue	12	823	C
Anaheim	Lincoln Avenue	13	745	⊗, C
Anaheim	Broadway	14	763	C
Anaheim	Orange Avenue	15	772	C
Anaheim	Brookmore Avenue	16	1276	C
Anaheim	Ball Road	17	781	⊗, C
Anaheim	Cerritos Avenue	18	795	C
Anaheim	Katella Avenue	19	801	⊗, C
GardenGrove	Orangewood Avenue	20	4189	
GardenGrove	Chapman Avenue	21	4199	Control Point-Chapman TLSP
GardenGrove	Shopping Center	22	4180	
GardenGrove	Bixby Avenue	23	4155	
GardenGrove	Lampson Avenue	24	4219	
GardenGrove	Stanford Avenue	25	4161	
GardenGrove	Garden Grove Boulevard	26	4238	⊗
GardenGrove	Trask Avenue	27	4246	

Agency	Brookhurst Street @	Location	ROADS Node #	Description of Work This Location
Caltrans	Trask Av @SR - 22 WB Ramps	28	33	
Caltrans	SR - 22 E/B Ramps	29	34	
GardenGrove	Woodbury/Traylor Way	30	4169	
GardenGrove	Westminster Ave	31	4250	Xing Arterial
GardenGrove	15th Street	32	4413	30 and 31 clustered
GardenGrove	Reading Street	33	4172	single controller
GardenGrove	11th Street	34	4177	
GardenGrove	Hazard Avenue	35	4252	
Westminster	Bolsa Avenue	36	6100	⊗
Westminster	Bishop Place	37	6189	
Westminster	McFadden Avenue	38	6111	
Westminster	Margo Lane	39	6069	
Fountain Valley	Edinger Avenue	40	7074	⊗
Fountain Valley	Heil Avenue/Miles Square Park	41	7075	New 332 Cabinet
Fountain Valley	Warner Avenue	42	7080	⊗, New 332 Cabinet
Fountain Valley	La Hacienda Avenue	43	7047	
Fountain Valley	La Alameda	44	7051	
Fountain Valley	Slater Avenue	45	7088	⊗, New 332 Cabinet
Fountain Valley	Talbert @Foster Street	46	7062	New 332 Cabinet
Fountain Valley	Quail Avenue	47	7054	
Fountain Valley	Ellis Avenue	48	7070	
Huntington Beach	Garfield Avenue	49	3928	
Huntington Beach	Yorklown Avenue	50	3938	⊗, GPS
Huntington Beach	Adams Avenue	51	3947	
Huntington Beach	Adams Ave @ Ranger Lane			
Huntington Beach	Adams Ave @ Shopping Ctr Dwy			
Huntington Beach	Indianapolis Avenue	52	3955	
Huntington Beach	Atlanta Avenue	53	3965	
Huntington Beach	Hamilton Avenue	54	3968	⊗
Huntington Beach	Banning Avenue	55	3931	
Huntington Beach	Bushard Street	56	3932	GPS
Caltrans	Pacific Coast Highway	57	261	GPS

cu = controller unit; ca = controller assembly includes cu + all necessary equipment and appurtenances + es; es = ethernet switch; EE = Ethernet Extender; FM = Field Master gps = gps interface and antennae installed; C = CenTracs; A = Aries; NAZ = Naztec ATMS; BB = Battery Backup System; I/C = Interconnect Conduit with media; media - F = Fiber Optic; TP = 24 pair Twisted Copper; VD = Video Detection; VS = Video Surveillance System; W = WiFi; L = Loop Detector; a # following item codes = quantity (i.e. L42 = install 42 loop detectors); \* = shared ownership; \*\* following task code = NOT A PART, agency pays 100% for that task  
 All other location tasks are a part \*\*\* following task code = Part TLSP/Part Agency funded; All equipment is furnished and installed and/or modify existing installation with 1 year guaranty on labor and material Firmware and Software Upgrades for installed specified systems is included in the installed price for a period of 3 years. Excludes new software for new features not originally installed nor specified to be installed and included Removal of existing equipment and appurtenances is included in the furnish and install or modify existing installation price. PS & E may be available at no cost to the Consultant from Project Agencies ⊗ = Xing Arterial Operations Considered











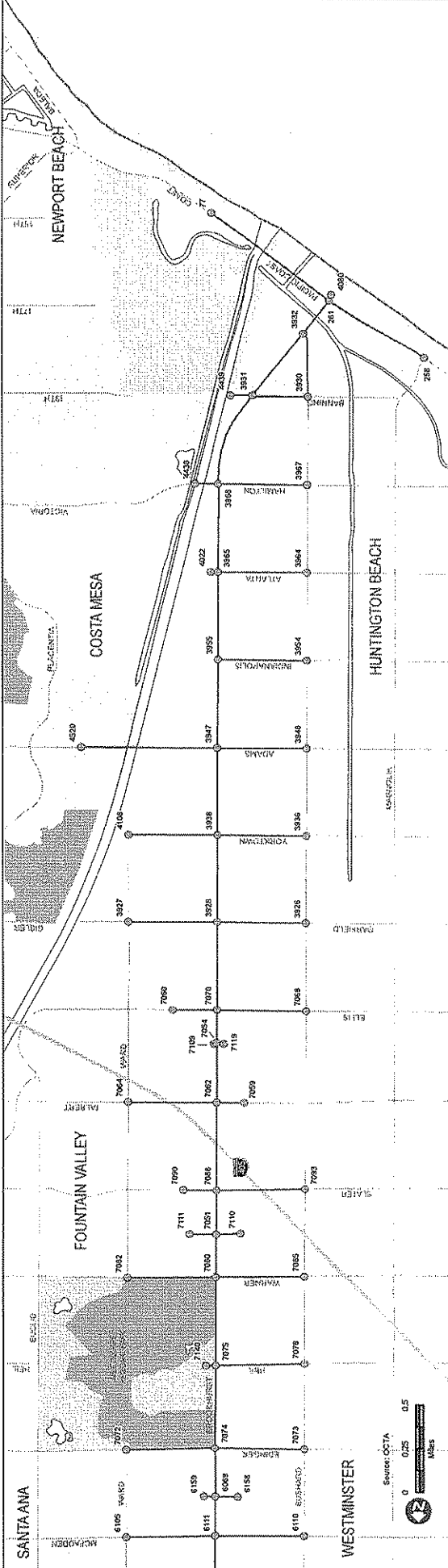
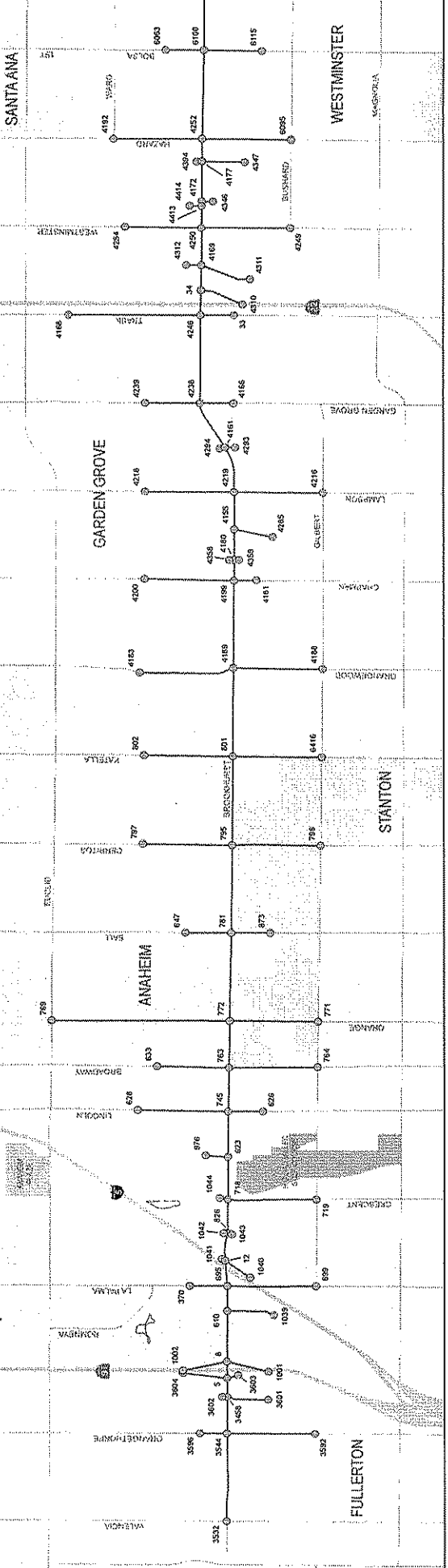








# Attachment B: Brookhurst Street



Source: CSTA  
 0 0.25 0.5 Miles  
 Prepared by: [unreadable] 2018/01/18/2018

**List of Contacts**

**OCTA**

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**City of Fountain Valley**

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