Dynamic Downtown - Part 2

Adaptive Signal Control Technology (ASCT), Transit Signal Priority (TSP), And Emergency Vehicle Preemption (EVP) NEW Technology in Downtown Fresno

Measure C New Technology Reserve Grant Program
Grant Application July 2020

City of FRESNO

NEW TECHNOLOGY RESERVE GRANT PROGRAM
ADVANCED TRANSIT AND TRANSPORTATION PROJECTS

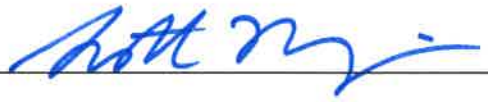
Fiscal Year 2020-2021 Grant Application

Project/Program Name/Description: Dynamic Downtown II - Adaptive & Emergency Preemption Downtown Fresno		
Lead Agency (Applicant) Legal Name: City of Fresno		
Physical Address (No P.O. Box): 2600 Fresno Street		
City: Fresno	County: Fresno	Zip: 93721
Contact Person (Grant Manager): Shelby MacNab		
Phone: 559-261-8689	Email: Shelby.MacNab@Fresno.gov	

Name of Authorizing Representative certifying that the information contained in this application is true and accurate:

Printed Name: Scott Mozier Title: Director of Public Works

Email Address: Scott.Mozier@Fresno.gov

Signature: 

Fresno Council of Governments

2035 Tulare Street, Suite 201
Fresno, CA 93721
(559) 233-4148

APPLICANT CHECKLIST/TABLE OF CONTENTS

Applicants should use this checklist to ensure that all applicable parts of the application and attachments are completed and submitted.

BACKGROUND

The Fresno Council of Governments (Fresno COG) is seeking proposals from eligible public agencies for advanced transit projects that have the potential for broad benefits to Fresno County residents and will assist the region in meeting its air quality goals. Fresno COG is proposing to fund projects of regional significance in the areas of research, development, demonstration, and deployment that will advance public transit and transportation.

Fresno COG is a consensus builder, developing acceptable programs and solutions to issues that do not respect political boundaries. Fresno COG is a voluntary association of local governments, one of California's 38 regional planning agencies, and one of 500+ nationwide. In 1967 elected officials of Fresno County and its incorporated cities informally created the agency, formalizing Fresno COG in 1969 through a Joint Powers Agreement. Fresno COG undertakes comprehensive regional planning with an emphasis on transportation, provides citizens an opportunity to be involved in the planning process, and supplies technical services to its members.

Fresno County voters approved Measure C, a ½ cent transportation sales tax, in 1986 and again in 2006. Fresno COG prepared the Measure C Expenditure Plan, a guide to how $1.2 billion in Measure C transportation dollars will be spent through the year 2027. It was prepared with our partners, the cities, the County, Caltrans and the Fresno County Transportation Authority (administrators of the tax) and other community stakeholder groups. In its first 20 years, Measure C delivered more than $1 billion of improvements to state highways and county roadways, and has helped the building of additional lanes and freeway improvements throughout the County. As a result of the successful original measure, Fresno County voters chose to extend Measure C for an additional 20 years. The Measure C Extension (2007-2027) not only funds improvements of local roadways by repairing potholes and paving streets and sidewalks, but also funds ride-share incentive programs and environmental enhancement programs.

The Fresno County Transportation Authority (FCTA) is the entity created by legislation to administer the Measure C Program(s) and ensure the revenue is received and distributed appropriately. Fresno COG is responsible for the implementation of several Measure C programs including the Measure C New Technology Reserve Grant Program (New Technology Grant Program). For information on the Measure C sales tax visit www.measurec.com.

This Request for Proposals (RFP) is being issued to eligible public agencies within Fresno County including the Fresno COG, Fresno County Rural Transit Agency, Fresno County, and the cities in Fresno County who propose projects meeting the eligibility requirements of the Measure C New Technology Reserve Grant Program and demonstrate the need for advanced transit and transportation. Entities deemed ineligible to apply for New Technology Grant funds may apply as a partnering agency but **must** partner with an **eligible** applicant that will be responsible for implementing the project. **Agencies wishing to request to partner with Fresno COG must submit an electronic copy of their proposal by June 18, 2020.** The implementing agency assumes responsibility and accountability for the use and expenditure of program funds. The eligible public agency will need to sign a Cooperative Agreement with the FCTA.

FUNDING DISTRIBUTION/TIMELINE

The Measure C New Technology Program makes $5.38 million available for the Fiscal Year 20/21 award cycle. An additional $6,000,000 - $9,000,000 can be made available over time through the next 5 years. Fresno COG will release an Application for New Technology Projects/Proposals on a biennial basis.

Fresno COG is committed to ensuring that grant funding from the RFP is equally distributed throughout the Fresno County Region to the extent feasible. From the most qualified proposals with the highest scores, Fresno COG will select projects for funding in a manner that is consistent with this commitment.

Fresno COG reserves the right to reject all proposals and make no awards under this announcement if the proposals submitted do not meet the goals of this RFP.

TIMELINE:

ACTIVITY	**DATE**
Request for Proposals Released	April 10, 2020
Last day to submit requests for clarification	June 4, 2020
Deadline for Electronic Proposal Submittal for agencies	
requesting to partner with Fresno COG	June 18, 2020
Deadline for Proposal Submittal	July 22, 2020
Scoring (Tentative)	July 27 - August 14, 2020
Potential Interviews (Tentative)	August 17 - 28, 2020
Policy Board Approval (Tentative)	September 24, 2020
FCTA Board Approval (Tentative)	October 28, 2020
Notice to Proceed - Subject to Contract Signing (Tentative)	January 2021

GOALS AND OBJECTIVES

The goal of the New Technology Reserve Subprogram is the set-aside Measure "C" funding to finance new transit technologies that may be developed in the future. To further its Measure C New Technology Program goals, Fresno COG is focusing on technological advances in public systems, safety features, fuel efficiencies and alternatives, intelligent transportation system (ITS) applications, and information dissemination. These areas help to promote passenger safety and satisfaction, attract customers, improve capital and operating efficiencies, reduce environmental pollution, and ease dependence on fossil fuels.

Expenditures on funded projects must be directed into the Fresno County economy, and must have a strong potential to attract future financial investment in that economy. To the extent possible, the Measure C New Technology Program funds should be used to leverage additional funding from other sources to create more viable projects.

Examples of eligible projects or project components include, but are not limited to:

1. The evaluation of viability and local benefits of new transit technologies.
2. Planning, design and construction of new transit technologies, including construction of track and ancillary improvements
3. Purchase of vehicles only if they are an integral part of a new-technology system, not replacement vehicles in an already existing system; hiring of staff to seek additional funding for new transit technologies after project is awarded
4. Environmental Review
5. Right-of-way acquisition
6. Other necessary projects, programs, systems, or services that enable new technology transit and transportation systems to provide the desired objectives.

Previous cycles awarded the following types of projects:

1. Public transit buses retrofitted with Near-Zero Emission engines
2. Electric public transit vehicles
3. Electric school buses
4. Solar tree charging stations
5. Electric aircraft/commercial flight training service
6. University Transportation Institute
7. BRT Route Synchronization
8. Advanced Propulsion Systems Training Program

APPLICANT ELIGIBILITY

Public Agency

This application is open to selected eligible public agencies within Fresno County. These agencies include:

- Fresno Council of Governments
- Fresno County
- Incorporated cities within Fresno County
- Fresno County Rural Transit Agency

Entities deemed ineligible to apply for New Technology Grant funds may apply as a partnering agency but **must** partner with an **eligible** public agency that will be responsible for implementing the project. Eligible public agencies wishing to partner will need a resolution from their governing body. This resolution must be submitted as an attachment to this application. In addition, public agencies must attach an authorizing resolution, designating a person authorized to sign on behalf of the agency, as an Appendix to the application. Furthermore, if a school district is one of the partnering agencies, a resolution from the school district's board must be submitted as an attachment to this application.

Eligible Public Agencies must provide a representative's contact information.

Legal Name of Applicant: City of Fresno		
Address: 2600 Fresno Street		
City, State, and Zip: Fresno, CA 93704	Phone: 559-261-8689	Email:

Eligible Public Agency's Representative

Name (print): Scott Mozier	Title (print): Director of Public Works
Signature: Scott Mozier	Date: 7-20-2020
Email: Scott.Mozier@Fresno.gov	

APPLICANT ELIGIBILITY

Civil Rights

Describe any lawsuits or complaints that have been received or acted on in the last year based on Title VI of the Civil Rights Act or other relevant civil rights requirements by the partnering agency and/or the eligible applicant. This list should include only those lawsuits or complaints that pertain to allegations of discrimination on the basis of race, color, and/or national origin that pertain to the department of the agency submitting this application, not necessarily the larger agency of which the applicant is a part.

There were no lawsuits or complaints received or acted on in the last year relating to title VI or other relevant civil rights requirements.

Furthermore, provide a status of lawsuits or an explanation of how complaints were resolved including corrective actions taken.

There were no lawsuits or complaints received or acted on in the last year relating to title VI or other relevant civil rights requirements.

If **NO** lawsuits or complaints were received or acted on – subrecipient must provide the following statement:

THERE WERE NO LAWSUITS OR COMPLAINTS RECEIVED OR ACTED ON IN THE LAST YEAR RELATING TO TITLE VI OR OTHER RELEVANT CIVIL RIGHTS REQUIREMENTS.

GRANT APPLICATION PROCEDURES

Project Selection Process

All project applications will be evaluated in accordance with the scoring criteria on pages 8-23 to determine the extent to which the proposed project meets the overall program goals and objectives of the programs. **Fresno COG will use volunteers from various multidisciplinary groups to recommend projects for funding through a competitive process and recommend funding levels.**

Fifteen (15) bound hard-copies, one (1) reproducible copy and one electronic copy (on CD or flash drive) of the **application must be submitted to Fresno COG before noon on July 22, 2020**. All copies shall be securely bound, e.g. spiral or comb bound (no clips, clamps, ringed binders, or rubber bands) except for the one reproducible copy. **All printing (including appendixes, but excluding maps) shall be limited to no more than 50 pages. All printing must be double-sided. If an application is single sided or over 50 double-sided pages, it will be rejected.** The original application must be marked "ORIGINAL COPY". All documents contained in the original application package must have original signatures. The copies of the application may contain photocopies of the original package (so long as the maps, photographs and other detailed exhibits are in color and/or high resolution that clearly depicts all relevant information.)

Applications must be submitted to the following address:

Fresno Council of Governments
2035 Tulare Street, Suite 201
Fresno, CA 93721

To the attention of: Peggy Arnest

Inquiries and Updates: Requests for clarification regarding this application must be submitted in writing via email to Peggy Arnest at parnest@fresnocog.org, and received by Fresno COG no later than 4:00 pm, Thursday, June 4, 2020. Such information as is reasonably available and will facilitate preparation of responses hereto; requests for clarification and associated responses; and any Addenda to this RFP will be posted at: http://www.fresnocog.org/Doing-Buisness-With-Fresno-COG and will not otherwise be distributed.

The information in this application is public record. Therefore, applicants should not include information regarded as confidential.

GRANT APPLICATION PROCEDURES

Transmittal Letter

A. Applicant Information:	
Legal Name: City of Fresno	
Address: 2600 Fresno Street	
City/State/Zip: Fresno, CA 93704	
Contact Person: Shelby MacNab	
E-mail: Shelby.MacNab@Fresno.gov	
Phone: 559-261-8689	Fax:

B. Project Type (check one):	
☒ Capital Only	☐ Capital and Operating
☐ Operating Only	☐ Other, please specify __Planning Project_____

C. Project Information:	
Project Title: Dynamic Downtown Part 2 - ASCT, TSP, EVP in Downtown Fresno	
Project Description: *(Location/Boundaries, Nature of Project, Scope)*	State of the art adaptive signal control technology, Transit Signal Priority, and Emergency Vehicle Preemption will be installed at the following locations: Tulare Street (R Street to H Street); Tuolumne Street (Broadway Street to P Street). State of the Art video detection SmartCycle & PedTrax pilot at Tulare Ave and P Street. See Exhibit 10 for Project Estimate.

D. Funding Request:	**FFY 2020/2021**
New Technology Funds Request:	$2,500,000
Total Matching Funds: *(DOT federal, state, local, private, etc.)*	$0
Total Cost of Project:	$2,500,000
E. Authorized Signature:	
Name (print):	Scott Mozier
Title (print)	Director of Public Works
Signature:	Date 7-20-2020

PROJECT/PROGRAM ELIGIBILITY - Subjective Evaluation (0 – 15 points)

APPLICATION INSTRUCTIONS:
NARRATIVE RESPONSES SHOULD BE CLEAR, COMPLETE, AND CONCISE. INSERT ADDITIONAL SPACE WHERE NEEDED TO COMPLETE QUESTIONS (e.g., application for page 8, continuing pages should be numbered 8a, 8b, 8c…etc.). ALL ADDITIONAL DOCUMENTATION SHOULD BE INCLUDED IN A DISTINCTLY LABELED SECOND PART OF YOUR APPLICATION LABELED AS THE "APPENDIX." THE NARRATIVE SHOULD INDICATE SPECIFIC DOCUMENTATION AND INCLUDE A REFERENCE TO WHERE IT CAN BE FOUND IN YOUR APPENDIX. USE MULTIPLE TABS IN THE APPENDICES, IF NEEDED, TO IDENTIFY CORRESPONDING DOCUMENTATION.

1. Provide a brief executive summary of your project/program – **no more than 100 words**. Include a description, objective, information on the organization and the partnering agency (if any). Provide a summary of the funding request, total project/program cost, and important timelines. There is a question asking for a detailed description of the project/program in the Readiness section on page 11.

The Project will install Adaptive Signal Control Technology (ASCT), Transit Signal Priority (TSP), and Emergency Vehicle Preemption Systems along Tulare Street and Tuolumne Street, interconnecting with Dynamic Downtown (Part 1) Fresno Street and Van Ness Avenue, creating a truly Dynamic Downtown Grid (Exhibit 1). The ASCT System (**Exhibit 6.1**) will employ video vehicle detection technology for real-time monitoring and 24/7 traffic synchronization system. The project will install Transit Signal Priority and Next Generation GPS Emergency Vehicle Preemption (**Exhibits 6.2 & 6.3**) and validate interoperability. Project will pilot Next Generation SmartCycle & PedTrax traffic signal video detection system (**Exhibit 6.4**) at Tulare & P Street and validate interoperability.

2. **Briefly** describe the geographic area that will be served by the project/program. *Attach an 8½ x 11 map of the service area.*

The project area includes:

-Tulare Street from R Street to H Street.
-Tuolumne Street from Broadway Street to P Street.
-Divisadero Street From Fresno Street to Tulare Street

Please see Exhibit 1 (Downtown ITS Map) & Exhibit 2 (Citywide ITS Projects Map).

PROJECT/PROGRAM ELIGIBILITY - Subjective Evaluation (continued)

3. Briefly list and describe all agencies with which your eligible public agency will partner with on this project/program. (If your public agency is not partnering, then please skip to the next page.)

   This information should include, but not be limited to the following:

- General business history

  N/A - There are no partners included in this project.

- General experience with the development and implementation of transportation projects/programs

  The City of Fresno, Public Works ITS Program has constructed a Traffic Operations Center, developed Intelligent Transportation Systems Standards and Specifications, constructed the regional transportation fiber and wireless network, constructed more than 19 ITS corridor synchronization projects and is currently working on 6 new ITS capital projects. Please see Exhibit 2 and Exhibit 3.

- Specific experience with projects similar to the proposed project/program

  The City of Fresno, Public Works ITS Program staff developed the system engineering, design, and synchronization of the Herndon Ave and Shaw Avenue (SR99-SR168) with Trafficware Adaptive Signal Control Technology (ASCT). Staff developed the traffic signal timing, testing, and synchronization for the 63 traffic signals Bus Rapid Transit system. ITS Program staff designed 4 projects, which are in currently in construction phase, to deploy ASCT along BRT corridors.

- Ability to deliver projects/programs in a timely manner. Provide examples.

  During the last 15 years, the Public Works ITS Program has designed, constructed and synchronized 15 corridors with Advanced Transportation Management Systems (ATMS) and Adaptive Signal Control Technology (ASCT). Exhibit 2 - Citywide ITS Projects Map and Exhibit 3 - ITS Projects Completion Record.

PROJECT/PROGRAM ELIGIBILITY - Subjective Evaluation (continued)

4. Briefly describe the following aspects of your project/program, if applicable:

   - Consistency with the most current adopted Regional Transportation Plan & Sustainable Community Strategy (RTP/SCS). Cite applicable verbiage from the 2014 RTP/SCS and the Chapter and Page numbers where found.

The Fresno COG's 2014 Regional Transportation Plan, pages 5-15, Intelligent Transportation Systems Strategic Deployment Plan (ITS SDP) references the Fresno County ITS SDP (1999) and the San Joaquin Valley SDP (2001) both of which indicate traffic synchronization as a key goal for the Fresno-Clovis metropolitan area. The updated Fresno COG's Fresno County ITS SDP (2015) addresses the current 20 year ITS vision for Fresno County and addresses all the Federal requirements in accordance with Title 23 CFR 940. The ITS SDP ITS User Needs Assessment Results, Table 5.1, indicates one of the highest priorities for the County was to improve signal timing/coordination. Project Sequencing Strategic Deployment Plan, Section 12, Project No. 44 outlines the Citywide need for Advanced Transportation Management Systems (ATMS) and Adaptive Signal Control Technology (ASCT).

   - Describe how this project/program will be integrated into the member agency's circulation element of its general plan or their Complete Streets Policy.

See the 2014 City of Fresno General Plan, pages 4-31, Chapter 4, Mobility & Transportation Implementing Policy MT-2-F -Optimization of Roadway Operations. This section of the plan discusses the optimization of roadway operations by continuing to expand the use of techniques such as City ITS to manage traffic signal timing coordination in order to improve traffic operations and increase traffic carrying capacity, while reducing unnecessary congestion and decreasing air pollution emissions.

Due to the highly specialized nature of ITS, the City's General Plan and RTP reference the Fresno COG's, ITS Strategic Deployment Plan (1999), San Joaquin Valley SDP (2001), all of which have now been updated by Fresno COG's Fresno County Intelligent Transportation Systems Strategic Deployment Plan (2015). The ITS SDP is available on COG's web site:

https://www.fresnocog.org/wp-content/uploads/publications/ITS/Fresno%20County%20ITS%20SDP.pdf

PROJECT/PROGRAM ELIGIBILITY - Readiness (0 – 10 points)

1. Provide a detailed description of the project/program.

   The proposed project will deploy Adaptive Signal Control Technology (ASCT), Transit Signal Priority (TSP), and Emergency Vehicle Preemption (EVP) along key downtown corridors, including Tulare Street and Tuolumne Street traffic signals (Exhibit 1). The project will validate the interoperability and functionality of the advanced transportation ASCT, TSP, and EVP systems. Upon successful completion of the project, the Next Generation GPS Emergency Vehicle Preemption system will be added to the extensive City of Fresno ITS Standards.

   This ITS Project will be the first to incorporate ASCT, TSP, and Next Generation GPS EVP at 15 of the traffic signals, which in conjunction with Dynamic Downtown Part 1, will create a state-of-the-art ASCT/TSP/EVP grid for greater mobility and emission reductions in the heart of Downtown Fresno. Please see Exhibits 6.1, 6.2, 6.3, 6.4 for a brief overview of the various state-of-the-art technologies to be deployed in Dynamic Downtown Part 2.

2. Describe the project/program work plan. This section of the application documents the current delivery phase of a project/program and the applicant's proposed schedule for implementation. For each of the project milestones or significant stage in development, applicants must list the dates that previous milestones were completed or the dates applicants anticipate completing current and/or future milestones.

   The project design and advertise/award will run from July 2021 to December 2022, and the project construction and close out will run from approximately January 2023 - December 2023 (See Exhibit 4 for detailed milestones). National Cooperative Highway Research Program, Report 560, Guide to Contracting ITS Projects determines the best procurement method based on project category and agency capability level. While this project is considered "moderate to high risk", the ITS Program staff have designed, constructed, and synchronized 15 ITS projects over the last decade, including Advanced Transportation Management Systems, Adaptive Signal Control Technology, and Transit Signal Priority.

3. Applicants must demonstrate the ability (staff and resources) of the agency to complete the project/program on time and within budget. Attach a project/program schedule in the appendix.

   The City's ITS Program has completed numerous successful ITS projects: 1) Traffic Operation Center is constructed and operational and staffed with 7 full time employees (2000), 2) Citywide fiber and wireless traffic network is constructed and operational, 3) ITS Standards are published (2008), 4) 15 corridors are constructed and synchronized (last 10 years) and 330 of ~500 traffic signals are synchronized, and 5) Six new ITS Projects are in Design or Construction. (See Exhibits 2 & 3)

PROJECT/PROGRAM ELIGIBILITY - Environment (0 – 5 points)

1. Describe if and how the project/program will reduce greenhouse gas emissions.

Traffic synchronization projects reduce travel times and the number of stops vehicles make at red lights. Based on guidance from 2020 Congestion Mitigation & Air Qualify Improvement Program and associated 2018 Emission Factor Tables, and Emission Calculation Guidelines using California Air Resources Board (ARB) Access Database, the emission reductions for traffic signal synchronization for this project is the following:

ROG: 163
NOx: 570
PM10/2.5: 0
CO: 116
Total: 849 Pounds per year

ARB Access Database outputs are attached as Exhibit 5.1 (with CO) and 5.2 (Without CO).

Note: Average Daily Trips was foretasted from General Plan AM Peak Hour Volumes and PM Peak Hour Volumes which are typically 1/5th of average corridor ADTs. Tulare Street (10,600 ADT; 0.73 Miles) and Tuolumne Street (3300 ADT; 0.62 Miles) were averaged proportionally, resulting for the combined corridor (7500 ADT; 1.35 Miles).

2. Describe if and how the project/program will improve the environment in other ways.

By improving traffic flow in Downtown Fresno, this project optimizes the reliability of public transportation which contributes to ridership and travel mode shift. Better traffic flow and travel mode shift both reduce fuel consumption for personal vehicles. This project will also pilot and validate the interoperability of traffic signal bicycle and pedestrian video detection system (SmartCycle and PedTrax) at Tulare Street and P Street. This equipment also has the potential to further support mode shift if deployed more widely. Testing it as part of this project is the first step to determine functionality and standards for its use.

PROJECT/PROGRAM ELIGIBILITY - Public Benefit (0 – 15 points)

1. Describe how the project/program will impact and provide a direct public benefit to Fresno County residents that are both transit and non-transit users.

   Emissions contribute to poor air quality, and according to CalEPA can cause lung irritation, inflammation, and worsening of existing chronic health conditions - even at low levels of exposure. Reducing exposure will provide a direct public health benefit for transit and non-transit users. Additionally, traffic volumes in Downtown Fresno can expand and contract significantly depending on the types of events occurring at the stadium, theatre or convention center. Travel reliability is a direct benefit to residents, because time spent in traffic is time wasted. Every hour spent in traffic ranges in value from $14.40 per hour for personal travel to $26.50 for business travel. By enhancing the existing transportation system along these routes, transit and non-transit users will benefit from time savings.

2. Explain the public need for the project/program.
   If applicable, attach a feasibility study for the project/program as an appendix. If one is not available, provide justification to how the public need was determined.

   The 2015 Fresno COG's Intelligent Transportation Systems Strategic Deployment Plan (ITS SDP), and the documents that preceded it (Fresno County 1999 ITS SDP and the 2001 San Joaquin Valley ITS SDP) all identify traffic signal synchronization as a key need for the Fresno-Clovis Metropolitan area. Traditional Advanced Transportation Management System (ATMS) relies on static traffic counts, modeling, and time-of-day synchronization which is ineffective in downtown corridors. However, Adaptive Signal Control Technology (ASCT) synchronization is ideally suited for real time monitoring and traffic synchronization, adjusting for Fulton Street events, Chukchansi park games, Convention Center events, etc. The Shaw Avenue ASCT (Fresno Street to SR168) has worked exceptionally well addressing the varying traffic demands from Fresno State University, Save Mart Center events, football games, and holiday season traffic at Fashion Fair.

3. Describe how the project/program will improve the economic vitality of Fresno County.

   A key indicator of economic vitality in an urban area is a thriving downtown. As the largest City in the County, Downtown Fresno draws thousands each day to conduct business, seek health services or enjoy a sporting event. The Downtown travel experience can draw additional private investment and professional talent to the County. This project will support the continued economic growth and vitality of Fresno County by improving the travel experience around Downtown Fresno which reduces barriers to business. Equipment that minimizes congestion will result in less user frustration and delay and remove traffic concerns as a barrier to economic investment. The project will also support timely and efficient delivery of goods to downtown restaurants and businesses.

PROJECT/PROGRAM ELIGIBILITY - Public Benefit (continued)

4. Describe the safety/security features of the project/program.

Typically with traffic synchronization projects of congested corridors, projects expect an 18% improvement in travel times. However, after the Shaw Avenue corridor adaptive deployment and synchronization, travel time studies indicated 23% improvement during AM peak and 31% improvement for PM peak. Overall, Shaw Avenue corridor complaints were reduced by 29%. These results were reported to Caltrans Local Assistance, Project Benefit Analysis, Proposition 1B, Traffic Light Synchronization Program and audited by the California Department of Finance, Office of State Audits and Evaluations. While the project forecast is an 18% improvement in travel times for the corridors, we can easily see upwards of 23%-31% improvements in travel times and a reduction in corridor incidents due to a reduced number of stops.

A study published in the APWA Reporter (Exhibit 6) found that safety benefits associated with adaptive signal control technology can reduce collisions by an average of 22%.

5. How will the project/program improve accessibility for disabled Fresno County residents?

The project will improve accessibility for disabled residents by responding real-time to traffic conditions. When traffic backs up into an intersection it impedes the use of the accessible pedestrian signal equipment disabled users rely on to cross the roadway. Vehicles in a queue block accessible paths for users in mobility devices and users with visual impairments. Congestion increases disabled pedestrians wait time, and increases potential pedestrian-vehicle conflict. Adaptive synchronization will keep traffic flowing and minimize the likelihood that traffic will back up into a crossing. This will improve the accessibility of existing facilities and pedestrian crossing equipment. Additionally, the Project will also pilot and validate the interoperability of traffic signal bicycle and pedestrian video detection systems at Tulare Street and P Street which will identify new tools for accessible, pedestrian friendly crossings.

6. Describe how the project/program will improve connectivity and enhance current transportation operations.

The project will enhance current transportation operations by making signal timing more responsive to changing conditions. Signals are currently timed based on time-of-day travel patterns. With this equipment, signals will be synchronized in response to changing travel demands. For example, sudden increases in traffic as a result of a large event will be sensed and signal timing will adjust. This level of responsiveness to changing travel conditions will reduce traffic as a barrier to connectivity to major regional destinations downtown which include: Community Medical Center, Fresno City Hall, Fresno County, Fresno County Office of Education, BitWise and Fresno City College.

PROJECT/PROGRAM ELIGIBILITY - Innovation (0 – 25 points)

1. Identify and clearly describe the advanced technology(ies) utilized in the project/program and how the project/program utilizes advanced technology(ies) beyond the level of existing technology(ies) currently used in transit and transportation systems in widespread applications.

   This Project will interconnect with Dynamic Downtown Part 1 (Advertised for Construction on July 13, 2020), creating a state-of-the-art downtown grid with real time, adaptive traffic synchronization, transit signal priority, and emergency vehicle preemption system (Exhibit 1). The Project Tulare Street and Tuolumne Street corridors have the basic ITS infrastructure (fiber and wireless) for connectivity of the traffic signals to the Traffic Operations Center for basic time-of-day synchronization. The basic time-of-day synchronization is limited to manual traffic counts taken every few years, modeling, retiming signals, which is highly ineffective in a dynamic downtown environment. In order to have a truly Dynamic Downtown Fresno, an adaptive traffic signal system is needed that monitors real time traffic, real time activities, and optimizes traffic signals in real time.

   The Project will install: 1) adaptive software modules at all the traffic signal intersections, 2) will separate and configure the vehicle detection for the adaptive system, 3) will install missing detection with advanced video detection equipment, 4) will install Transit Signal Priority (TSP) systems at signals and buses operating along the Project corridors, 5) will install GPS Emergency Vehicle Preemption (EVP) system at signals and a limited number of emergency vehicles (police and fire). The Project will also pilot and validate the interoperability of traffic signal bicycle and pedestrian video detection system (SmartCycle and PedTrax) at Tulare Street and P

2. Describe if and how this project incorporates energy storage.

   While this project does not incorporate what is considered a traditional energy storage system; it does produce fuel consumption savings. Synchro model for ITS Shaw Avenue adaptive project indicated the adaptive synchronization produced 1 million gallons of annual fuel savings. Note that the fuel savings for downtown corridors will be a proportional amount of this total since traffic volumes are a fraction of Shaw Avenue traffic volumes.

PROJECT/PROGRAM ELIGIBILITY - Innovation (continued)

3. If applicable, describe how a research project(s)/program(s) will further the goal of developing and deploying new and innovative ideas, practices, and approaches.

   The Dynamic Downtown Part 2 Project can be considered applied research and demonstration. The project will design, construct, and demonstrate the functionality and interoperability of cutting edge and new technologies (Adaptive Signal Control Technology, Transit Signal Priority, Emergency Vehicle Preemption, and video Bike & Pedestrian Detection) in the Downtown area. The results from this project will be the basis to seek future grant funding to expand ASCT/TSP/EVP equipment throughout the City of Fresno as outlined in 2015 Fresno COG's ITS Strategic Deployment Plan.

   In addition to real time synchronization, the ATMS/ASCT/EVP system will be able to detect and report real time vehicle counts 24 hours/7 days a week (no longer requiring manual traffic counts). The ability to provide vehicle counts is incredibly helpful for future traffic engineering studies and modeling used for grants, research and development. The data collected from this new technology can also be used to further improve signal timing across the downtown area to respond to various evening and weekend events and will inform ITS standards for the City of Fresno.

4. Explain how the project/program will provide more efficient and effective delivery of public transportation services through the use of the new technology or technological capacity improvements.

   The Dynamic Downtown Part 2 Project will provide more efficient and effective delivery of timely transit services by deploying new adaptive technology to maximize the capacity of existing Traffic Signal Prioritization (TSP) technology.

   The TSP quipped signals and buses will allow more green time for the buses to continue along the route without hitting too many red lights. This keeps routes on-time with 10-minute headways. However, when the entire traffic system is heavily congested it can contribute to delays due to gridlock. Adaptive signal control equipment proposed in this project will minimize gridlock by analyzing travel needs real-time and responding with the most efficient allocation of green time. This dynamic system will maximize the effective capacity of existing TSP equipment while also demonstrating the effectiveness of new adaptive equipment.

PROJECT/PROGRAM ELIGIBILITY - Replication & Regional Applicability (0 – 10 points)

1. Explain how the project/program has the potential for replication and/or growth in other areas of the Fresno County region.

Over the last 15 years, the City of Fresno Public Works Department has implemented multiple ITS phases which include the Traffic Operations Center with an Advanced Transportation Management System interconnecting approximately 330 0f 500 traffic signals. The City's Traffic Engineers have a state-of-the-art technology to monitor, model, and coordinate traffic on some of the City's major arterials, thereby, improving safety, operations, energy conservation, and effective capacity of major arterials. ITS Operations and Maintenance Program is funded with a $700,000 annual budget and is staffed with 7 permanent positions.

The City of Fresno ITS Standards and Specifications were published after extensive research and development (City of Fresno, ITS Standards and Specifications, 2008 and Wireless ITS Standards and Specifications, 2009). All intelligent transportation systems are designed to meet City ITS Standards and Specifications. The ITS Program has established an ITS Technical Advisory Group (TAG) to manage the City's ITS Standards and Specifications, to assist with the design and implementation of all ITS Projects. The ITS Technical Advisory Group includes the Traffic Engineers, City Design Engineer, Traffic Signals Electrical Maintenance Supervisor, TOC Supervisor, and Program Manager to guide the City's ITS Standards & Specifications development, revisions, and design application processes. All ITS Standards and Specifications are shared with all Central Valley agencies.

The City's ITS Program has worked 1) with Fresno COG to assist with the 2015 Fresno COG's Intelligent Transportation Systems Strategic Deployment Plan (ITS SDP), 2) with Caltrans, City of Clovis, and County of Fresno to provide various agencies with transportation network access and E-Gov network interconnectivity, 3) with Clovis Unified School District (CUSD) to provide fiber network interconnectivity between all 17 CUSD schools in the City of Fresno and the downtown Office of Education.

The City's ITS Program's vision and mission is clearly articulated, as published in City's ITS Management Plan, and the ITS Program has a proven track record of developing standards for all new technologies for the Central Valley, and partnering and deploying such shared technologies when the opportunities are presented in ITS capital projects. Wireless vehicle detection standards will benefit traffic signal projects where installing traditional conduit, vault, and loop detection is not favorable for various field conditions. The adaptive/TSP/EVP and video detection interoperability will greatly benefit downtown corridors; however, the standard will benefit all future ITS projects along the exiting and future TSP corridors throughout the City of Fresno and Central Valley.

PROJECT/PROGRAM ELIGIBILITY - Environmental Justice Benefits (0 – 10 points)

1. Describe if and how the project/program will provide **health benefits** to disadvantaged communities.

   Based on the CalEnviroScreen 3.0, the project area in this proposal falls into the 91st to 100th percentile. It is considered an extremely disadvantaged community. See Exhibit 7 for maps.

   According to the California Office of Health Hazard Assessment, outdoor air pollution can trigger asthma attacks or make asthma worse. Disadvantaged residents in the area are plagued with compounding health issues that include severe asthma. The asthma percentile for project census tracts ranges from 78-97%, meaning the asthma rate in this community is higher than 78-97% of the census tracts in California. See Exhibit 7 for maps.

   As a result of this project, fewer emissions will be released. Better air quality will result in a healthier environment for disadvantaged residents, particularly those with asthma.

2. Describe if and how the project/program will provide **economic and/or improved public services** to disadvantaged communities.

   Public transportation offers important employment and service connections to low-mobility residents. It enables disadvantaged residents with limited access to vehicles the ability to affordably reach essential community resources and employment centers. The City of Fresno's Active Transportation Plan has identified Downtown as an area where 40-50% or more of all households do not have access to an automobile. See Exhibit 8 for a map of households with zero automobiles from the City of Fresno's Active Transportation Plan. The EVP included in the project will reduce barriers to timely emergency response services for disadvantaged communities from police and fire. Interoperability testing will allow for improved citywide services for disadvantaged communities over the long term.

   The project will improve the travel experience along the TSP corridors in downtown Fresno by minimizing the likelihood of gridlock. This will improve travel times for disadvantaged residents to reach public service organizations and employment centers around the City. Services and employers along the BRT route include: the Housing Authority, Public Health Department, Community Regional Medical Center, Health Clinics, Fresno Unified, Fresno County Department of Social Services, and major shopping centers like Manchester and RiverPark.

For more information on environmental justice areas in Fresno County, see the Fresno COG environmental justice plan found at http://www.fresnocog.org/environmental-justice.

PROJECT/PROGRAM MATCH FUNDING COMMITMENTS (0 – 10 points)

1. Discuss the project/program funding strategy, clearly indicating total cost, authorization amounts and dates for all funding sources committed or anticipated to fully fund the project. Include a contingency plan if anticipated funding does not materialize.
   Attach an electronic copy of a current audited financial statement of all agencies with which your eligible public agency will partner as an appendix to the electronic copy of your agency's application. Do NOT submit a hard copy of the audited financial statement. Additionally, do NOT submit a copy of a Fresno COG member agency's audited financial statement.

PROPOSED FUNDING									
Fund No. 1:									**Program Code**
Proposed Funding									
Component	Prior	20/21	21/22	22/23	23/24	24/25	25/26+	Total	**Funding Agency**
E&P (PA&ED)									FCTA/COG
PS&E			200,000						
R/W SUP									
CON SUP				300,000					
R/W									
CON				2,000,000					
TOTAL									

Fund No. 2:									**Program Code**
Proposed Funding									
Component	Prior	20/21	21/22	22/23	23/24	24/25	25/26+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP									
CON SUP									
R/W									
CON									
TOTAL									

Fund No. 3:									**Program Code**
Proposed Funding									
Component	Prior	20/21	21/22	22/23	23/24	24/25	25/26+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP									
CON SUP									
R/W									
CON									
TOTAL									

I certify that the information contained in the Proposed Funding table above is accurate to the best of my knowledge and that I am authorized to submit the project/program proposal for scoring and possible programming. The agency is required to identify matching funds, if any, and deliver the project as proposed within the scope and schedule specified in the application should the project be awarded funding.

Signed: _____

Printed Name: Scott Mozier

Date: 7-20-2020

PROPOSED BUDGET FOR OPERATIONAL PROJECTS/PROGRAMS

PROJECT ANNUAL BUDGET:

Estimated Income:	
a. Passenger Revenue	$ N/A
b. Other Revenues	$
c. Total grants*, donations, subsidy from other agency funds	$
TOTAL INCOME	$
***Not including this grant request.	
Estimated Expenses:	
a. Wages, Salaries and Benefits (non-maintenance personnel)	$
b. Maintenance & Repair (include maintenance salaries)	$
c. Fuels	$
d. Casualty & Liability Insurance	$
e. Administrative & General Expense	$
f. Other Expenses (e.g., materials & supplies, taxes)	$
g. Contract Services (specify)_____	$
TOTAL EXPENSES	$

PERFORMANCE MEASURES

1. List performance measures your agency will use to track the effectiveness of this project.

   Overall ASCT Project benefit analysis for the corridors will include:

   1) Travel time studies
   2) Improvement in the number of traffic signal complaints
   3) Improvement in accidents
   4) Synchro study to demonstrate emission reductions (VOx, NOx, CO, PM10/2.5)
   5) Synchro study to demonstrate fuel savings

   Once determined to be a viable tool for adaptive synchronization, the innovative wireless detection system funded by this project will be incorporated into ITS Standards for future application in other areas of the City.

2. Describe how your agency will monitor, evaluate, and report on the service your agency proposes to provide.

   The Traffic Operations Center is staffed with a team of seven who continually monitor the existing Advanced Transportation Management System (ATMS) including the Adaptive Signal Control Technology. Staff can provide project reports through construction, and collect outcome data once the equipment is installed. A Project Manager will be assigned to ensure the project stays on time and on budget and identifies any challenges or best practices to inform the future application of this new technology.

Exhibit List

1. Project Location Map
2. ITS Citywide Map
3. 15 Year ITS Project list
4. Project Schedule
5. ARB Emissions Reduction Calculations
    - 5.1 ROG, NOX, With CO
    - 5.2 ROG, NOX, Without CO
6. APWA Reporter Article – *Safety Benefits Associated with Adaptive Traffic Signal Control*
    - *6.1 - SynchroGreen Adaptive Signal Control Technology (ASCT)*
    - *6.2 - Opticom Emergency Vehicle Preemption (EVP)*
    - *6.3 - Opticom Transit Signal Priority (TSP)*
    - *6.4 - SmartCycle & PedTrax Detection System*
7. Project Area Maps:
    - Asthma Indicator Map
    - Disadvantaged Community Map
    - Ozone Indicator Map
    - PM 2.5 Map
8. Percent of Households with Zero Automobiles Map
9. Letters of Support
10. Engineer's Estimate
11. Council Resolution

EXHIBIT 1
LOCATION MAP

NOT TO SCALE

City of FRESNO

DEPARTMENT OF PUBLIC WORKS

DYNAMIC DOWNTOWN ADAPTIVE
SIGNAL CONTROL TECHNOLOGY (ASCT)-PART 2

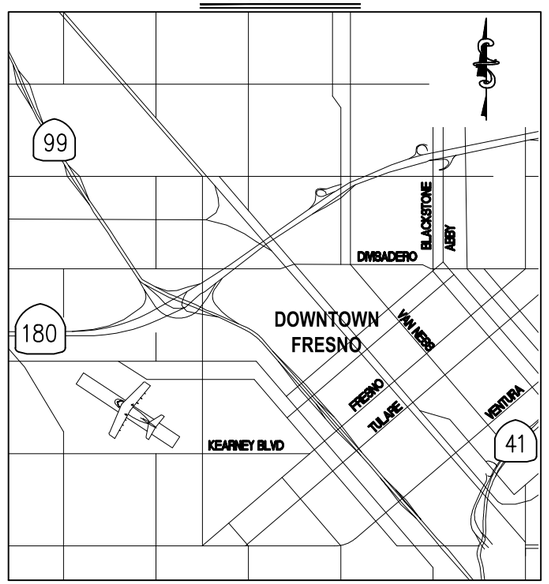
DATE: 06/19/2020

MEASURE C NEW TECHNOLOGY

LEGEND:

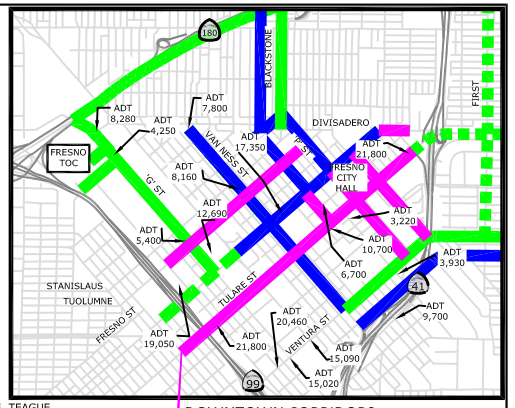
- EXISTING SIGNALIZED INTERSECTION
- PROPOSED SIGNALIZED INTERSECTION BY SEPARATE CITY CAPITAL PROJECT, FY21–FY22 CONSTRUCTION
- PROPOSED ITS ADAPTIVE CORRIDORS WITH EXISTING TSP SYSTEM, FY21–FY22 CONSTRUCTION
- DYNAMIC DOWNTOWN ADAPTIVE ASCT – PART 1 FY21–FY22 CONSTRUCTION
- DYNAMIC DOWNTOWN ADAPTIVE ASCT – PART 2 UNDER THIS GRANT APPLICATION

VICINITY MAP



INTELLIGENT TRANSPORTATION SYSTEMS
PUBLIC WORKS DEPARTMENT
CITY OF FRESNO

EXHIBIT 2



Herndon Ave ADAPTIVE
Completed February 2020

Shaw Ave ADAPTIVE
Completed October 2019

Blackstone Ave - Friant Rd
ADAPTIVE
In Construction 2020/2021

Abby St - Blackstone Ave
ADAPTIVE
Construction Phase 2020/2021

Ventura Ave - Kings Canyon Blvd
ADAPTIVE
Construction Phase 2020/2021

Dynamic Downtown Part 1
ADAPTIVE & TSP
Construction Phase 2020/2021

Dynamic Downtown Part 2
ADAPTIVE, TSP &
EMERGENCY VEHICLE PREEMPTION

Ashlan Ave Wireless
Design Phase 2020/2021

Jensen Ave ADAPTIVE
Design Phase 2020/2021

N

LEGEND

- FIBER CORRIDOR SYNCHRONIZED
- WIRELESS CORRIDOR SYNCHRONIZED
- FIBER CORRIDOR IN DESIGN, CONSTRUCTION, OR SYNCHRONIZATION
- WIRELESS CORRIDOR IN DESIGN, CONSTRUCTION, OR SYNCHRONIZATION
- FUTURE FIBER MASTER PLAN (2015-2025)
- CONDUIT/FIBER CORRIDOR CONSTRUCTED
- CITY LIMITS
- CITY SPHERE

"ADT ARE FOR ILLUSTRATION PURPOSES ONLY BASED ON 2000 TO 2012 TRAFFIC DATA"
ARROW POSITION INDICATES LOCATION OF ADT, FOR THE COUNT SHOWN.

EXHIBIT 3

City of Fresno, Public Works Department, ITS Program				
Decade of ITS Projects Design, Construction, and Synchronization Summary				
		CITY	**TIP**	**Status**
1	Clovis Ave	PW510	FRE090106	Completed
2	Shaw Ave 99-41	PW439	FRE070107	Completed
3	Shaw Ave 41-168	PW509	FRE090133	Completed
4	Ashlan Ave (Blackstone - Peach)	PW626	FRE110133	Completed
5	First Street	PW618	FRE110132	Completed
6	CUSD - Fiber to 17 Schools	PW641	CUSD Funding	Completed
7	Central Valley Independent Network Project	PW653	CVIN Funding	Completed
8	Bullard Ave	PW617	FRE110131	Completed
9	McKinley Ave	PW622	FRE110135	Completed
10	Nees Ave	PW623	FRE110134	Completed
11	Friant-Nees-Palm	PW549	LSTMP198- FRE90137	Completed
12	Willow Ave	PW542	FRE090109	Completed
13	Shields Ave	PW550	LSTMP067-FRE90137	Completed
14	Tulare Street	PW624	FRE110136	Completed
15	West Ave	PW616	FRE110130	Completed
16	Downtown Fresno & Van Ness	PW689	FRE130034	Completed
17	Freeway Crossings	PW688	FRE130037	Cancelled - Technology Incompatibility Issue
18	Adaptive Herndon	PW743	FRE150029	Completed
19	Adaptive Shaw West	PW742	FRE150030	Completed
19	Ashlan Ave (Blackstone - Cornelia)	PW898	LSTMP645	Design Phase FY2021
20	Adaptive Abby - Blackstone (Divisadero - McKinley)	PW809	LSTMP546	Construction Phase Advertise in 2020
21	Adaptive Blackstone - Friant (McKinley to Shepherd)	PW810	LSTMP545	Construction Phase Advertise in 2020
22	Adaptive Ventura - Kings Canyon (Van Ness to Chestnut)	PW811	LSTMP546	Construction Phase Contract Awarded
23	Dynamic Downtown Adaptive, TSP, Video Detection	PW879	Measure C New Technology	Construction Phase Advertised July 13, 2021
24	Adaptive Jensen Ave (Elm to Temperance)	PW21018	FRE090137	Design Phase FY2021/22

EXHIBIT 4

Dynamic Downtown - Adaptive Signal Control Technology in Downtown Fresno

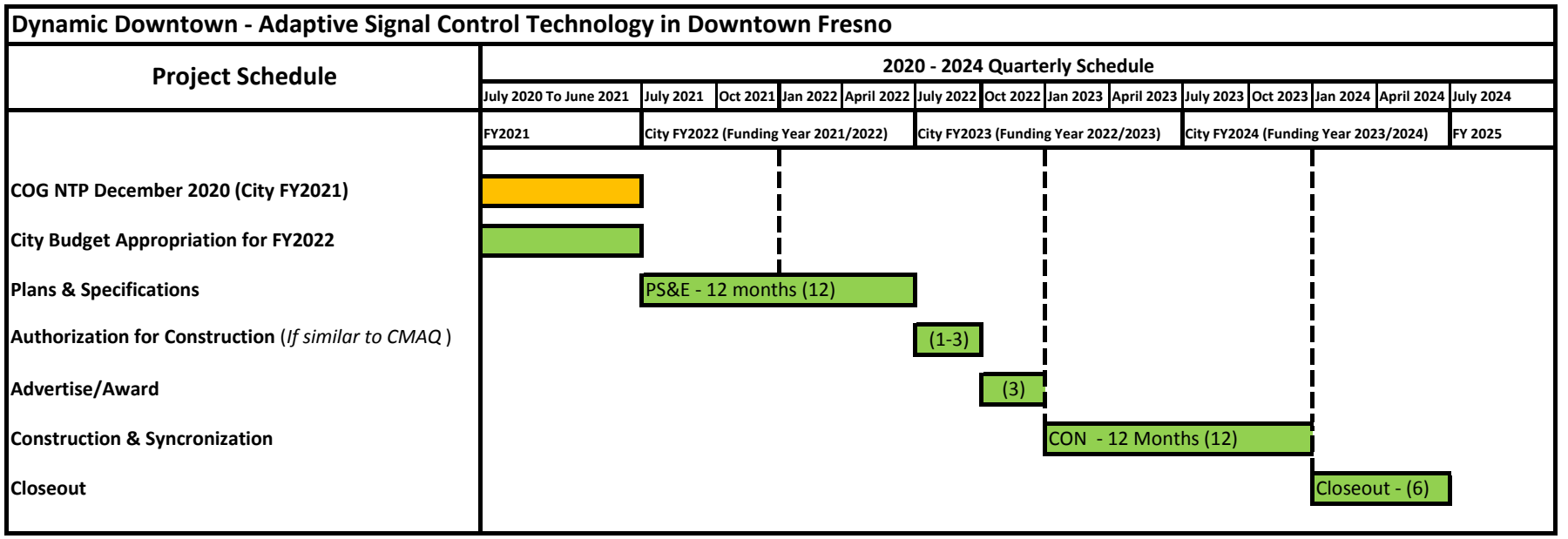


Exhibit 5.1

SIGNAL COORDINATION

County: Fresno

Federal Number:

Approval Date:

Caltrans DIST-EA: 06

Short Description: Dynamic Downtown Part 2 - Adaptive Traffic Signal Synchronization

Project Scope: Adaptive Signal Control Technology

Project Sponsor: City of Fresno **Private Agency:** No

CMAQ Funding:	$2,500,000	
Local Match:	$0	
Capital Recovery Factor:	0.22	
Project Analysis Period:	5	**years**
Days (D):	365	**operating days per year**
Congested Traffic:	7,500	**ADT - 24/7/365 Adaptive Synchronization**
Length (L) of congested roadway:	1.35	**miles**
Annual VMT (VMT):	3,695,625	**annual miles**

EMISSION FACTORS:

	Before Speed Factor		After Speed Factor	
ROG :	0.19	***grams per mile***	0.15	***grams per mile***
NOx :	0.84		0.70	
PM2.5 :	0.01		0.01	
CO :	2.20		2.00	

EMISSION REDUCTIONS:

	Pounds per Year	Kilograms per Day
ROG:	163	0
NOx:	570	1
PM2.5:	0	0
CO:	116	0
Total:	***849***	***1***

COST-EFFECTIVENESS OF:

CMAQ Funds:	$643.05	**per pound**	,286,102	**per ton**
All Funding Sources:	$643.05	**per pound**	,286,102	**per ton**

EXHIBIT 5.2

SIGNAL COORDINATION

County: Fresno

Federal Number:

Approval Date:

Caltrans DIST-EA: 06

Short Description: Dynamic Downtown Part 2 - Adaptive Traffic Signal Synchronization

Project Scope: Adaptive Signal Control Technology

Project Sponsor: City of Fresno **Private Agency:** No

CMAQ Funding:	$2,500,000	
Local Match:	$0	
Capital Recovery Factor:	0.22	
Project Analysis Period:	5	**years**
Days (D):	365	**operating days per year**
Congested Traffic:	7,500	**ADT - 24/7/365 Adaptive Synchronization**
Length (L) of congested roadway:	1.35	**miles**
Annual VMT (VMT):	3,695,625	**annual miles**

EMISSION FACTORS:

	Before Speed Factor		After Speed Factor	
ROG :	0.19	***grams per mile***	0.15	***grams per mile***
NOx :	0.84		0.70	
PM2.5 :	0.01		0.01	
CO :	0.00		0.00	

EMISSION REDUCTIONS:

	Pounds per Year	Kilograms per Day
ROG:	163	0
NOx:	570	1
PM2.5:	0	0
CO:	0	0
Total:	***733***	***1***

COST-EFFECTIVENESS OF:

CMAQ Funds:	$745.12	**per pound**	,490,245	**per ton**
All Funding Sources:	$745.12	**per pound**	,490,245	**per ton**

EXHIBIT 6

Safety benefits associated with adaptive traffic signal control

Jim Clark, P.E., Southeast Territory Engineering Manager, Rhythm Engineering, Lenexa, Kansas;
Dennis Randolph, P.E., PTP, PTOE, PWLF, Director of Public Works, City of Grandview, Missouri, and member, APWA Engineering and Technology Committee

The World Health Organization (WHO) calls traffic injuries a "global public health problem" accounting for a staggering 1.27 million lives lost each year. WHO also reports that in 2006, one of the worst years for traffic crashes in the United States in recent history, there were 42,642 road traffic deaths and a further 3,305,237 nonfatal road traffic injuries documented.

To narrow the scope of this problem further, according to the Federal Highway Administration (FHWA), of the 33,808 reported deaths on U.S. roadways in 2009, 7,043, or about 21 percent, were intersection related. The FHWA reports about 700 people are killed in red-light running crashes—the most common type of crash in urban areas—and an estimated 165,000 are injured annually. It follows that improving intersections should be a priority in reducing the human and economic costs of traffic crashes.

Traffic Signal Timing

Traffic signal timing measures stand to increase road safety by improving the conditions that lead to collisions at or near signalized intersections. Engineers refer to traditional signal timing optimization tools as "off-line" optimization. Traffic engineers have used these tools for many years to coordinate signals—a measure agreed by multiple Department of Transportation agencies to reduce stops and delays—and in turn reduce intersection conflicts to travelers. However, for traffic engineers to develop ideal timing plans off-line there must be an ongoing commitment to update the plans. This commitment includes efforts to collect data every few years to keep pace with changing traffic demands.

On the other hand, adaptive traffic control system (ATCS) functionality is different from off-line optimization methods. For instance, the ATCS used in the studies described below, InSync, constantly gathers traffic data then analyzes, optimizes and adapts signal timings in real time, that is, every second, to changing traffic demands.

With traditional optimization techniques, traffic engineers develop predetermined system timing plans stored in controllers. The controllers then download plans based on time of day or responsive control thresholds. In contrast, ATCSs can continuously measure traffic flow using sensors and analyze the flow data using artificial intelligence technology. InSync, for example, performs this analysis to develop a local optimization solution. Then it combines its local optimization algorithm with a global coordination plan to efficiently serve traffic demand along signalized roadways.

Safety Impact of ATCSs

ATCSs produce safety benefits by reducing the conditions that lead to crashes. ATCSs also minimize opportunities for conflicts by decreasing the number of stops, queues and delay. They do this through optimizing service at individual intersections and creating progression where possible. According to the National Cooperative Highway Research Program (NCHRP) Synthesis 403, ATCS solutions reduce the likelihood of crashes at intersections "through decreases of some efficiency-related performance measures, which highly correlate with some safety metrics (for example, a decrease in the number of stops reduces the chance of rear-end crashes)."

Theoretically, ATCSs often coordinate signals better than traditional off-line solutions because they adapt in real time to changing traffic demands. The FHWA recognizes that signal coordination reduces traffic crashes and that reducing stops not only removes opportunities to run red lights, but also reduces the desire to "beat" a red light. To the extent ATCSs can contribute to reducing stops, queues and delays by improving local signal operation and signal coordination, they should also improve safety, assuming all other factors remain consistent.

The unique characteristics of modern ATCSs such as the system reported on here are the ability to decrease stops, queues and delay as well as significantly improving safety while:

- Optimizing traffic control based on delay of individual movements as prescribed in the Highway Capacity Manual (HCM)

EXHIBIT 6

- Not using a traditional cycle length, thereby giving it greater flexibility to adjust to changes in demand and better coordinate signals to create progression in both directions (and, since InSync is not constrained by cycle, there is no signal transitioning)

- Not only gathering data in real time but also optimizing in real time, adjusting green time, phasing and sequencing as often as each second

Because these characteristics are proven effective at reducing stops, queues and delays, the critical factors leading to crashes, it follows that their decline is the reason this ATCS improves safety.

Evidence from five recent ATCS implementations in Columbia County, Georgia; Topeka, Kansas; Lee's Summit, Missouri (two sites); and Springdale, Arkansas verifies the safety benefits of ATCS deployments. Early data on the ATCS deployments at these five sites reflect the key benefit of confirmed stop frequency, delay and travel time reductions: a resulting decline in intersection-related traffic crashes.

The five corridors (see Table 1) each had the ATCS implemented between 2009 and 2011. The total number of intersections for all five systems was 40, and the total length of corridors was 8.5 miles. To determine the safety effectiveness of the implementations, before-and-after crash data were collected. Each of the corridors had a different amount of before-and-after data collected, with a total of 78.3 signal-years of *before* period and 41.0 signal-years of *after* period data collected.

Each of the corridors had decreases in crashes (on an annualized basis), with percentage changes (after compared to before) ranging from -15 percent to -30 percent, with an aggregate change of -22 percent. Annual crash-related cost savings were also computed for each corridor and they ranged from about $360,000 to over $1.2 million, with a

TAC Corridor Implementation Summary

Corridor and Agency	Scope of Corridor		Before Period		After Period		Change In Crashes		Signal Years Exposure		Annual Crash-Related Cost Saving
	Inter-sections	Length (miles)	Years	Ave. Annual Crashes	Years	Ave. Annual Crashes	Fre-quency	Percent-age	Before	After	
Washington Road Columbia County, GA	5	1	1.0	162	1.0	120	-42	-26%	5.0	5.0	$1,164,702
21st Street City of Topeka, KS	7	1	2.0	142	2.0	108	-34	-24%	14.0	14.0	$942,854
Missouri Highway 291, Lee's Summit (Missouri DOT)	12	2.5	3.0	262	1.0	217	-45	-17%	36.0	12.0	$1,247,895
Chipman Road City of Lee's Summit, MO	8	1	2.0	89	0.6	76	-13	-15%	16.0	4.7	$360,503
Thompson Road/ Hwy 71, City of Springdale, AR	8	3	0.9	63	0.9	44	-19	-30%	7.3	7.3	$526,889
Total	**40**	**8.5**	**8.9**	**718**	**5.5**	**565**	**-153**	**-22%**	**78.3**	**41.0**	**$4,242,843**

Table 1

EXHIBIT 6

combined total of over $4.3 million of savings a year.

These five implementations support the effectiveness of ATCSs in improving road safety. They show that real-time signal coordination and dynamic signal optimization based on delay of individual movements result in significant improvement even on arterials previously running coordinated timing plans.

References: Contact the authors for a complete version of the study with a full reference list documenting recent safety research from the FHWA, AASHTO and more.

Jim Clark is the Southeast Territory Engineering Manager for Rhythm Engineering and has practiced transportation engineering for over 35 years. During his career, Jim has made significant contributions to the research, development and practical application of advanced transportation methods. Contact: Jim.Clark@Rhythmtraffic.com

Dennis Randolph is Director of Public Works for the City of Grandview, Missouri, and has practiced traffic engineering for over 42 years. Currently, he is an adjunct instructor at the University of Missouri-Kansas City. Dennis is also a Public Works Leadership Fellow. Contact: drand77201@att.net

The Springdale Police Department reported the InSync ATCS reduced crashes on the corridor by 30% based on crash data for the 12 months before and 12 months after ATCS installation.

A before-and-after study revealed significant reductions in stops, travel time and delay on Washington Road, a Columbia County, Georgia, corridor with an average daily traffic (ADT) of 40,000. The County's traffic engineer, Glen Bollinger, provided the crash data for the year before and after deployment of adaptive traffic technology. In 2009, before deployment, the Washington Road study corridor experienced 162 total crashes with 114 of those occurring at intersections (as opposed to mid-block). In 2010, after deployment of InSync, the study corridor experienced 120 crashes of which 79 occurred at intersections. These figures represent a 26% reduction in total crashes.

CUBIC | Trafficware

EXHIBIT 6.1

SynchroGreen® Module

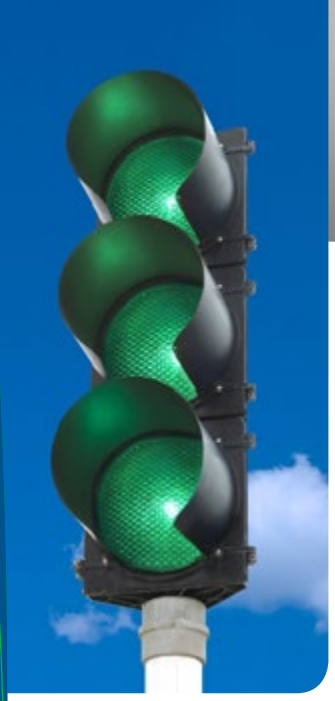
Adaptive Traffic Control
ATMS Central Management System

SynchroGreen®

Real-Time Adaptive Traffic Control

522 Gillingham | Sugar Land | Texas | 77478
For more information, call 281-269-6512 or visit www.trafficware.com.

EXHIBIT 6.1



SynchroGreen optimizes for balanced service, maximum progression, and critical movements.

What is SynchroGreen?

SynchroGreen optimizes signal timing for the mainline, side streets, and pedestrians through real-time adaptive traffic control. This field-proven solution is designed to reduce motorist travel time, delays, and stops. SynchroGreen maximizes the use of available roadway capacity, while also decreasing fuel consumption and emissions.

Installs in traffic controllers,
not beside them.

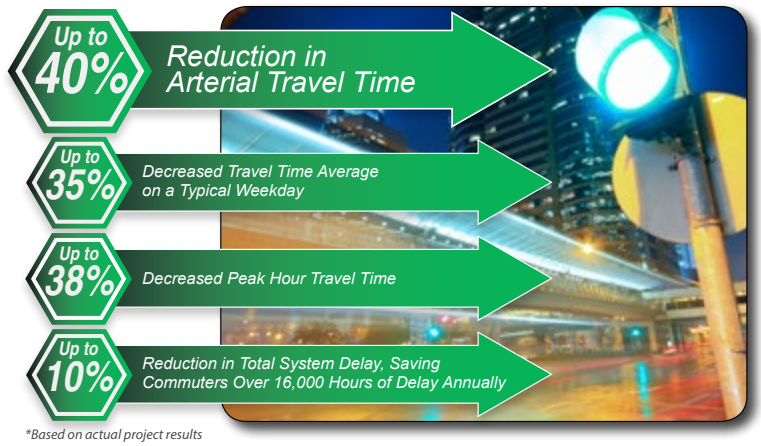
How is SynchroGreen different?

SynchroGreen was designed from the ground up by Cubic | Trafficware, a company with decades of experience in the traffic industry. Cubic | Trafficware's Synchro Studio software is used by tens of thousands of traffic engineers around the globe to simulate and optimize traffic. Cubic | Trafficware's ATMS central management software is utilized by hundreds of cities across the country to manage and control thousands of intersections. Together, this depth of experience provides a reliable and effective foundation to understand the complexity of optimizing traffic signal operations.

SynchroGreen takes a holistic approach when optimizing traffic signals by considering side-street and pedestrian traffic, in addition to mainline traffic. SynchroGreen will allocate time to each vehicle and pedestrian phase in real time, without any additional modules.

Finally, as the only true NTCIP-compliant, real-time adaptive traffic control system, SynchroGreen provides peace of mind.

SynchroGreen has demonstrated...



*Based on actual project results

EXHIBIT 6.1

It's not just about the greenband.

SynchroGreen considers side streets and pedestrians too.

How does SynchroGreen work?

SynchroGreen optimizes signal timings based on demand. If more vehicles demand service for a particular movement, then more time is allocated; if less time is required, less time is allocated. Secondly, SynchroGreen promotes traffic signal coordination and synchronization. SynchroGreen reduces vehicle stops and travel time by analyzing when vehicles arrive at the intersection and increasing the probability that the traffic signals will be green when they arrive.

- The SynchroGreen management information base resides within the signal controller
- The traffic signal controller remains in charge of the intersection
- The signal cabinet does not require proprietary hardware or rewiring
- The agency can choose whether adaptive control is provided from a central location or by using a closed-loop system

REAL-TIME ADAPTIVE TRAFFIC CONTROL

1. Adjusts traffic signal timing plans in real time based on ***current traffic characteristics***
2. Optimizes signal timing (cycle, offset and split) for normal traffic flow or ***uncharacteristic surges*** due to accidents, road closures, or

SMART SYSTEM AND EASY SETUP

1. Designed for ***easy startup*** and reliability
2. Accessible from a ***web-based interface*** or Windows application
3. Returns traffic controllers to ***normal time-of-day operation*** if the system is shut down

INTEGRATES WITH SYNCHRO & SIMTRAFFIC

1. Models adaptive traffic control and provides ***simulation capabilities***
2. ***Calibrates adaptive settings*** using actual field data
3. Allows users to ***preview expected results*** before implementation

SynchroGreen is the only solution that ***analyzes the entire system.***

EXHIBIT 6.1

SynchroGreen is Available in Three Levels.

- SynchroGreen Lean includes the Local Intersection Software and Central Server Software, and provides a web-based interface for monitoring and controlling the system. This option is an economical way for a city to experience the benefits of adaptive traffic control.
- SynchroGreen Premium includes the Local Intersection Software and Enhanced Central Server Software. It provides agencies with the ability to analyze real-time system performance, create detailed reports, log system calculations, and much more. This solution is designed to be easily integrated as part of federally funded adaptive traffic control projects.
- SynchroGreen Enterprise integrates directly with your ATMS central management system and also qualifies for federal funding. It allows agencies to operate any number of adaptive intersections and up to 9,999 total intersections.

SynchroGreen Adaptive Algorithm	✓
SynchroGreen Local Intersection Software	✓
SynchroGreen Web Interface	✓
Enhanced User Interface	✓
Adaptive System Performance Monitoring	✓
Real-time and Historical Adaptive System Reports	✓
Assign User Profiles and Restrictions	✓
Designed for Federally-Funded Adaptive Traffic Control Projects	✓
Supports Adaptive and Non-Adaptive Traffic Signals	✓
Comprehensive Monitoring of Non-Adaptive Traffic Signals	✓
Multi-Year Support and Upgrades available	✓

ABOUT CUBIC | TRAFFICWARE

Cubic | Trafficware specializes in researching, designing, and developing electronic equipment and enterprise software designed to enhance the transportation industry. Our industry expertise comes from:

1. Hands on experience attained while solving traffic management challenges across the country since 1979.
2. Our in-house team including: professional traffic engineers, hardware and software design and development staff, manufacturing personnel, and customer service/field application engineers.
3. Regular dialogue with our customers to address their real-world operational issues and future traffic management requirements.

Cubic | Trafficware manufactures a full line of traffic equipment in its 90,000 square-foot technology center located in Sugar Land, Texas. In over three decades of manufacturing in the USA, our products have earned a reputation for unmatched quality and reliability.

EXHIBIT 6.2

OPTICOM™ | GPS Platform

Proven technology with better results

Global Positioning System (GPS) technology and highly-secure radio communications power the Opticom GPS Platform – a robust, secure Emergency Vehicle Preemption (EVP) solution from GTT.

Opticom GPS-enabled systems offer unmatched precision and superior management capabilities that will allow your department to respond quickly and safely to emergencies.

Built on more than 45 years of Opticom signal priority performance and reliability, the Opticom GPS platform helps ensure safer, faster on-scene arrival—while maximizing resources and your investment.

REDUCE INTERSECTION CRASH RATES by up to 70%*

PREVENT INJURIES AND RELATED COSTS

IMPROVE RESPONSE TIMES by up to 25%*

OPTICOM™ BENEFITS

DECREASE LIABILITY FOR CRASHES WITH OTHER MOTORISTS

OFFER QUICK PAYBACK ON YOUR INVESTMENT

COMMUNICATE AROUND CORNERS

Send EVP requests around curves and corners, over hills and overpasses

*Independent studies available upon request

SOLUTIONS FOR:

- Fire
- EMS
- Law Enforcement

GLOBAL TRAFFIC TECHNOLOGIES GTT™

EXHIBIT 6.2

When every second counts

The Opticom™ GPS platform brings together a combination of proven hardware, advanced software and comprehensive services to enable faster and safer on-scene arrivals for departments of any size.

The GPS-enabled platform uses powerful and precise algorithms to enable industry-leading Opticom EVP.

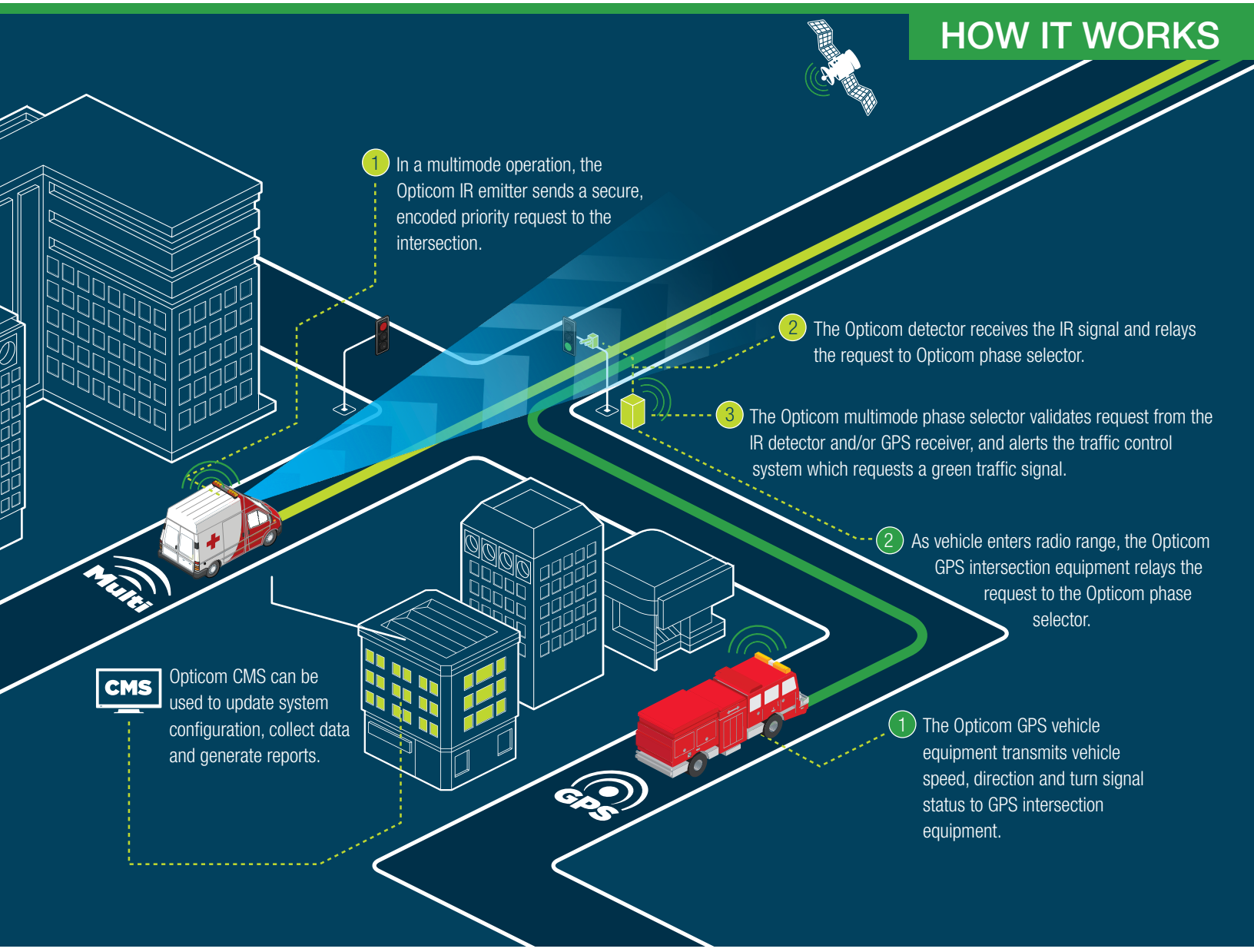
Join other public service agencies and use Opticom for more effective mutual aid strategies and to resolve critical traffic management challenges.

When combined with Opticom Central Management Software (CMS), the Opticom GPS platform provides the ability to monitor and maintain system performance from a central location, including cloud-based analytics and reporting. Traffic managers can monitor and maintain system performance and update system software from anywhere Internet access is available.

Designed for interoperability, GPS-enabled components can communicate with Opticom IR components in a multimode system to allow for upgrades and mutual aid while maintaining emergency response and transit functionality.

Additional equipment and services can be added as an agency's needs evolve.

HOW IT WORKS



Global Traffic Technologies, LLC
7800 Third Street N
St. Paul, MN 55128-5441
1-800-258-4610
651-789-7333
www.gtt.com

Global Traffic Technologies Canada, Inc.
157 Adelaide Street West
Suite 448
Toronto, ON M5H 4E7
Canada
1-800-258-4610

Global Traffic Technologies, LLC
1210 Parkview
Reading RG7 4TY
UK
+44 (0) 7799 908916

GLOBAL TRAFFIC TECHNOLOGIES

EXHIBIT 6.3

OPTICOM™ HELPS PUT TRANSIT SERVICES ON THE FAST TRACK

Commuters depend on public transit to get them where they need to go—on time. Chronic delays risk ridership, force more cars onto the road and increase emissions. That's why public transit agencies choose Opticom™ Transit Signal Priority (TSP) solutions. GTT's reliable, scalable systems help to ensure faster, more reliable transit service that can attract more riders and reduce operating costs.

Although capital budgets are sometimes scarce, there's a cost for doing nothing. Opticom helps make sure transit vehicles are on the road less, which reduces fuel costs, emissions and even the number of needed in-service vehicles. This all leads to more profitable operations.

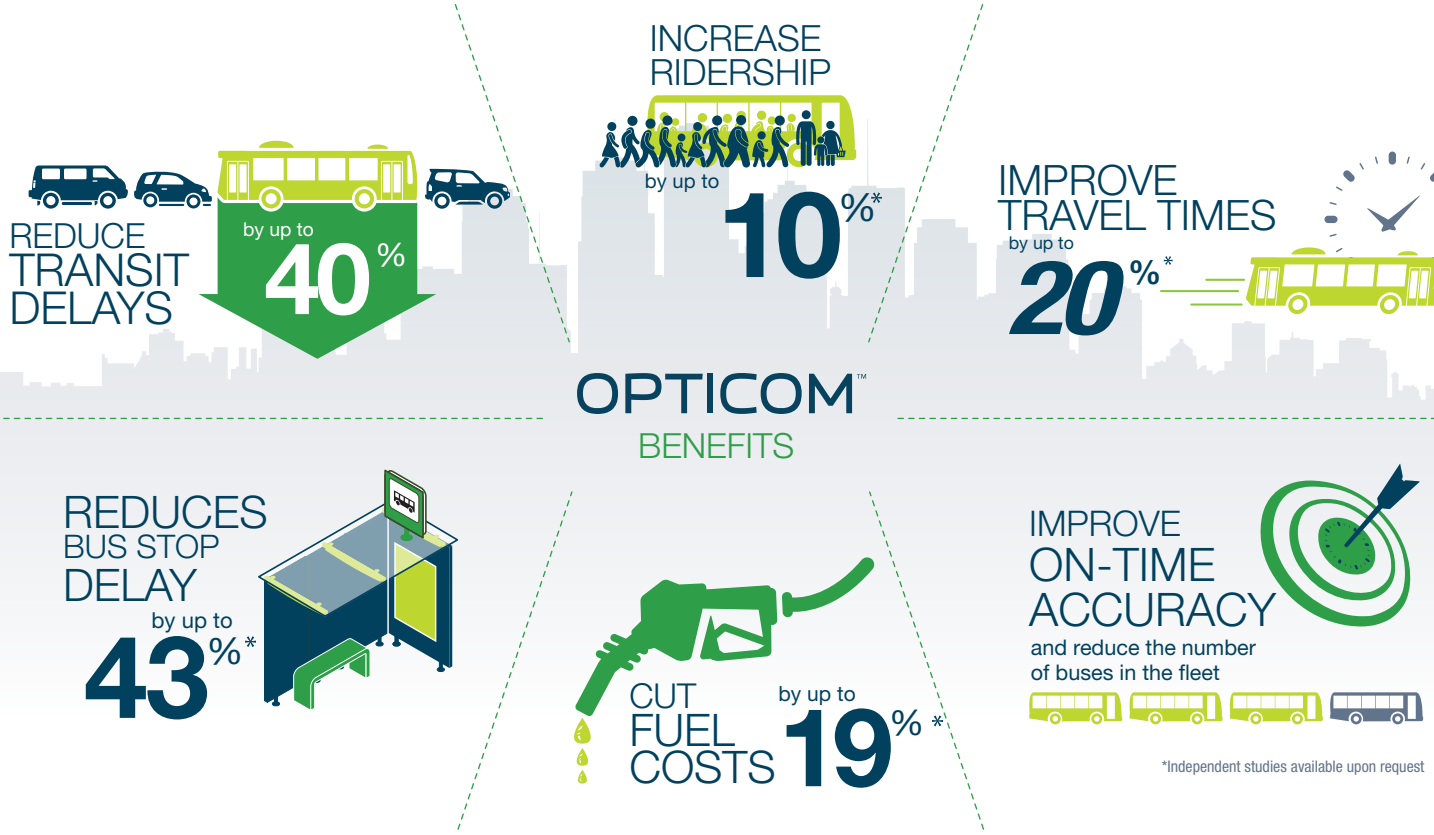


EXHIBIT 6.3

SERVICES THAT RUN ON TIME, EVERY TIME.

Transit vehicles using Opticom TSP solutions request priority from the traffic signal when they're late. TSP truncates or extends the green cycle time for more accurate schedule adherence. This allows transit vehicles to safely make up lost time without compromising traffic flow. For a complete priority control system, Opticom TSP components are designed to coexist with Opticom Emergency Vehicle Preemption solutions.

HOW OPTICOM™ TSP WORKS

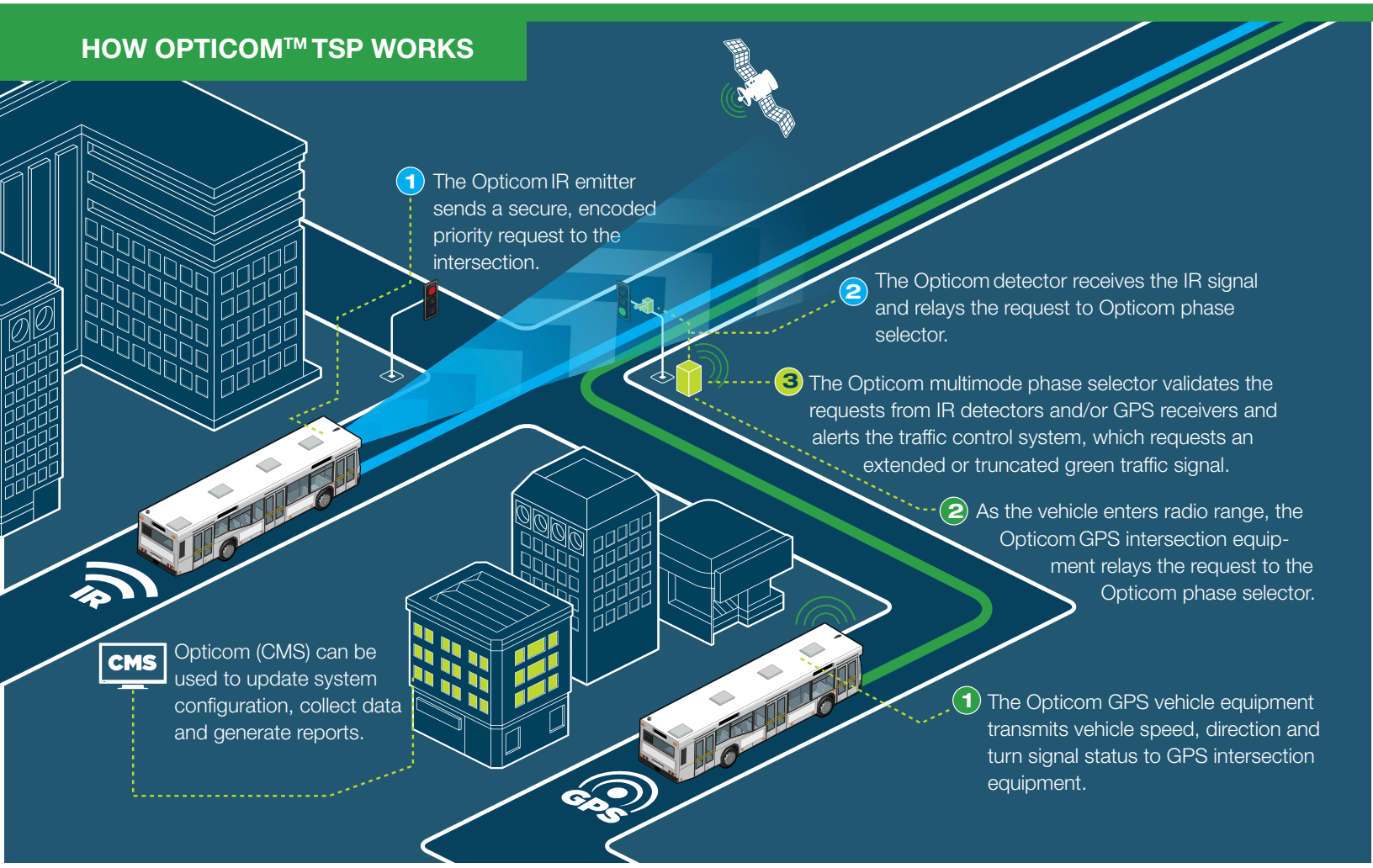


EXHIBIT 6.4

PRODUCT SPOTLIGHTS

ITERIS

THIRD GENERATION BICYCLE DIFFERENTIATION FROM ITERIS

In the early 2000s, Iteris developed and produced one of the industry's first video detection systems, which had the capability of detecting both cars and bicycles, and in 2012, developed the first bicycle differentiation system, SmartCycle®. SmartCycle clearly became one of the industry's first and only products that did not require an additional detector at the intersection to detect and differentiate bicycles from other vehicles and provide a unique output to the controller to extend the green time of that phase. This extension allows bicyclists more time to cross the intersection, providing them safety from cross traffic. This type of detection is a current requirement of all new or replaced intersections in the states of California and Washington, and meets many of the goals of popular programs that many cities are engaged in like Vision Zero, Towards Zero Deaths, and the USDOT Mayor's Challenge. The over-arching goal of all of these programs is to increase safety and reduce injuries and fatalities on roadways and intersections. SmartCycle helps do this!

To that end, and in concert with National Bike Month in May, Iteris released its 3rd generation of bicycle differentiation algorithm. This algorithm builds on the years of already highly accurate method of detecting bicycles in the field of view of the camera. Knowing that bicyclists behave differently moving through an intersection approach than do vehicles, as in many of the new innovative methods of handling cyclists, such as bike boxes, shared lanes and cycle tracks, Iteris is able to use advanced analytic techniques to more reliably detect them. In addition to a more accurate detection and differentiation algorithm, including multiple bicycles that approach the intersection simultaneously, we have improved the counting algorithm to increase the accuracy with which we count bicycles. Many agencies have unleashed the incredible data collection power of video detection to perform continuous turning movement counts, and we continue to add to this capability by including the count feature for bicycles. This data only becomes more valuable to an agency to help calculate and present the mode-share split of vehicles and bicycles.

We look forward to future customers giving this incredible system a chance to improve the safety of their city and we encourage all of our current customers to engage their distributor and Iteris product support teams to show them how SmartCycle bicycle differentiation works within their existing systems, SmartCycle comes as a standard feature on all Iteris video detection systems. Please visit our website (www.iteris.com) for more information, or view this YouTube video (tinyurl.com/bikedifferentiation) for a peek at how SmartCycle works.

EXHIBIT 6.4

Award-Winning Innovation

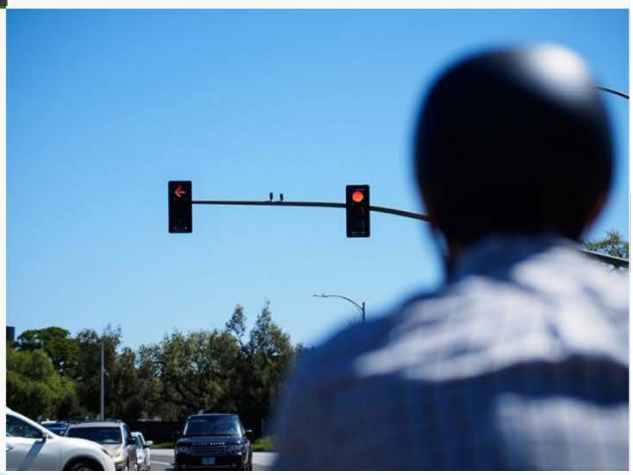
Shortly after launching the SmartCycle Bike Indicator, the device won the 2018 BIG Innovation Award from the Business Intelligence Group.

The SmartCycle Bike Indicator was also named a finalist in Fast Company's World Changing Ideas Awards 2018.

Read More

Detected. Confirmed. Safe.♂

Iteris' SmartCycle Bike Indicator provides cities with a new way to improve signal timing and bicycle safety by avoiding unnecessary pedestrian activations, dismounting in busy roads, and cyclist and car interactions.



First Of Its Kind

Built on Iteris' patented SmartCycle® solution, which differentiates between bicycles and vehicles at intersections, the SmartCycle Bike Indicator™ is another first-of-its-kind innovation.

The SmartCycle Bike Indicator is a device that mounts onto traffic signals and illuminates when cyclists waiting at an intersection have been detected.

EXHIBIT 6.4

PedTrax™

Tracking critical pedestrian activity with your Vantage video detection system

Provides bi-directional pedestrian counts, speed data and detection alerts

Included with all new Vantage video detection systems

Field-upgradeable for latest Vantage hardware platforms

Value-Added Data Feeds

There is a growing demand for more information at signalized intersections, including vehicle, bicycle, and pedestrian metrics. Agencies want a complete view of intersection usage and they want to ensure that safety is a key component of roadway improvements. To help support these efforts, Iteris developed PedTrax™, a video detection feature embedded on the latest Iteris hardware platforms.

Enhanced Safety with Data and Detection

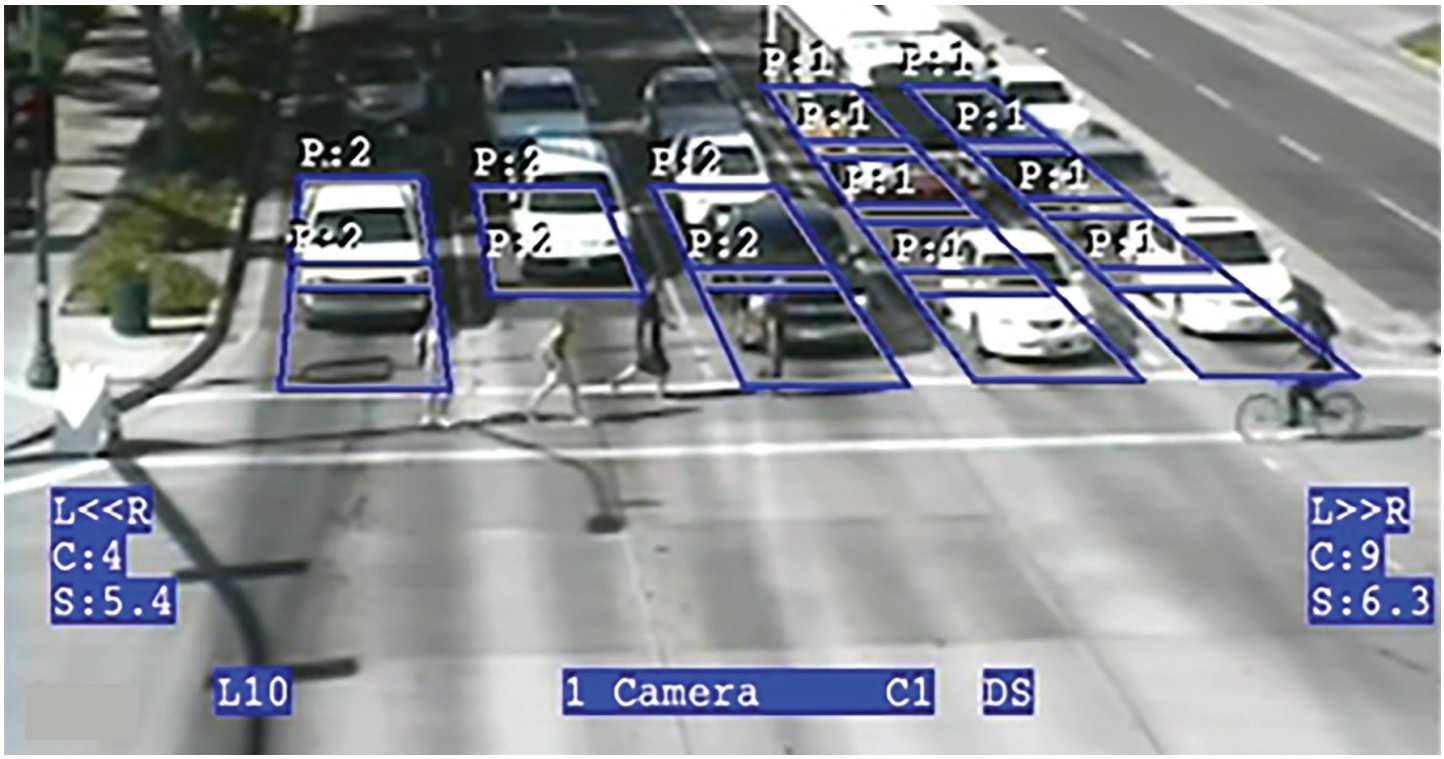
PedTrax provides automatic counting, direction and speed tracking of pedestrians within the crosswalk. Along with collecting this information with normal vehicle and bicycle detection, PedTrax can provide discrete outputs when detecting pedestrians moving in the crosswalk. Numerous safety applications can be realized when connecting these outputs to traffic controllers or other devices.

The PedTrax feature is embedded within Iteris detection algorithms, there is no need for any additional equipment for operation. With count and speed data of pedestrians within the crosswalk, combined with the already available vehicle and bicycle counts, agencies now have the necessary data to support enhanced safety initiatives, improve funding applications and focus on specific multimodal roadway improvements.

iteris®

Addressing Active Transportation Planning

City active transportation planners and engineers have a full view of roadway usage and the ability to focus resources on intersections that require safety enhancements. With the critical pedestrian data that PedTrax provides, along with SmartCycle® data, agencies can better plan for intersection and roadway improvements to enhance safety for vulnerable road users (VRU).



PedTrax data (*shown in blue*) for bi-directional counts and speeds of pedestrians moving left-to-right and right-to-left.

WORKS WITH ALL ITERIS VIDEO DETECTION SYSTEMS INCLUDING:

- VantageNext®
- Edge®2
- SmartSpan®
- Vantage Vector®

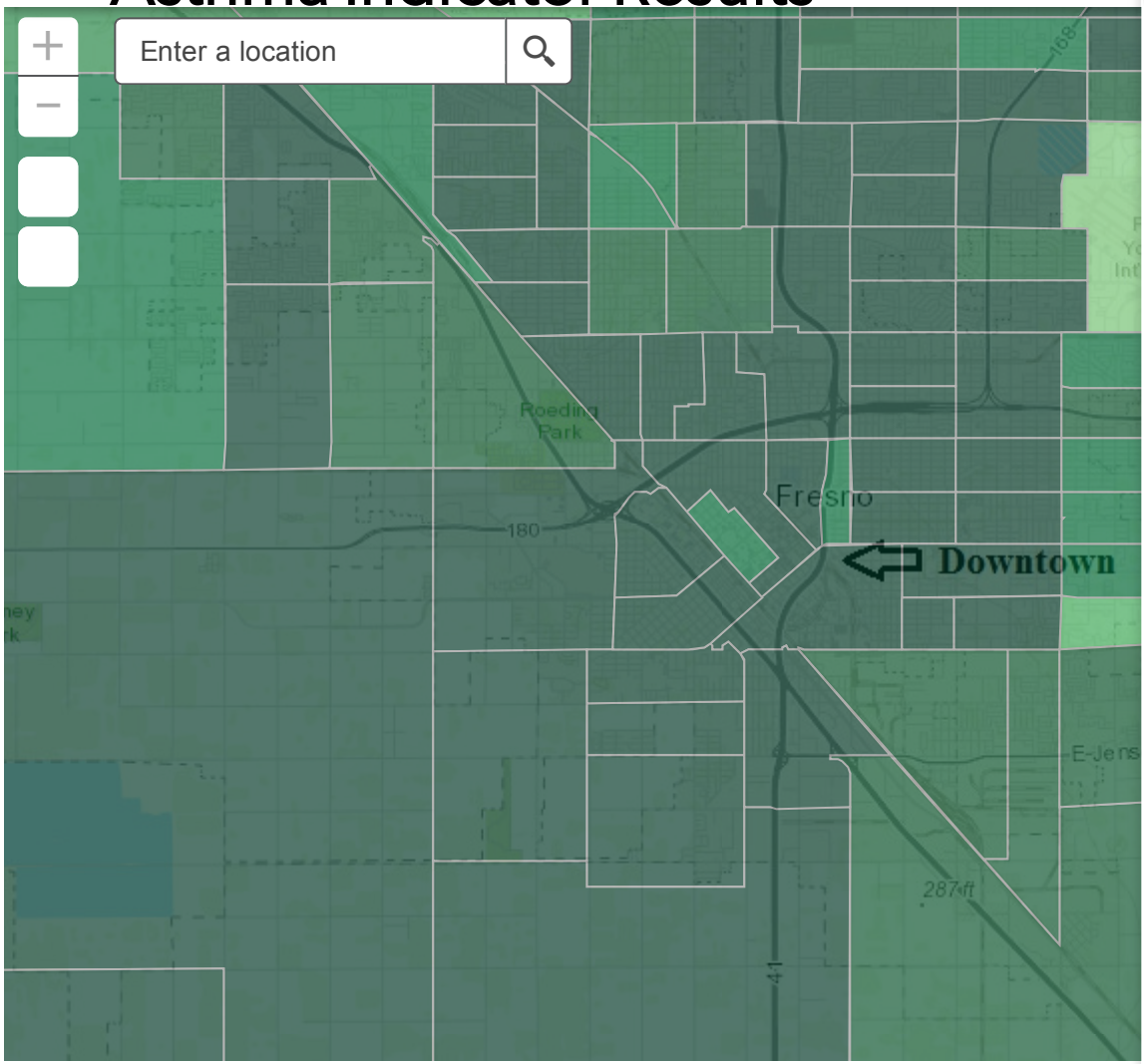
Benefits

- Utilizes previously installed non-intrusive sensor systems
- Additional data stream to existing vehicle and bicycle counts
- Pedestrian speed data can help improve signal timing efficiency
- No additional setup required
- Field-proven detection performance from the industry leader
- Provides discrete outputs for enhanced safety applications

August 2017 Rev 2

Asthma Indicator Results

from CalEnviroScreen 3.0



2mi

-119.723 36.737 Degrees

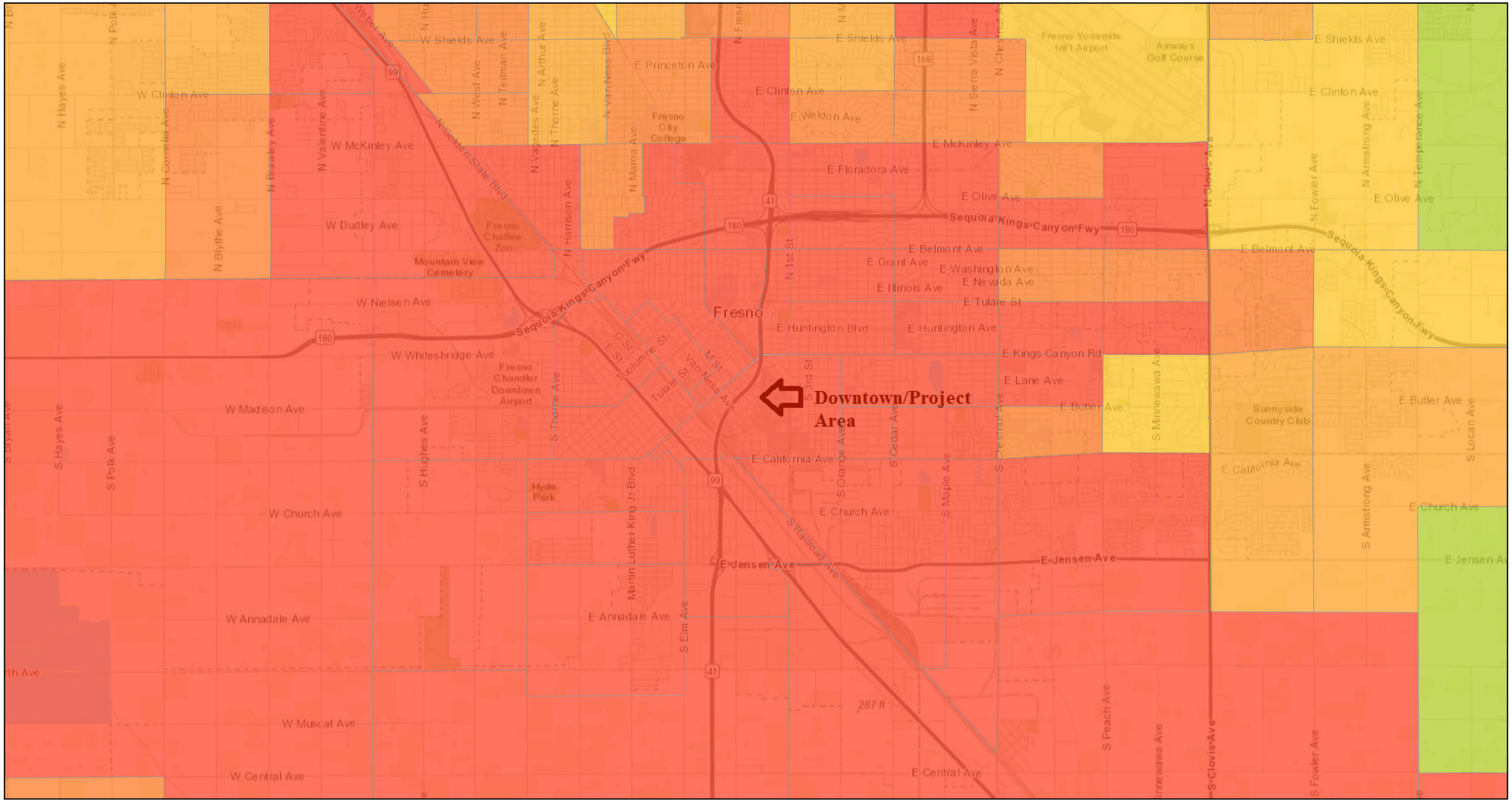
Legend

Asthma Percentile

- > 90 To 100
- > 80 To 90
- > 70 To 80
- > 60 To 70
- > 50 To 60
- > 40 To 50
- > 30 To 40
- > 20 To 30
- > 10 To 20
- 0 To 10

Exhibit 7

CalEnviroScreen 3.0 Results - Disadvantaged Community Map



6/30/2018, 10:31:53 AM

CalEnviroScreen 3.0 Results (June 2018 Update)

- 31 - 40%
- 61 - 70%
- 71 - 80%
- 81 - 90%
- 91 - 100% (Highest Scores)

1:72,224

0 0.75 1.5 3 mi

0 1 2 4 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

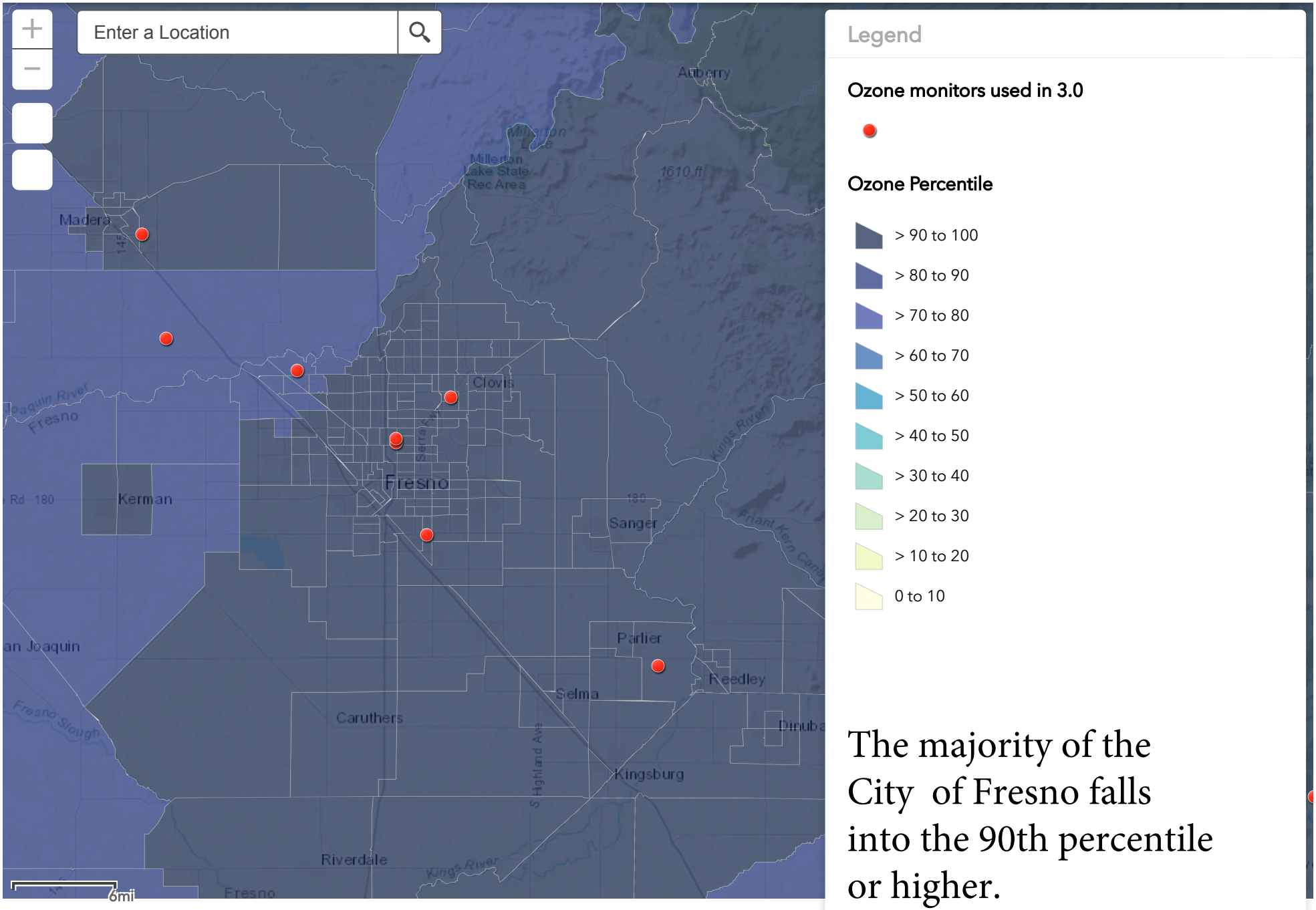
Web AppBuilder for ArcGIS

Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA | OEHHA |

Exhibit 7

Ozone results

from CalEnviroScreen 3.0



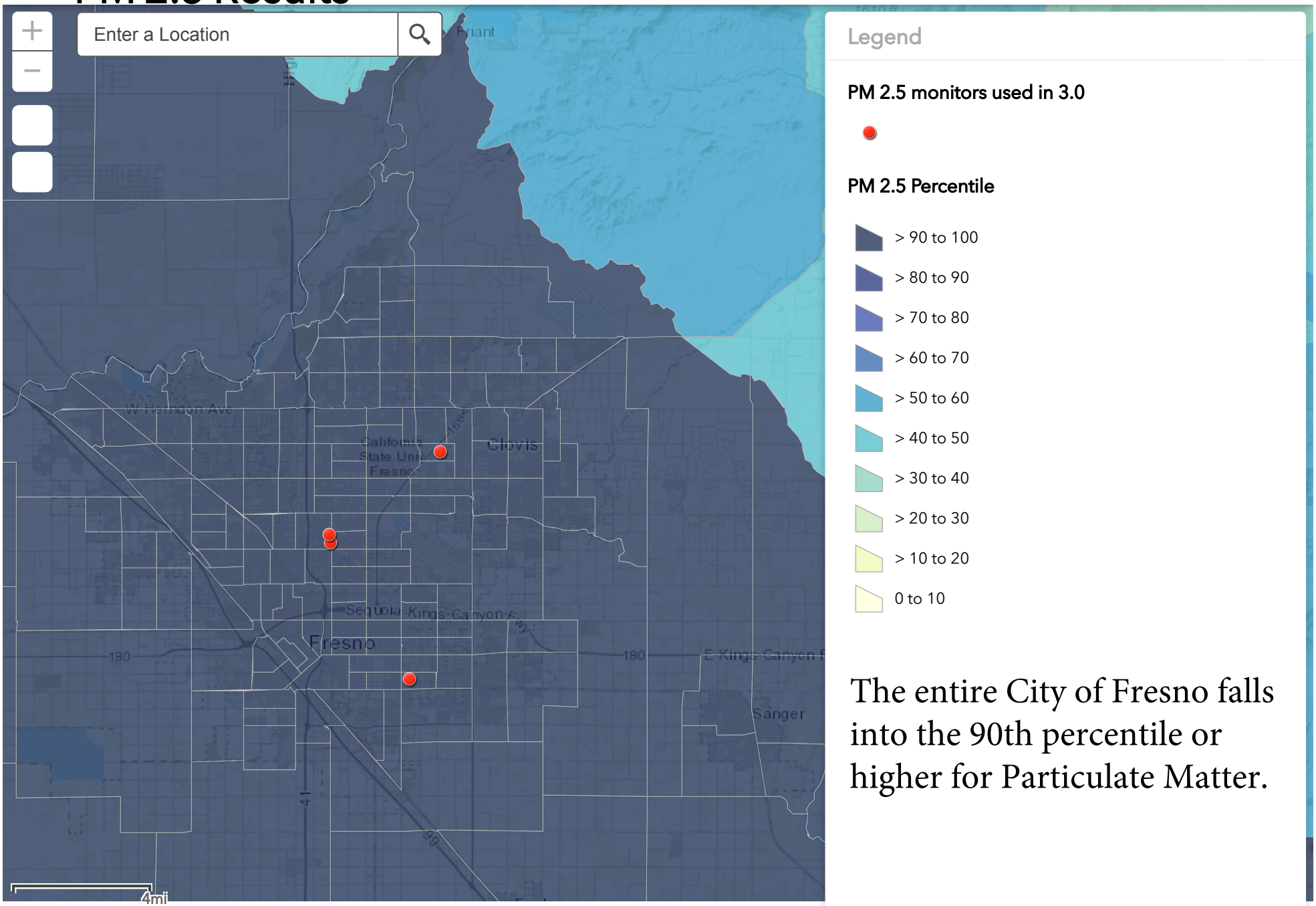
-119.478 36.602 Degrees

The majority of the City of Fresno falls into the 90th percentile or higher.

Exhibit 7

PM 2.5 Results

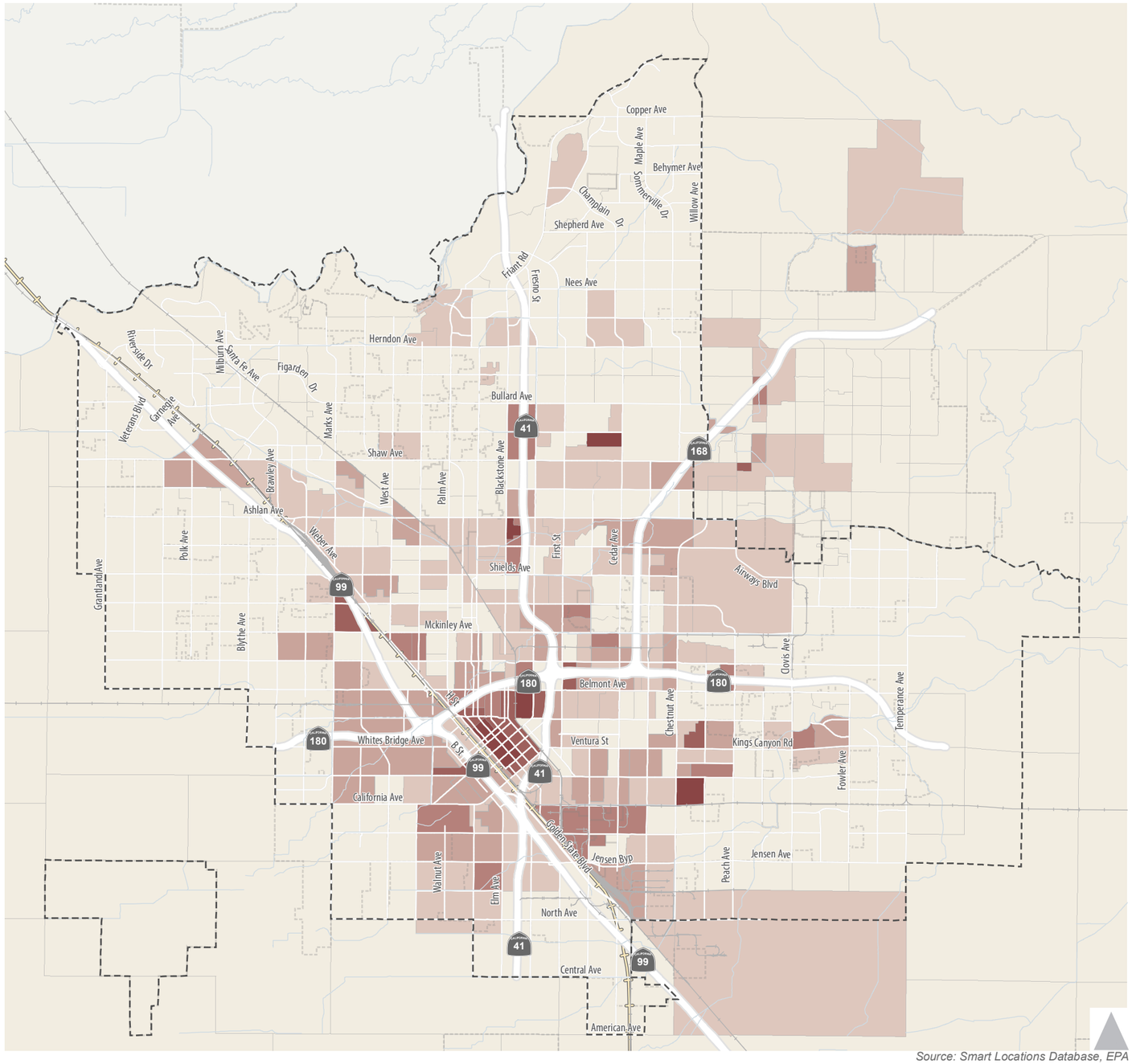
from CalEnviroScreen 3.0



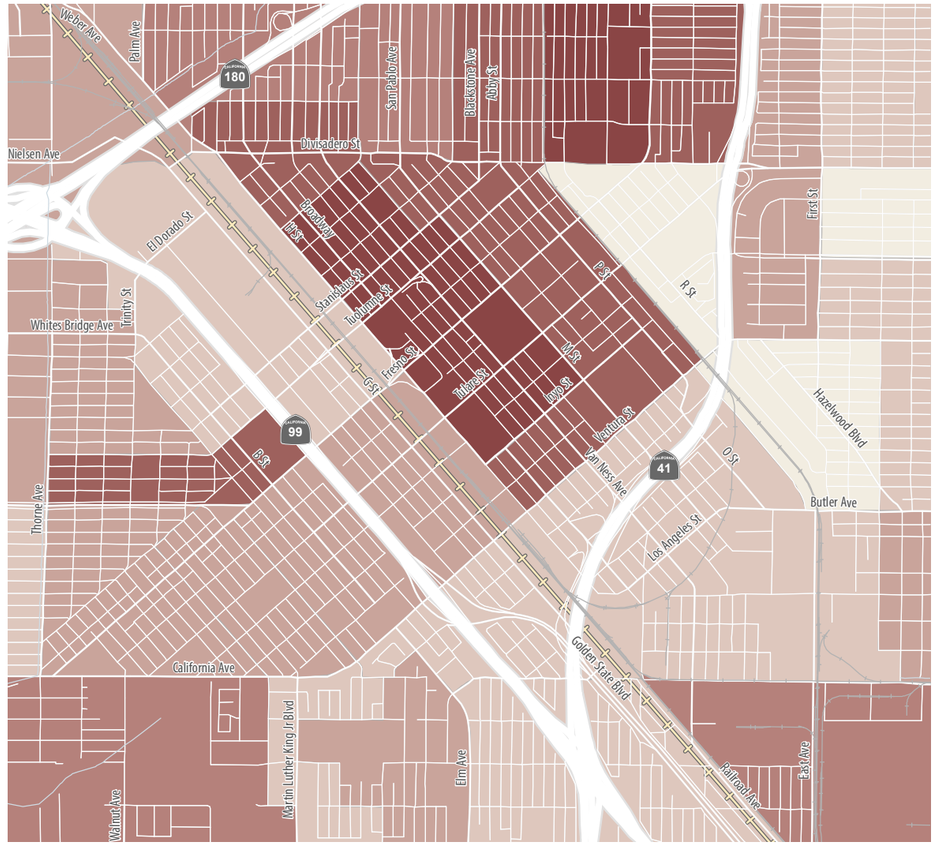
-119.515 36.834 Degrees

The entire City of Fresno falls into the 90th percentile or higher for Particulate Matter.

Exhibit 7



Source: Smart Locations Database, EPA



DOWNTOWN VIEW

Percent of Households with Zero Automobiles

- < 10%
- 10 - 20%
- 20 - 30 %
- 30 - 40%
- 40 - 50%
- > 50%

Rail
High Speed Rail Alignment
City Sphere of Influence
City

City of FRESNO active transportation plan

Exhibit 8

Percent of Households with Zero Automobiles

EXHIBIT 9

July 2, 2020

Fresno Council of Governments
2035 Tulare Street Suite 201
Fresno, CA 93721

Re: City of Fresno Measure C New Technology Grant Application – Dynamic Downtown

Dear Selection Committee,

The City of Fresno is applying for the Measure C New Technology Reserve Grant Program. Funding from this program includes advanced technology that would allow adaptive synchronization of the Bus Rapid Transit route and key corridors in Downtown Fresno. I believe this project exemplifies the type of cutting edge, emission-reducing equipment representative of the Measure C New Technology Program. If funded, traffic signal timing will be vastly improved by the proposed equipment.

As revitalization continues in the Downtown area, public transit is expected to increase. Infrastructure to support timely and efficient travel is an important part of planning for urban growth. It will help to attract shopping, restaurants, nightlife, housing and businesses to Downtown Fresno. The technology will also improve the experience for local residents, entrepreneurs, and business owners who visit the many civic centers located Downtown.

Thank you for your consideration of this application for funding. This project will improve travel, as well as air quality in the Downtown area.

Sincerely,

Miguel Angel Arias
Fresno City Council President
Representing District 3

EXHIBIT 9

June 19, 2020

Fresno Council of Governments
2035 Tulare Street Suite 201
Fresno, CA 93721

Re: City of Fresno Measure C New Technology Grant Application – Dynamic Downtown

Dear Selection Committee:

The City of Fresno is applying for Measure C New Technology Grant funding to expand efforts for an advantaged technology, which would allow adaptive synchronization of the Bus Rapid Transit route as well as key corridors in Downtown Fresno. As the downtown area continues its' revitalization, the use of public transit also continues to increase and requires modernization. This type of infrastructure supporting timely and efficient travel is an important part of planning for urban growth and attracting regional events, restaurants and nightlife to Downtown Fresno.

The Downtown Fresno Partnership is defined as a Property-based Business Improvement District (PBID). We are leading downtown Fresno toward its future as a vibrant hub of business activity by promoting downtown's image; supporting physical improvements and development; advocating for merchants; and hosting special events that bring new life to the historic core of our city. As our efforts continue to come to fruition, it is critical that we as a City continue to invest in our infrastructure, particularly with new technologies.

Thank you for your consideration of this proposal and for supporting improved travel in the Downtown area.

Sincerely,

Jimmy Cerracchio
President/CEO

City of FRESNO

EXHIBIT 10

DEPARTMENT OF PUBLIC WORKS

BY:	JRT	DATE:	07/03/20	ACCT.	FILE NO.	Sheet 1	of 2
CHKD.		DATE:		DWG. REF.	Exhibit 1 - Location Map		

SUBJECT: **DYNAMIC DOWNTOWN Part 2 - Adaptive Signals with Transit & Emergency Preemption**

PRELIMINARY ENGINEER'S ESTIMATE

CONSTRUCTION COST (CON)

ITEM	QUANTITY		DESCRIPTION OF WORK	UNIT PRICE	PARTICIPATING COST	NON-PARTICIPATING COST
1	1	LS	Mobilization	50,000.00	$ 50,000.00	0
2	1	LS	MEDIATOR	40,000.00	$ 40,000.00	0
3	1	LS	Traffic Control	70,000.00	$ 70,000.00	0
4	1	LS	Clearing and Grubbing	37,384.00	$ 37,384.00	0
5	1	LS	Dust Control Pollution Prevention Implementation	7,000.00	$ 7,000.00	0
6	1	LS	Storm Water Pollution Best Management Practices (BMP's)Implementation	5,000.00	$ 5,000.00	0
7	1	LS	Pre-Construction Survey	20,000.00	$ 20,000.00	0
8	344	SF	Concrete Repair and Reconstruction	19.00	$ 6,536.00	0
9	10	LF	Four 1-1/2" HDPE (ITS Conduits)	150.00	$ 1,500.00	0
10	368	LF	Directional Bore 4" RGC	55.00	$ 20,240.00	0
11	566	LF	Directional Bore 2" RGC	40.00	$ 22,640.00	0
12	114	LF	4" RGC	60.00	$ 6,840.00	0
13	20	LF	2" RGC	50.00	$ 1,000.00	0
14	12	LF	1.5" RGC	80.00	$ 960.00	0
15	14	EA	No. 6 Pullbox with Locking Lid	1,100.00	$ 15,400.00	0
16	7	EA	No. 5 Pullbox with Locking Lid	900.00	$ 6,300.00	0
17	1	EA	No. 2 PG&E Pullbox	1,200.00	$ 1,200.00	0
18	5	EA	Camera Detection Equipment	22,000.00	$ 110,000.00	0
19	16	EA	Video Detection Camera	2,000.00	$ 32,000.00	0
20	11	EA	Curb Ramps	9,000.00	$ 99,000.00	0
21	1	EA	Traffic Signal Controller Cabinet (332L)	25,000.00	$ 25,000.00	0
22	6	EA	APS Push Button in Signal Pole	2,000.00	$ 12,000.00	0
23	2	EA	APS Push Button Post	4,000.00	$ 8,000.00	0
24	2	EA	Panoramic Camera	4,000.00	$ 8,000.00	0
25	1	EA	Intersection Service Cabinet	8,000.00	$ 8,000.00	0
26	6	LF	Wireless Equipment	9,000.00	$ 54,000.00	0
27	1	LS	Signal Modifications	55,000.00	$ 55,000.00	0
28	14	EA	Traffic Counts	1,500.00	$ 21,000.00	0
29	14	EA	Traffic Adaptive Control Module	27,000.00	$ 378,000.00	0
30	1	EA	Bike Detection Cameras	50,000.00	$ 50,000.00	0
31	1	LS	System Integration	38,000.00	$ 38,000.00	0
32	2	EA	EVP Installation per Intersection	20,000.00	$ 40,000.00	0
33	15	EA	TSP Installation per Intersection	9,000.00	$ 135,000.00	0
34	15	EA	TSP City Furnish (TIF) per Intersection	7,000.00	$ 105,000.00	0
35	1	LS	Trafficware Performance Measures	25,000.00	$ 25,000.00	0
36	1	LS	PD/Fire Vehicle Equipment Additions	100,000.00	$ 100,000.00	0
37	1	LS	Miscellaneous Facilities and Operations	50,000.00	$ 50,000.00	0
38	1	EA	PG&E Rule 16	20,000.00	$ 20,000.00	0
			STREET IMPROVEMENTS SUBTOTAL		**$1,685,000.00**	**$0.00**
			TOTAL STREET IMPROVEMENTS (PARTICIPATING + NON-PARTICIPATING)		**$1,685,000**	

EXHIBIT 10

PROJECT TOTAL (CONSTRUCTION COST + ROW, INCLUDES PARTICIPATING & NON-PARTICIPATING)

	10% CONTINGENCY	$170,000	$0.00
	CONSTRUCTION SUBTOTAL W/CONTINGENCY	**$1,855,00**	
	CONSTRUCTION (CON) ESCALATION FACTOR	$145,000	$0.00
	CONSTRUCTION SUBTOTAL (CON) W/CONTINGENCY AND ESCALATION FACTOR A		$0.00
ESCALATION RATE 3.00%	**CONSTRUCTION (CON) TOTAL W/CONTINGENCY AND ESCALATION FAC**	**$2,000,000**	
	10% ENGINEERING (PE)	$	-
ESCALATION YEARS 2.5	**ENGINEERING (PE) TOTAL**	**$200,000**	
	15% CONSTRUCTION ENGINEERING (CE)		$0.00
	CONSTRUCTION ENGINEERING (CE) TOTAL	**$300,000**	
	R.O.W. ACQUISITION w/R.O.W. Contingency & Escalation Factor	$ -	$ -
	R.O.W. ACQUISITION (R.O.W.) TOTAL w/R.O.W. Contingency & Escalation Factor	**$0.00**	
	PROJECT SUBTOTAL (CON + PE + CE + R.O.W.)	$2,531,711.87	$0.00
	PROJECT TOTAL (CON + PE + CE + R.O.W.)	**$2,500,000**	

PROJECT TOTALS BY PHASE

Phase	Phase Description		PARTICIPATING COST	NON-PARTICIPATING COST
PE	The PE phase is calculated as a percentage of the construction costs including contingency and escalation factor applied to the aforementioned items.	Total PE	$	-
			$200,000	
ROW	The R.O.W. phase includes "cost to cure" to the property as a result of the project, City/Escrow administrative costs, R.O.W. cost per sf, contingency and escalation factor applied to the aforementioned items.	Total R.O.W.	$0.00	$0.00
			$0.00	
CE	The CE phase is calculated as a percentage of the construction costs and includes contingency and escalation factor.	Total CE		$0.00
			$300,000	
CON	The Construction Phase includes the project construction costs, and also includes a contingency and escalation factor applied to the aforementioned items.	Total CON		$0.00
			$2,000,000	

NOTE:

1. The above quantities and items of work are approximate in order to verify if funding for this traffic signal project is sufficient. Still to be prepared are the construction plans, which are to be used to prepare a more precise FINAL engineer's estimate.

2. This PRELIMINARY engineer's estimate is an approximation of the probable cost of the proposed work based on previous competitive bids the City has received for similar work. It is not intended to be indicative of the final cost of the project. It is intended to represent a general magnitude of the cost of a competitively bid project. It is not intended to represent the cost of a project completed by City crews.

Assumptions:

1. Assumed L/Tulare, Q/Tulare and Mariposa/Divisadero signalized intersection will be fully constructed. Only TSP and Adaptive Control Module will be needed on that intersections except instalation of Camera Video Detection is required for Tulare/Q for front zone lanes detection.

2. Adaptive Control Modules and TSP System will be installed on Broadway St., Fulton St,, M St. and O St. along Tuolumne Street signalized intersections. Only TSP System will be installed on Van Ness and Tuolumne signalized intersection.

3. Assumed no equipment requirements inside ITS Hub Cabinet #5.

RESOLUTION NO. 2020-162

A RESOLUTION OF THE COUNCIL OF THE CITY OF FRESNO, CALIFORNIA, AUTHORIZING THE SUBMISSION OF GRANT APPLICATIONS REQUESTING UP TO $3 MILLION IN GRANT FUNDS TO THE FRESNO COUNCIL OF GOVERNMENTS (COG) 2020/21 MEASURE C NEW TECHNOLOGY RESERVE GRANT PROGRAM FOR ADVANCED TRANSIT PROJECTS (NEW TECHNOLOGY GRANT PROGRAM) AND AUTHORIZING THE EXECUTION OF ALL APPLICATION RELATED DOCUMENTS BY THE DIRECTOR OF PUBLIC WORKS OR DESIGNEE

WHEREAS, the City of Fresno is an eligible applicant of Measure C New Technology Reserve Grant funds; and

WHEREAS, the Fresno COG has issued a call for projects for fiscal year 2020/21 for an estimated available funding of $5,380,000.

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Fresno as follows:

1. The foregoing recitals are true and correct and incorporated herein.

2. Council authorizes submission of two applications: the Dynamic Downtown Phase Two project and a Contactless Accessible Pedestrian Signal Pilot project to the FY2020/2021 Measure C New Technology program.

3. Council authorizes the Director of Public Works or designee to execute all application related documents.

* * * * * * * * * * * * * * *

Date Adopted: 07/16/2020
Date Approved: 07/16/2020
Effective Date: 07/16/2020

STATE OF CALIFORNIA)
COUNTY OF FRESNO) ss.
CITY OF FRESNO)

I, YVONNE SPENCE, City Clerk of the City of Fresno, certify that the foregoing resolution was adopted by the Council of the City of Fresno, at a regular meeting held on the 16th day of July 2020.

AYES : Bredefeld,Chavez, Esparza, Karbassi, Soria, Arias
NOES : None
ABSENT : Caprioglio
ABSTAIN : None

YVONNE SPENCE, MMC CRM
City Clerk

By: Briana Pena 7/21/2020
Deputy Date

APPROVED AS TO FORM:
DOUGLAS T. SLOAN
City Attorney

By: 7.21.20
Raj Singh Badhesha Date
Supervising Deputy City Attorney