Dynamic Downtown

Adaptive Signal Control Technology in Downtown Fresno

Measure C New Technology Reserve Grant Program Grant Application
2018-2019

City of FRESNO

NEW TECHNOLOGY RESERVE GRANT PROGRAM
ADVANCED TRANSIT AND TRANSPORTATION PROJECTS

Fiscal Year 2018-1019 Grant Application

Project/Program Name/Description:
Dynamic Downtown - Adaptive Signal Control Technology in 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: 559-621-8689 | 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 partner with Fresno COG must submit an electronic copy of their proposal by June 21, 2018.** 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 **$6,400,000** available for the Fiscal Year 18/19 award cycle. An additional $15,000,000 - $18,000,000 can be made available over time through the next 8 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 16, 2018
Last day to submit requests for clarification	June 4, 2018
NEW: Deadline for Electronic Proposal Submittal for	
agencies wishing to partner with Fresno COG	June 21, 2018
Deadline for Proposal Submittal	July 23, 2018
Scoring (Tentative)	July 25 - August 10, 2018
Potential Interviews (Tentative)	Week of August 20 - 24, 2018
Policy Board Approval (Tentative)	September 27, 2018
FCTA Board Approval (Tentative)	October 10, 2018
Notice to Proceed - Subject to Contract Signing (Tentative)	January 2019

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.

The 2016 cycle awarded the following types of projects:

1. Public transit buses retrofitted with Near-Zero Emission engines
2. Electric public transit buses
3. Electric school buses
4. Solar tree charging stations
5. Electric aircraft/commercial flight training service
6. University Transportation Institute

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 93721	Phone: 559-621-8689	Email: Shelby MacNab

Eligible Public Agency's Representative

Name (print): Scott Mozier	Title (print): Director of Public Works
Signature:	Date: 7-17-2018
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.

Disadvantaged Business Enterprise

Disadvantaged Business Enterprise (DBE) Requirements

All successful applicants must submit a completed *Disadvantaged Business Enterprise Race-Neutral Implementation Agreement* with their signed Standard Agreement contract.

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 23, 2018**. 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, Monday, June 4, 2018. 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 93721	
Contact Person: Shelby MacNab	
E-mail: Shelby.MacNab@Fresno.gov	
Phone: 559-621-8689	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 - Adaptive Signal Control Technology in Downtown Fresno	
Project Description: *(Location/Boundaries, Nature of Project, Scope)*	State of the art adaptive signal control technology will be installed at the following locations: Fresno Street from Divisadero to Broadway, VanNess from Divisadero to Ventura and the BRT Corridor along N Street, P Street and Stanislaus Street.

D. Funding Request:	**FFY 2018/2019**
New Technology Funds Request:	$ 1,813,000
Total Matching Funds: *(DOT federal, state, local, private, etc.)*	$ 37,000
Total Cost of Project:	$ 1,850,000
E. Authorized Signature:	
Name (print):	Scott Mozier
Title (print)	Director of Public Works
Signature: 	Date 7-17-2018

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.

   This project will install a state-of-the-art Adaptive Signal Control Technology (ASCT) system which will be added to the existing time-of-day system in Downtown Fresno along Fresno Street, Van Ness Avenue and the Downtown Bus Rapid Transit corridors. The ASCT adaptive system will employ wireless vehicle detection technology for real-time monitoring and continuous synchronization. As a result of these improvements, traffic equipment will respond dynamically to changing conditions to optimize traffic flow. This will bring key downtown corridors to the same level of adaptive synchronization as the Shaw Avenue corridor, improving operations and reducing energy consumption and vehicle emissions.

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:

   -Fresno Street from Divisadero Street to Broadway Street.
   -Van Ness Avenue from Divisadero Street to Ventura Street.
   -BRT corridors along Fresno Street & Van Ness Avenue above, and N Street, P Street and Stanislaus Street.

   See Exhibit 1 for a map that includes the project limits.

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 15 ITS corridor synchronization projects and is currently working on 6 new ITS capital projects. See Exhibit 2 - ITS Projects Map.

- 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 Shaw Avenue (Fresno-SR168) trafficware adaptive signal control technology. Staff developed the traffic signal timing, testing, and synchronization for the 63 traffic signals of the newly constructed Bus Rapid Transit system. During 2018/2019, staff will be working on Shaw Avenue (Blackstone-SR99) and Herndon Avenue adaptive synchronization.

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

  During the last decade, the City of Fresno Public Works ITS Program has designed, constructed and synchronized Clovis Avenue, Shaw Avenue, Ashlan Avenue, Fresno Street, Bullard Avenue, McKinley Avenue, Palm-Nees-Friant corridor, Willow Avenue, Shields Avenue, Tulare Avenue, Fresno Street and Van Ness Avenue. ITS Herndon Avenue adaptive and ITS Shaw Avenue adaptive projects are currently in construction. See Exhibit 2 - ITS Projects Map and Exhibit 3 - ITS Projects Completion Record, 10 Years.

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) along the downtown BRT corridors, including Stanislaus Street, N Street, P Street, and segments of Van Ness Avenue and Fresno Street, totaling 21 traffic signals (see Exhibit 1). The project will deploy the latest ASCT technology and will install a new wireless detection system to 6 traffic signals which do not currently have detection along Van Ness Avenue.
   This project will demonstrate the functionality, longevity, reliability, and cost effectiveness of the new wireless vehicle detection system which includes wireless ground detection, wire antennas added at the traffic signals, and monitoring software at Traffic Operations Center. Upon completion, the wireless vehicle detection technology will be added to the extensive City of Fresno ITS Standards. The ITS Project will be the first to incorporate ASCT and Transit Signal Priority at 13 of the traffic signals along corridors and will reduce congestion in the heart of Downtown Fresno.

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 2019 to December 2020, and the project construction and close out will run from approximately January 2021 - June 2022 (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 300 of 466 traffic signals are synchronized. 5) ITS Blackstone-Abby-Ventura adaptive corridors are in design (2018). 6) Herndon Avenue and Shaw Avenue traffic adaptive corridors are in construction.

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 2017-2018 Congestion Mitigation & Air Qualify Improvement Program and associated 2013 Emission Factor Tables, and Emission Calculation Guidelines using California Air Resources Board (ARB) Access Database for AM/PM peak 1 hour volumes, the emission reductions for traffic signal synchronization for this project is the following:

ROG: 68
NOx: 46
PM10/2.5: 2
CO: 78
Total: 194 Pounds per year

ARB Access Database outputs are attached as Exhibit 5.

Note: ARB methodology only uses 1-hour AM and 1-hour PM traffic counts for emission reductions; However, Fresno's Downtown is very active with business trips during the daytime and recreational trips most evenings. Reduced emissions will have a positive impact in an area that suffers disproportionately with poor air quality (Exhibit 7) and are likely higher than the minimum reductions calculated above (2hr/ day calculations vs. 24/7 benefits).

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.

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.

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 soon 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.

   The BRT Corridors (Stanislaus-N-Fresno-Van Ness-P) and the extended corridors of Van Ness Avenue (Divisadero - Ventura) and Fresno Street (Divisadero - Broadway) already have basic ITS infrastructure (fiber and wireless) for connectivity of the traffic signals to the Traffic Operations Center for corridor monitoring and basic time-of-day synchronization. The basic time-of-day synchronization is limited to manual counts taken every 3-4 years and modeling in Synchro software which provides timing for these corridors based on the counts from a 1-week period. In order to have a truly dynamic Downtown Fresno an adaptive traffic signal system that monitors real time traffic, monitors real time BRT activities, and adjusts traffic signal timing in real time is needed.

   The proposed 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 stop bar and advanced wireless detection equipment (new technology to the region), and 4) will configure the adaptive technology and BRT Transit Signal Priority system (interoperability is also new to the region).

   These downtown Fresno corridors will have the most cutting edge technology in the Central Valley. As with all existing City of Fresno ITS Standards, new technology standards would follow for all Fresno County agencies to benefit.

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 modeling 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 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, and wireless detection) in the Downtown area. The results from this project will be the basis to seek future grant funding to expand ASCT/TSP equipment throughout downtown corridors and various heavily congested corridors as outlined in 2015 Fresno COG's ITS Strategic Deployment Plan.

   In addition to real time synchronization, the ATMS/ASCT 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 project will provide more efficient and effective delivery of Bus Rapid Transportation services by deploying new adaptive technology to maximize the capacity of existing Traffic Signal Prioritization (TSP) technology.

   The BRT buses currently have TSP equipment to 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 300 of 466 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/wireless detection interoperability will greatly benefit downtown BRT corridors; however, the standard will benefit all future ITS projects along the exiting and future BRT corridors throughout the City of Fresno and Central Valley. The City's ITS Management Plan can be accessed by the link: http://m3.fresno.gov/upload/files/its/ITSManagementPlan.pdf

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 project will improve the travel experience along the Bus Rapid Transit Corridor 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:	Measure C New Technology Funds								**Program Code**
Proposed Funding									
Component	Prior	18/19	19/20	20/21	21/22	22/23	23/24+	Total	**Funding Agency**
E&P (PA&ED)									FCTA/COG
PS&E			201,000						
R/W SUP									
CON SUP				201,000					
R/W									
CON				1,411,000					
TOTAL			201,000	1,621,000				1,813,000	

Fund No. 2:	City of Fresno, Local Measure C Funds								**Program Code**
Proposed Funding									
Component	Prior	18/19	19/20	20/21	21/22	22/23	23/24+	Total	**Funding Agency**
E&P (PA&ED)									City Of Fresno
PS&E			4,100						
R/W SUP									
CON SUP				4,100					
R/W									
CON				28,800					
TOTAL			4,100	32,900				37,000	

Fund No. 3:									**Program Code**
Proposed Funding									
Component	Prior	18/19	19/20	20/21	21/22	22/23	23/24+	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: 7-17-2018

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

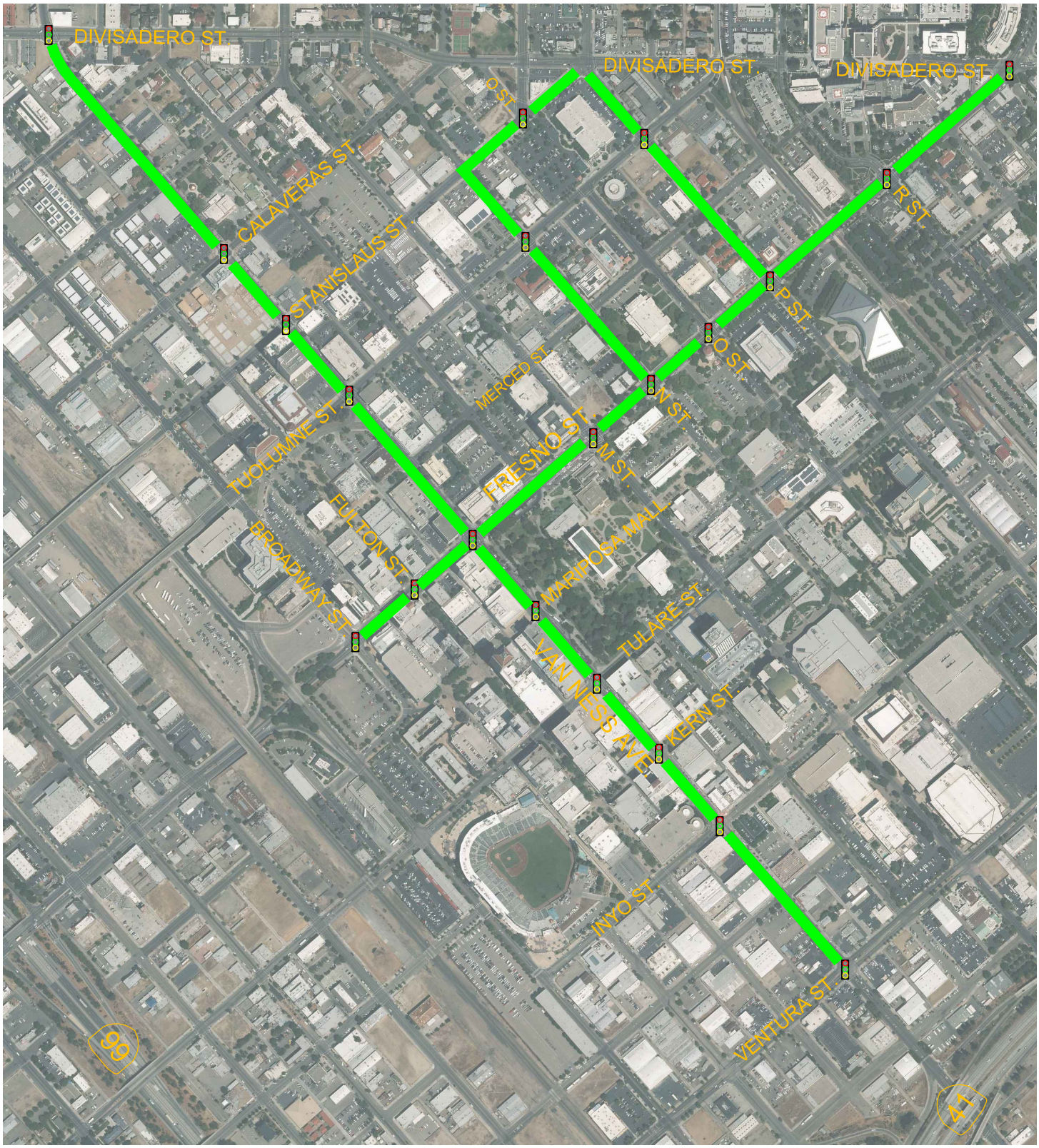
   Once determined to be a viable tool for adaptive synchronization, the innovative wireless detection system funded by this project will be incorporated into ITS Standards for future application in other areas of the City.

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. Intelligent Transportation Systems Map
3. 10 Year ITS Project list
4. Project Schedule
5. ARB Emissions Reduction Calculations, Peak Hours
6. APWA Reporter Article – *Safety Benefits Associated with Adaptive Traffic Signal Control*
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



LEGEND:

– *SIGNALIZED INTERSECTIONS WILL BE UPDATED WITH ADAPTIVE CONTROL TECHNOLOGY SYSTEM. VAN NESS AVENUE SIGNALIZED INTERSECTIONS WILL BE UPDATED WITH WIRELESS TRAFFIC DETECTION SYSTEM.*

EXHIBIT-1
LOCATION MAP

NOT TO SCALE

PW File No. TBD *Proj. ID.* TBD *F&O* GRANT *Ref. & Rev.*	*CITY OF FRESNO* | *Department of Public Works*		
	ITS FRESNO ST., VAN NESS AVE. AND BUS PATH CORRIDORS ADAPTIVE SYNCHRONIZATION	*DR BY:* JRT *CH. BY:* *DATE:* 06/14/18 *SCALE:* As Noted	*SHEET NO.* 1 *OF* 1 *SHEET*

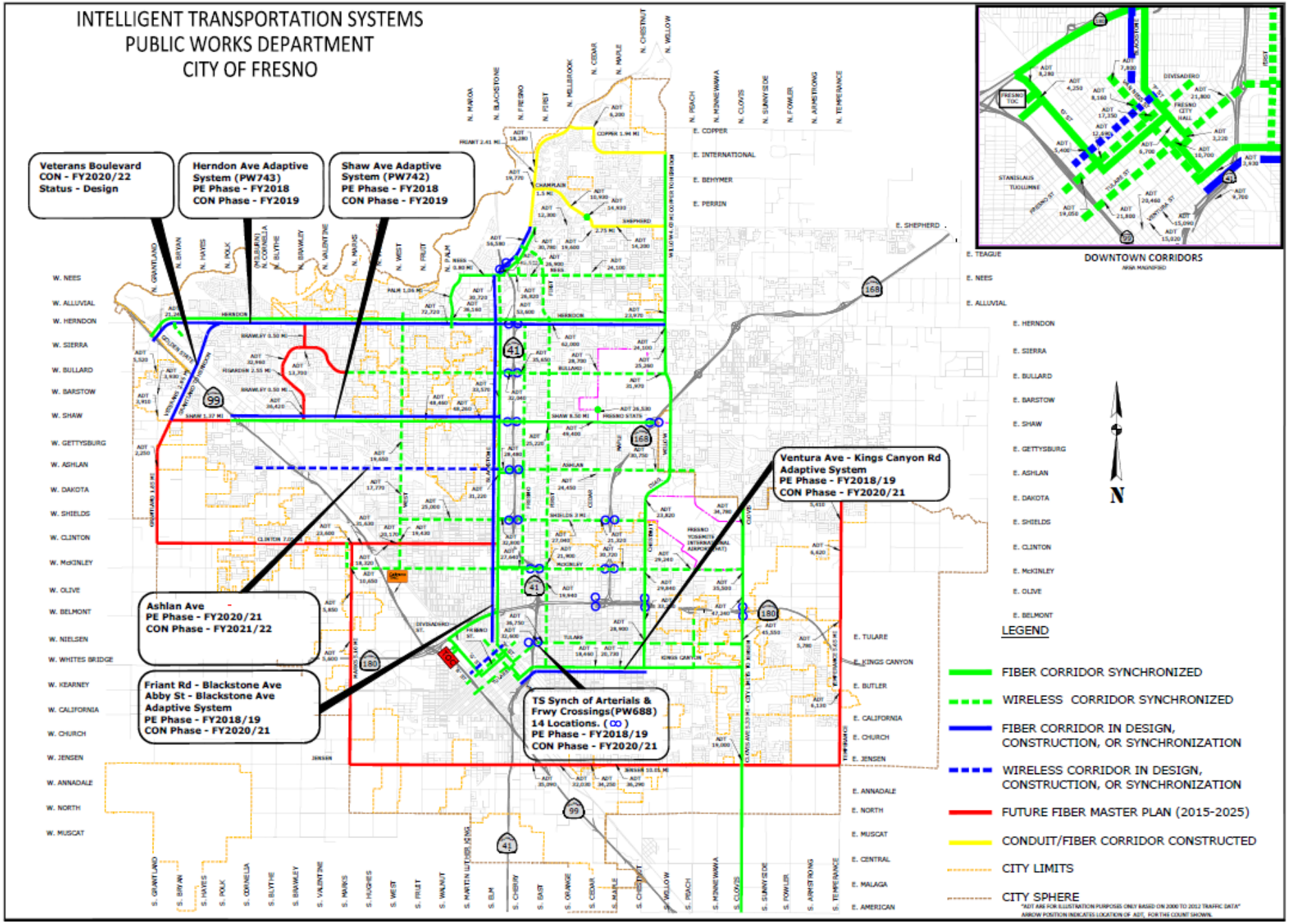

INTELLIGENT TRANSPORTATION SYSTEMS
PUBLIC WORKS DEPARTMENT
CITY OF FRESNO
Veterans Boulevard
CON - FY2020/22
Status - Design
Herndon Ave Adaptive System (PW743)
PE Phase - FY2018
CON Phase - FY2019
Shaw Ave Adaptive System (PW742)
PE Phase - FY2018
CON Phase - FY2019
Ventura Ave - Kings Canyon Rd Adaptive System
PE Phase - FY2018/19
CON Phase - FY2020/21
Ashlan Ave
PE Phase - FY2020/21
CON Phase - FY2021/22
Friant Rd - Blackstone Ave
Abby St - Blackstone Ave
Adaptive System
PE Phase - FY2018/19
CON Phase - FY2020/21
TS Synch of Arterials & Frwy Crossings(PW688)
14 Locations. (∞)
PE Phase - FY2018/19
CON Phase - FY2020/21
DOWNTOWN CORRIDORS
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
N

Exhibit 2

City of Fresno, Public Works Department, ITS Program

10 Year 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 Corridor	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 & Closing
17	Freeway Crossings	PW688	FRE130037	In Design
18	Adaptive Herndon Avenue	PW743	FRE150029	In Construction
19	Adaptive Shaw Avenue (BS-SR99)	PW742	FRE150030	In Construction

Dynamic Downtown - Adaptive Signal Control Technology in Downtown Fresno

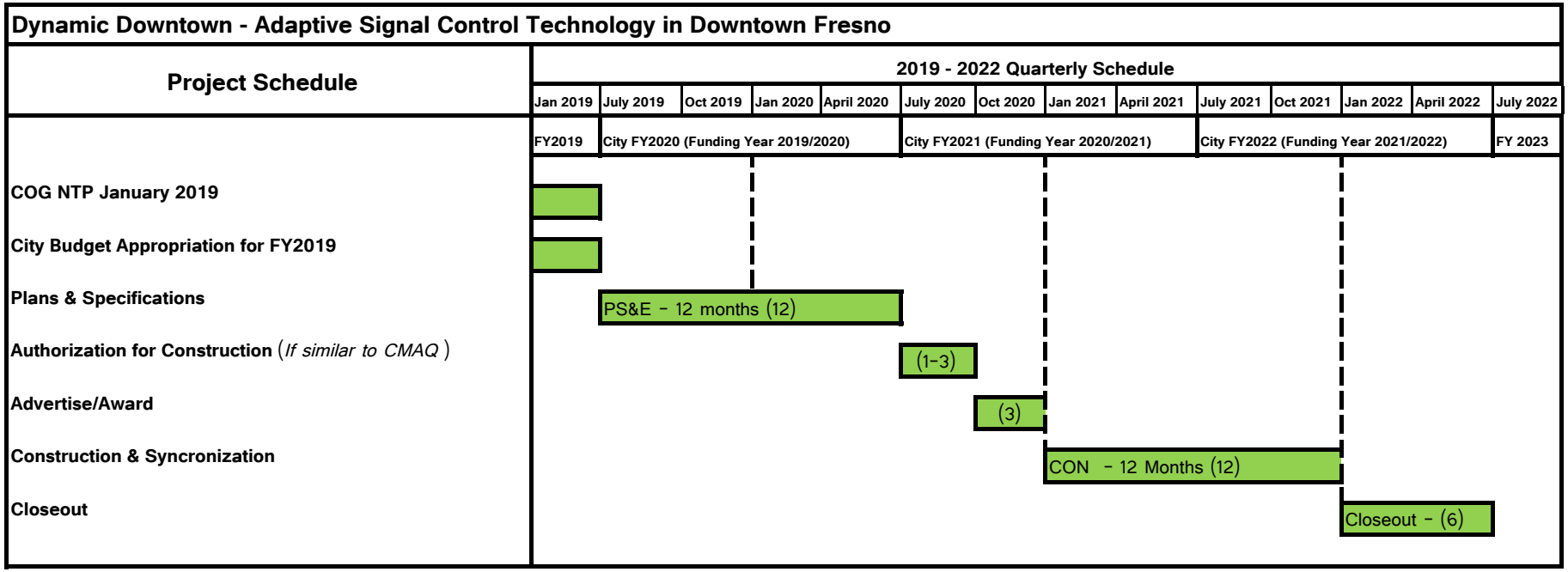


Exhibit 4

SIGNAL COORDINATION: Adaptive Signal Control Technology & Wireless Detection Pilot

County: Fresno

Federal Number:

Approval Date:

Caltrans DIST-EA: 6

Short Description: Downtown BRT path and Fresno St. & Van Ness Ave

Project Scope:

Project Sponsor: Fresno County COG **Private Agency:** No

CMAQ Funding:	$1,813,000	
Local Match:	$37,000	
Capital Recovery Factor:	0.22	
Project Analysis Period:	5	**years**
Days (D):	250	**operating days per year**
Congested Traffic:	2,951	**traffic volume during congested period**
Length (L) of congested roadway:	2.80	**miles**
Annual VMT (VMT):	2,065,700	**annual miles**

EMISSION FACTORS:

	Before Speed Factor		After Speed Factor	
ROG :	0.24	***grams per mile***	0.21	***grams per mile***
NOx :	0.43		0.41	
PM10 :	0.01		0.01	
CO :	3.77		3.53	

EMISSION REDUCTIONS:

	Pounds per Year	Kilograms per Day
ROG:	68	0
NOx:	46	0
PM10:	2	0
CO:	78	0
Total:	***194***	***0***

COST-EFFECTIVENESS OF:

CMAQ Funds:	$2,040.34	**per pound**	$4,080,679	**per ton**
All Funding Sources:	$2,081.98	**per pound**	$ 4,163,958	**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)

- 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

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

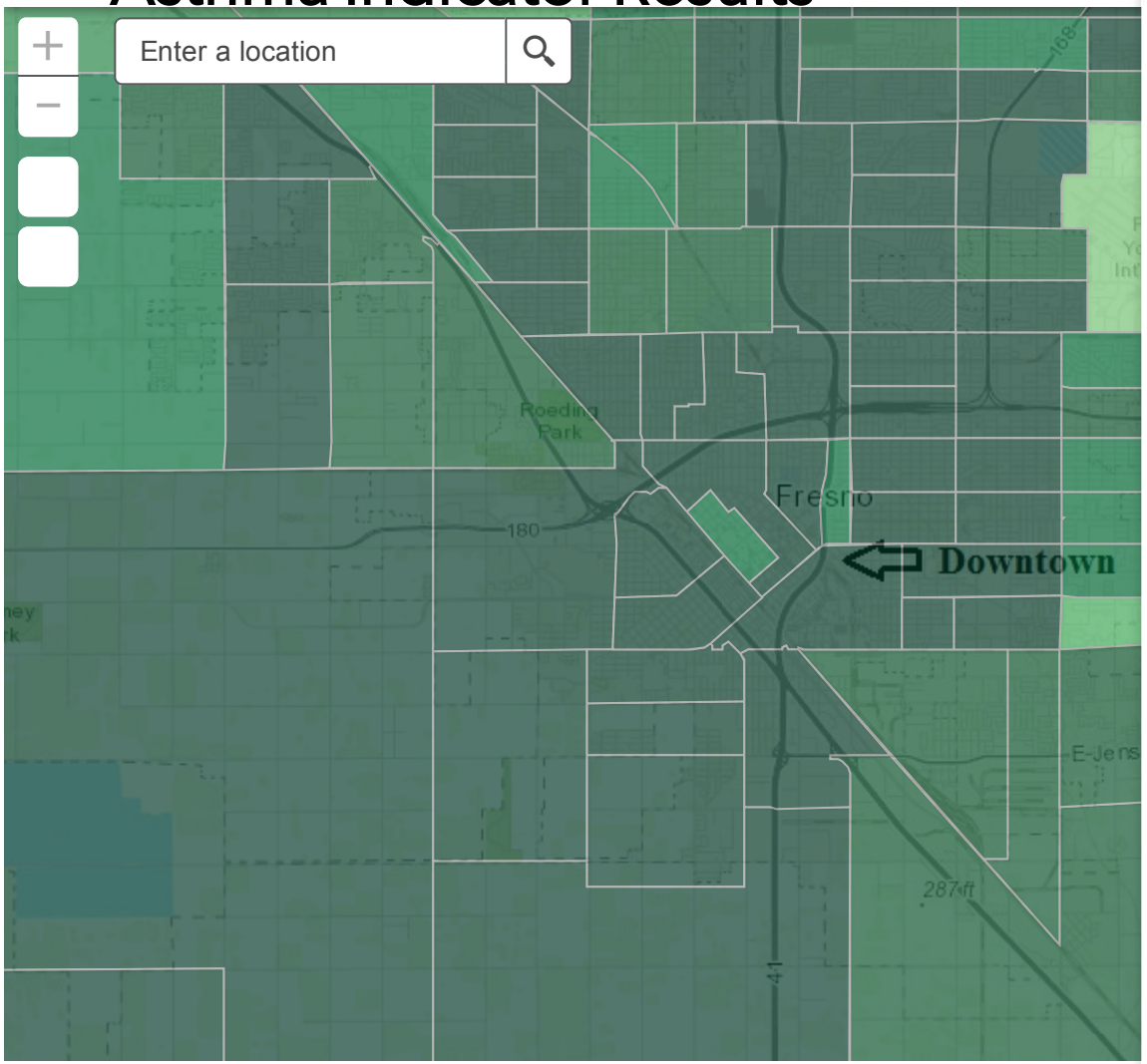
Dennis Randolph is Director of Public Works for the City of Grandview, Missouri, and has practiced traffic engineering for over 42 years. Currently, he is an adjunct instructor at the University of Missouri-Kansas City. Dennis is also a Public Works Leadership Fellow. Contact: drand77201@att.net

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.

Asthma Indicator Results

from CalEnviroScreen 3.0



2mi

-119.723 36.737 Degrees

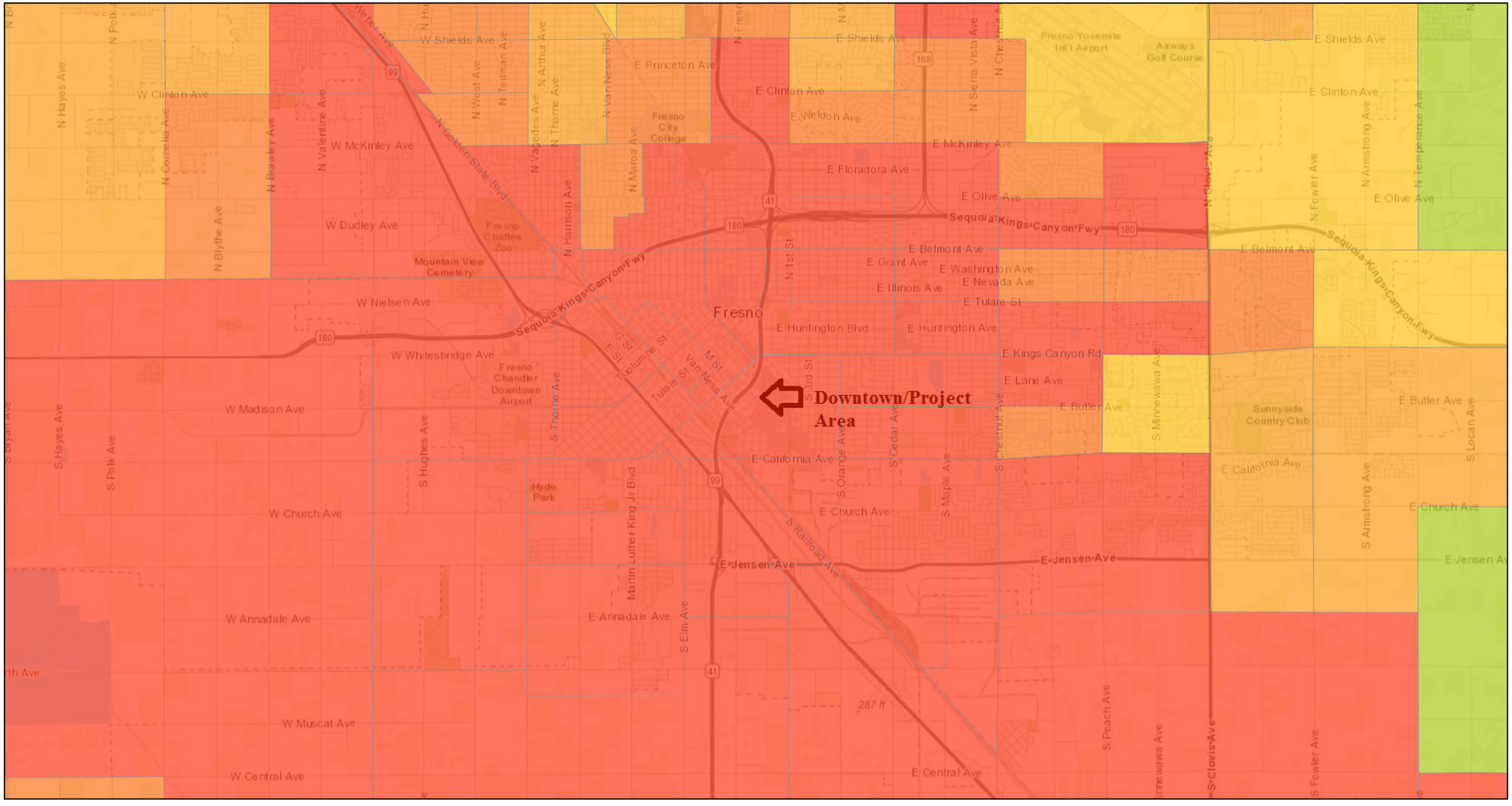
Legend

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

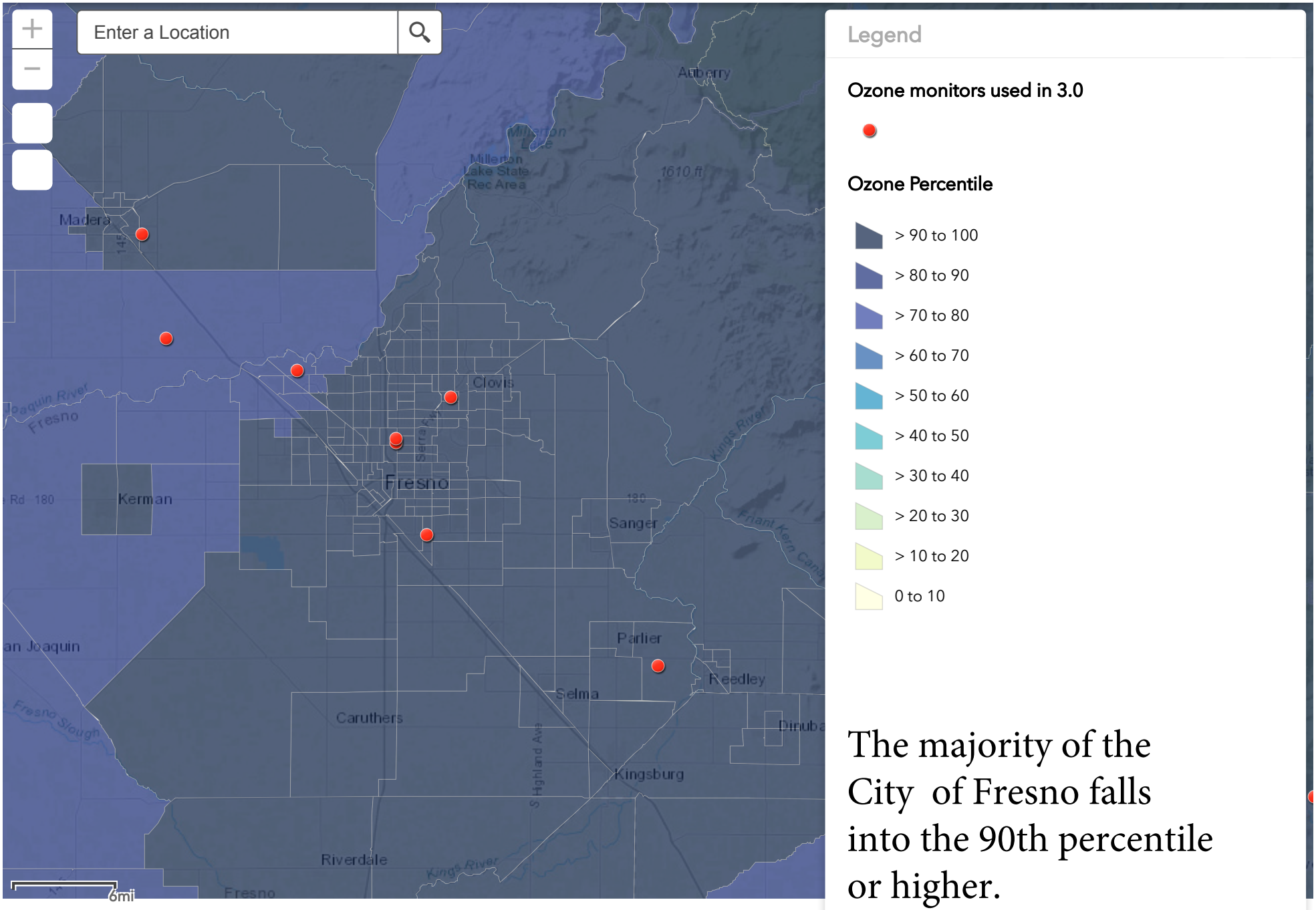
Web AppBuilder for ArcGIS

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

Exhibit 7

Ozone results

from CalEnviroScreen 3.0



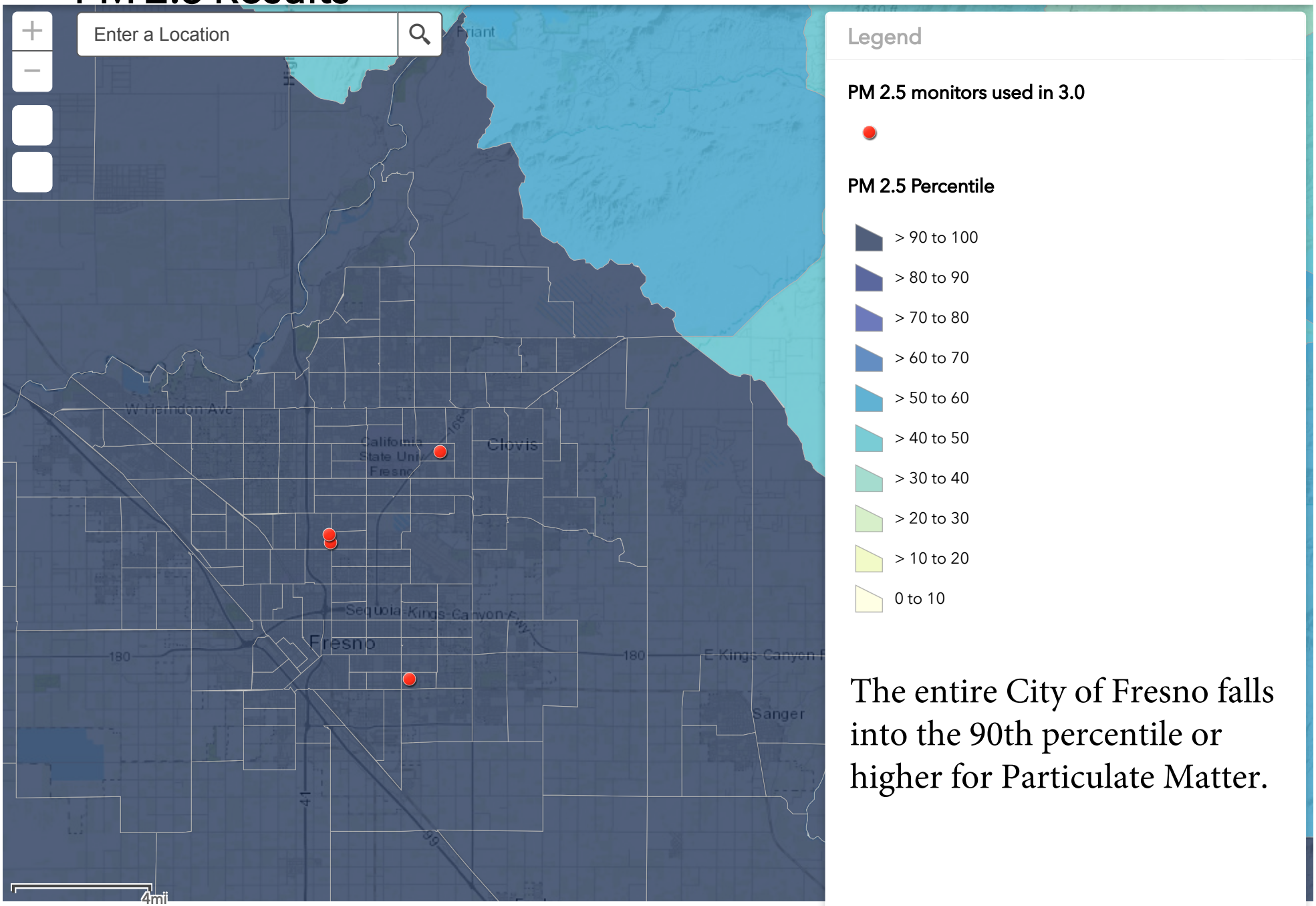
-119.478 36.602 Degrees

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

Exhibit 7

PM 2.5 Results

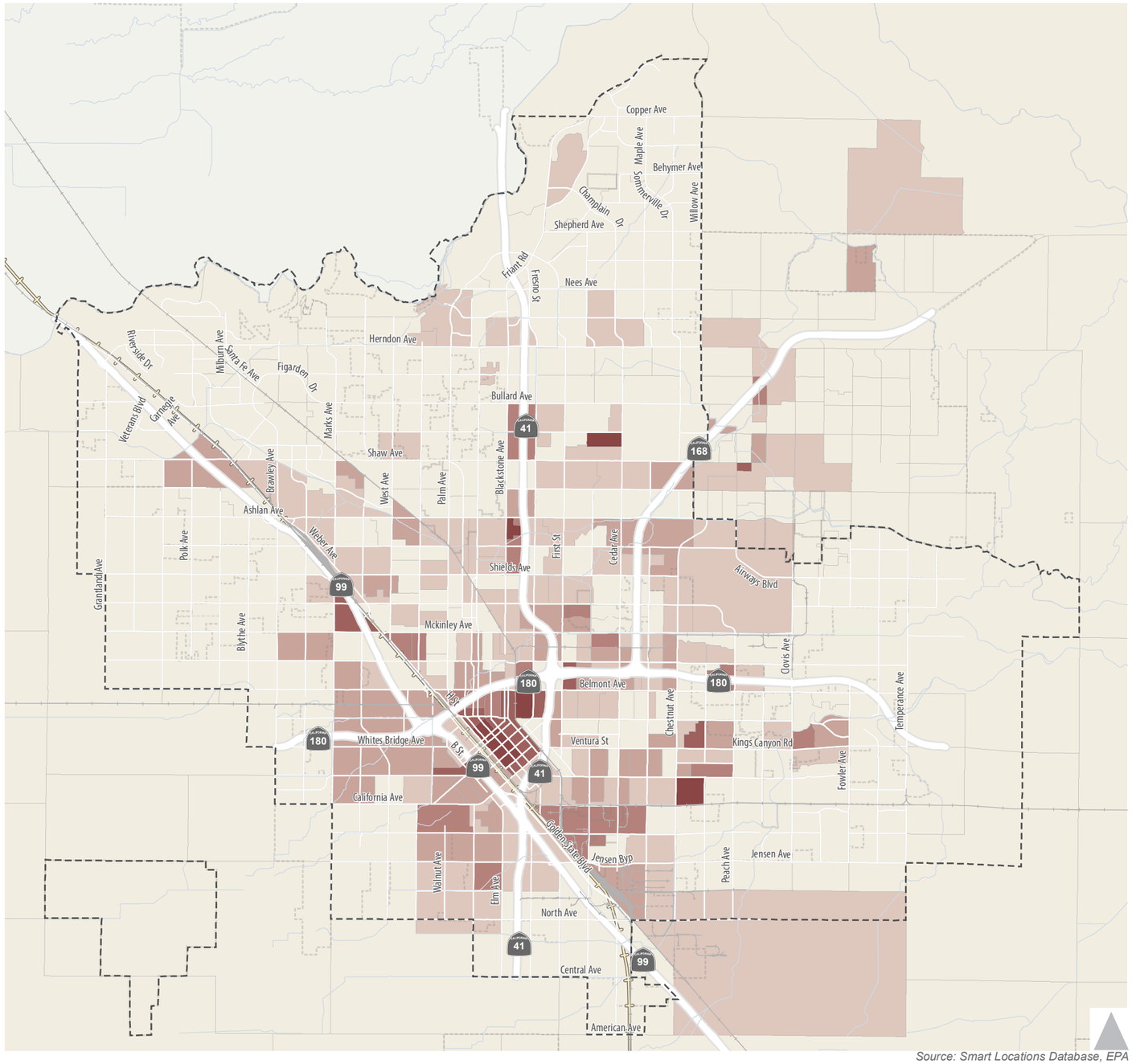
from CalEnviroScreen 3.0



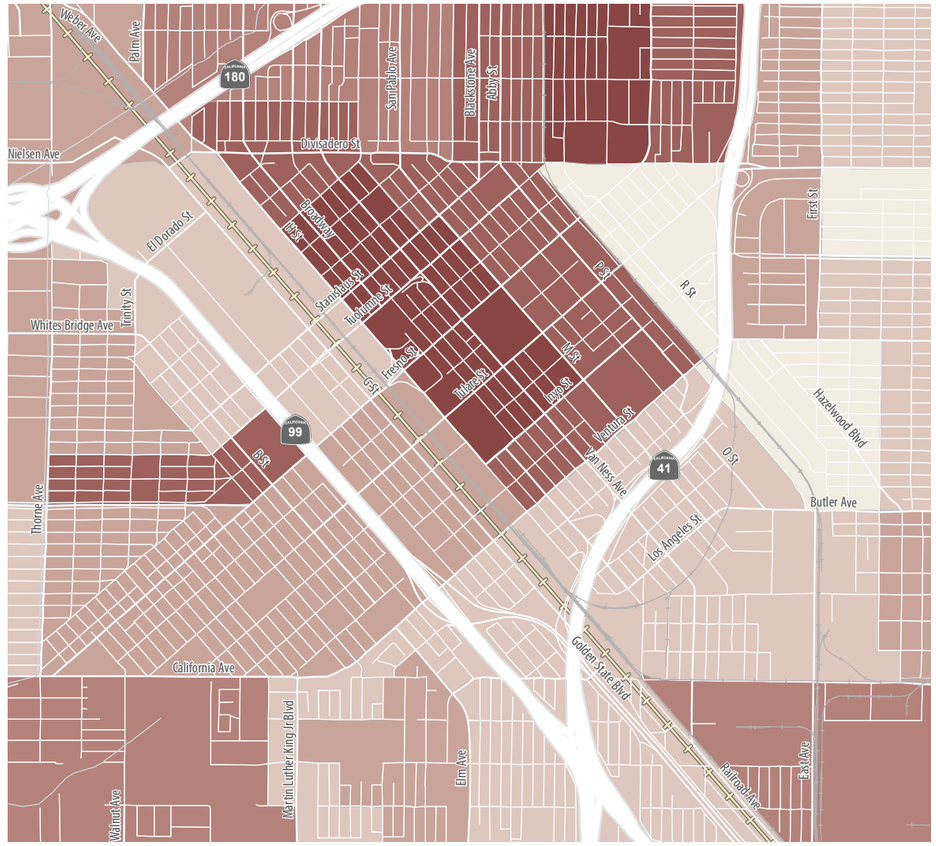
-119.515 36.834 Degrees

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

City of FRESNO

Police Department

Mariposa Mall
P.O. Box 1271
Fresno, CA 93715-1271

Jerry P. Dyer
Chief of Police

July 16, 2018

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

SUBJECT: CITY OF FRESNO MEASURE C NEW TECHNOLOGY GRANT APPLICATION – DYNAMIC DOWNTOWN

Dear Selection Committee:

The City of Fresno is applying for Measure C grant funding. This new technology will allow adaptive synchronization of the Bus Rapid Transit route and key corridors in Downtown Fresno. If funded, traffic signal timing will vastly be improved with the proposed equipment. Less congestion will support more efficient public transportation, vehicle travel, and a reduction in emissions. This may also contribute to a reduction in unlawful traffic behavior, such as running red lights or failure to yield to pedestrians, as travelers rush to reach their destinations.

The City of Fresno has a high rate of collisions. The Police Department works diligently to reduce collisions through enforcement and educational efforts. Improved synchronization equipment along key Downtown Corridors will support these efforts by reducing congestion.

Thank you for your investment in Downtown Fresno.

Sincerely,

Jerry P. Dyer
Chief of Police

OLIVER L. BAINES III
Councilmember, District Three

July 16, 2018

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 funding for an advanced technology which would allow adaptive synchronization of the Bus Rapid Transit route and key corridors in Downtown Fresno. I support this project because it exemplifies the type of cutting edge, emission reducing equipment that Measure C New Technology Program invests in. If funded, traffic signal timing will be improved as a result of the new equipment.

As the Downtown area continues to be revitalized, the use of public transit is expected to increase. Having an infrastructure to support timely and efficient travel is an important part of planning for urban growth and attracting the region to sporting events, restaurants and night life in Downtown Fresno. The technology will also improve the travel experience for residents and business owners who make trips to the civic centers located Downtown.

Thank you for your consideration of this proposal and for supporting improved travel and air quality in the Downtown area. If you have any questions please feel free to contact my office at 559-621-8000.

Sincerely,

Oliver L. Baines, III
Member of the Fresno City Council
Representing District Three

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

July 16, 2018

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

Dear Selection Committee,

The City of Fresno is applying for funding for an advanced technology which would allow adaptive synchronization of the Bus Rapid Transit route and key corridors in Downtown Fresno. As the downtown area continues to be revitalized, public transit use is expected to increase. Infrastructure to support timely and efficient travel is an important part of planning for urban growth and attracting the region to sporting events, restaurants and night life in the 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. Over the last year we have seen over $100 million dollars in private sector development within downtown, and over 600 new residential units in the last five years. With the growth that we are experiencing in downtown it is critical that we 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,

James Cerracchio
Downtown Fresno Partnership President/CEO