NOTICE OF MEETING OF THE CARSON AREA METROPOLITAN PLANNING ORGANIZATION (CAMPO)

Day: Wednesday
Date: April 11, 2018
Time: Beginning at 4:30 pm
Location: Community Center, Sierra Room, 851 East William Street, Carson City, Nevada

AGENDA

AGENDA NOTES: The Carson Area Metropolitan Planning Organization (CAMPO) is pleased to make reasonable accommodations for members of the public who are disabled and wish to attend the meeting. If special arrangements for the meeting are necessary, please notify Carson Area Metropolitan Planning Organization staff in writing at 3505 Butti Way, Carson City, Nevada, 89701, or Comments@CarsonAreaMPO.com, or call Dirk Goering at (775) 887-2355 at least 24 hours in advance.

For more information or for copies of the supporting material regarding any of the items listed on the agenda, please contact Dirk Goering, Acting Transportation Manager, at (775) 887-2355. Additionally, the agenda with all supporting material is posted on the CAMPO website at www.carson.org/agendas, or is available upon request at 3505 Butti Way, Carson City, Nevada, 89701.

1. ROLL CALL AND DETERMINATION OF A QUORUM

2. AGENDA MANAGEMENT NOTICE: The Chair may take items on the agenda out of order; combine two or more agenda items for consideration; and/or remove an item from the agenda or delay discussion relating to an item on the agenda at any time.

3. DISCLOSURES: Any member of the CAMPO Board may inform the Chair of his or her intent to make a disclosure of a conflict of interest on any item appearing on the agenda or on any matter relating to the CAMPO's official business. Such disclosures may also be made at such time the specific agenda item is introduced.

4. PUBLIC COMMENT: Members of the public who wish to address the CAMPO Board may approach the podium and speak on any matter relevant to or within the authority of CAMPO. Comments are limited to three minutes per person per topic. If your item requires extended discussion, please request the Chair to calendar the matter for a future CAMPO meeting. No action may be taken upon a matter raised under this item of the agenda until the matter itself has been specifically included on an Agenda as an item upon which action may be taken.

5. APPROVAL OF MINUTES:

5.A (For Possible Action) March 14, 2018 Draft Minutes

6. PUBLIC MEETING ITEM(S):

6.A (Informational) Informational presentation on ongoing traffic signal coordination activities within Carson City and the Northern Nevada region.

Staff Summary: Staff and a representative from University of Nevada, Reno, Center for Advanced Transportation Education and Research (CATER) will provide an informational presentation on ongoing traffic signal coordination activities within Carson City and the Northern Nevada region.

6.B (Informational) To conduct a public hearing and accept public comment on the Draft FY 2019-2020 Unified Planning Work Program (UPWP).

Staff Summary: Staff has developed a UPWP for fiscal years 2019 and 2020 (July 1, 2018 – June 30, 2020). The UPWP establishes the budget for proposed CAMPO activities and describes how federal Consolidated Planning Grant (CPG) funds will be administered during the 2019 and 2020 fiscal years.

7. INTERNAL COMMUNICATIONS AND ADMINISTRATIVE MATTERS (Non-Action Items):

7.A Future Agenda Items

8. BOARD COMMENTS (Information only): Status reports and comments from the members of the CAMPO Board.

9. PUBLIC COMMENT: Members of the public who wish to address the CAMPO Board may approach the podium and speak on any matter relevant to or within the authority of CAMPO. Comments are limited to three minutes per person per topic. If your item requires extended discussion, please request the Chair to calendar the matter for a future CAMPO meeting. No action may be taken upon a matter raised under this item of the agenda until the matter itself has been specifically included on an Agenda as an item upon which action may be taken.

10. The Next Meeting is Tentatively Scheduled: 4:30 p.m., Wednesday, May 9, 2018, at the Sierra Room - Community Center, 851 East William Street.

11. ADJOURNMENT: For Possible Action

This agenda has been posted at the following locations on Thursday, April 5, 2018, before 5:00 p.m.:

City Hall, 201 North Carson Street
Community Center, Sierra Room, 851 East William Street
Carson City Public Works, 3505 Butti Way
Carson City Planning Division, 108 E. Proctor Street
Douglas County Executive Offices, 1594 Esmeralda Avenue, Minden
Lyon County Manager's Office, 27 South Main Street, Yerington
Nevada Department of Transportation, 1263 S. Stewart Street, Carson City
City Website: www.carson.org/agendas
State Website: https://notice.nv.gov

A regular meeting of the Carson Area Metropolitan Planning Organization was scheduled for 4:30 p.m. on Wednesday, March 14, 2018 in the Community Center Sierra Room, 851 East William Street, Carson City, Nevada.

PRESENT: Chairperson Mark Kimbrough
Vice Chairperson Brad Bonkowski
Member Don Alt
Member Lori Bagwell
Member Jon Erb
Member Chas Macquarie
Member Greg Stedfield
Ex-Officio Member Sondra Rosenberg

STAFF: Darren Schulz, Public Works Department Director
Dirk Goering, Senior Transportation Planner
Graham Dollarhide, Transit Coordinator
Hailey Lang, Transportation Planner
Dan Yu, Deputy District Attorney
Kathleen King, Chief Deputy Clerk

NOTE: A recording of these proceedings, the CAMPO's agenda materials, and any written comments or documentation provided to the Clerk, during the meeting, are part of the public record. These materials are available for review, in the Clerk's Office, during regular business hours.

1. CALL TO ORDER AND DETERMINATION OF A QUORUM (4:30:29) - Chairperson Kimbrough called the meeting to order at 4:30 p.m. Ms. King called the roll; a quorum was present. (4:31:56) Chairperson Kimbrough introduced Member Stedfield and Member Alt.

2. AGENDA MANAGEMENT NOTICE (4:30:55) - Chairperson Kimbrough entertained modifications to the agenda; however, none were forthcoming.

3. DISCLOSURES (4:31:02) - Chairperson Kimbrough entertained disclosures; however, none were forthcoming.

4. PUBLIC COMMENT (4:31:59) - Chairperson Kimbrough entertained public comment; however, none was forthcoming.

5. POSSIBLE ACTION ON APPROVAL OF MINUTES - February 14, 2018 (4:31:20) - Chairperson Kimbrough entertained suggested revisions to the minutes and, when none were forthcoming, a motion. **Member Bagwell moved to approve the minutes, as presented. Vice Chairperson Bonkowski seconded the motion. Motion carried 7-0.**

6. PUBLIC MEETING ITEMS:

6(A) POSSIBLE ACTION TO APPROVE AN AMENDMENT TO THE FEDERAL FISCAL YEAR 2018 - 2021 TRANSPORTATION IMPROVEMENT PROGRAM (4:32:28) - Chairperson Kimbrough introduced this item, and Mr. Goering reviewed the agenda materials. Member Macquarie requested to include pedestrians and bicycles, in addition to automobiles, in the collected data. Ex-Officio Member Rosenberg clarified that the pedestrian and bicycle data will be included if law enforcement

responds to the incident. "It has to be a reported crash but if the Sheriff's Office responds to it and it involves a bike or a pedestrian, then it would be included in that data." Member Macquarie discussed the importance of including the type of pedestrian or bicycle crash. "If we had that breakdown, that would be really helpful ... in deciding on projects going forward." Ex-Officio Member Rosenberg explained that law enforcement agencies' crash reporting systems are "pretty detailed, from which ... vehicle; what direction they were approaching; what type of crash it was; how many were injured, killed; property damage ... I believe it's all in there but I'd be happy to have our Traffic Safety folks reach out to you separately just to see if there are any enhancements we can make." Discussion followed.

Chairperson Kimbrough entertained public comment and, when none was forthcoming, a motion. **Member Bagwell moved to approve an amendment to the Federal Fiscal Year 2018 - 2021 Transportation Improvement Program, as listed. Vice Chairperson Bonkowski seconded the motion. Motion carried 7-0.**

6(B) POSSIBLE ACTION TO APPROVE THE FEDERAL FISCAL YEAR 2017 - 19 TITLE VI PROGRAM DOCUMENT UPDATE (4:41:47) - Chairperson Kimbrough introduced this item, and Mr. Dollarhide reviewed the agenda materials. Mr. Goering and Mr. Dollarhide responded to questions of clarification. Chairperson Kimbrough entertained public comment and, when none was forthcoming, a motion. **Member Bagwell moved to approve the Federal Fiscal Year 2017 - 19 Title VI Program Document Update, as presented. Member Erb seconded the motion. Motion carried 7-0.**

7. INTERNAL COMMUNICATIONS AND ADMINISTRATIVE MATTERS; FUTURE AGENDA ITEMS (4:47:54) - Chairperson Kimbrough introduced this item, and Mr. Goering reviewed the tentative agenda for the April meeting.

8. CAMPO MEMBER COMMENTS (4:48:55) - Chairperson Kimbrough introduced this item. Ex-Officio Member Rosenberg described a series of upcoming I-11 meetings. She advised that the Carson City meeting will be scheduled from 2:00 p.m. to 5:00 p.m. on March 29th at the NDOT main conference room. Chairperson Kimbrough entertained additional comments; however, none were forthcoming.

9. PUBLIC COMMENT (4:50:27) - Chairperson Kimbrough entertained public comment; however, none was forthcoming.

10. THE NEXT MEETING IS TENTATIVELY SCHEDULED FOR 4:30 P.M. ON WEDNESDAY, APRIL 11, 2018 IN THE COMMUNITY CENTER SIERRA ROOM, 851 EAST WILLIAM STREET (4:50:33) - Chairperson Kimbrough read this information into the record.

11. ACTION TO ADJOURN (4:50:38) - A motion was made, seconded, and carried unanimously to adjourn the meeting at 4:50 p.m.

The Minutes of the March 14, 2018 Carson Area Metropolitan Planning Organization meeting are so approved this _____ day of April, 2018.

_____
MARK KIMBROUGH, Chair

Carson Area Metropolitan Planning Organization
CAMPO

STAFF REPORT

Report To: The Carson Area Metropolitan Planning Organization (CAMPO)

Meeting Date: April 11, 2018

Staff Contact: Lucia Maloney, Transportation Manager

Agenda Title: (**Informational**) Informational presentation on ongoing traffic signal coordination activities within Carson City and the Northern Nevada region.

Staff Summary: Staff and a representative from University of Nevada, Reno, Center for Advanced Transportation Education and Research (CATER) will provide an informational presentation on traffic signal coordination activities within Carson City and the Northern Nevada region.

Agenda Action: Other/Presentation **Time Requested:** 15 minutes

---

Proposed Motion
N/A

Background/Issues & Analysis

Traffic signal coordination is accomplished by configuring signals to work together as a group to synchronize movements and allow for better progression. Coordination is not appropriate for all locations as the benefits of reduced travel times, stops, delay, and queues for the major movements may be offset by increased delay and other negative effects to the minor movements. The common non-coordinated mode of operation is known as "Free" and occurs when the signal operates independently, responding to the inputs it receives from its vehicle and pedestrian detection systems. Carson City has 50 traffic signals of which 31 operate in the coordinated mode of operation during peak periods. The 31 signals are operated in eight groups serving specific corridors. The S 395 corridor is cross jurisdiction, with two signals in Douglas County. Coordination engineering is typically performed when significant changes to the road network or volumes occur. All eight groups have been coordinated in the previous 13 months. Coordination engineering has been performed by third party engineering consultants, UNR, and by Public Works. Carson City is responsible for the operation and maintenance including timing and coordination of NDOT signals within Carson City. NDOT recently provided coordination support due to significant road network changes related to the freeway opening for the S 395 corridor from Mica Dr to Koontz Ln and on Hwy 50 E from N Saliman Rd to Fairview Dr.

There is regional effort towards the adoption of performance measures for corridor performance. CATER has developed a method for coordinating and evaluating the quality of signal timing that has been applied to the downtown corridors on Carson St and Stewart St.

Carson City Public Works is participating in an NDOT funded UNR research project "Developing a Quality of Signal Timing Performance Measure Methodology for Arterial Operations". The two year project runs through September 2019.

CAMPO's draft two-year Unified Planning Work Program (UPWP) Task 3.3 includes an evaluation and report on the current performance of Coordinated Traffic Signal Systems within the CAMPO planning area, with a focus on corridor-level traffic signal coordination. CAMPO staff will utilize a contractor to assess and document current performance levels and develop a plan that relies on corridor-level performance measures to monitor and evaluate system performance over time. The plan is expected to provide baseline data and benchmarks for future assessment.

Applicable Statute, Code, Policy, Rule or Regulation
N/A

Financial Information
Is there a fiscal impact? ☐ Yes ☒ No

If yes, account name/number: N/A

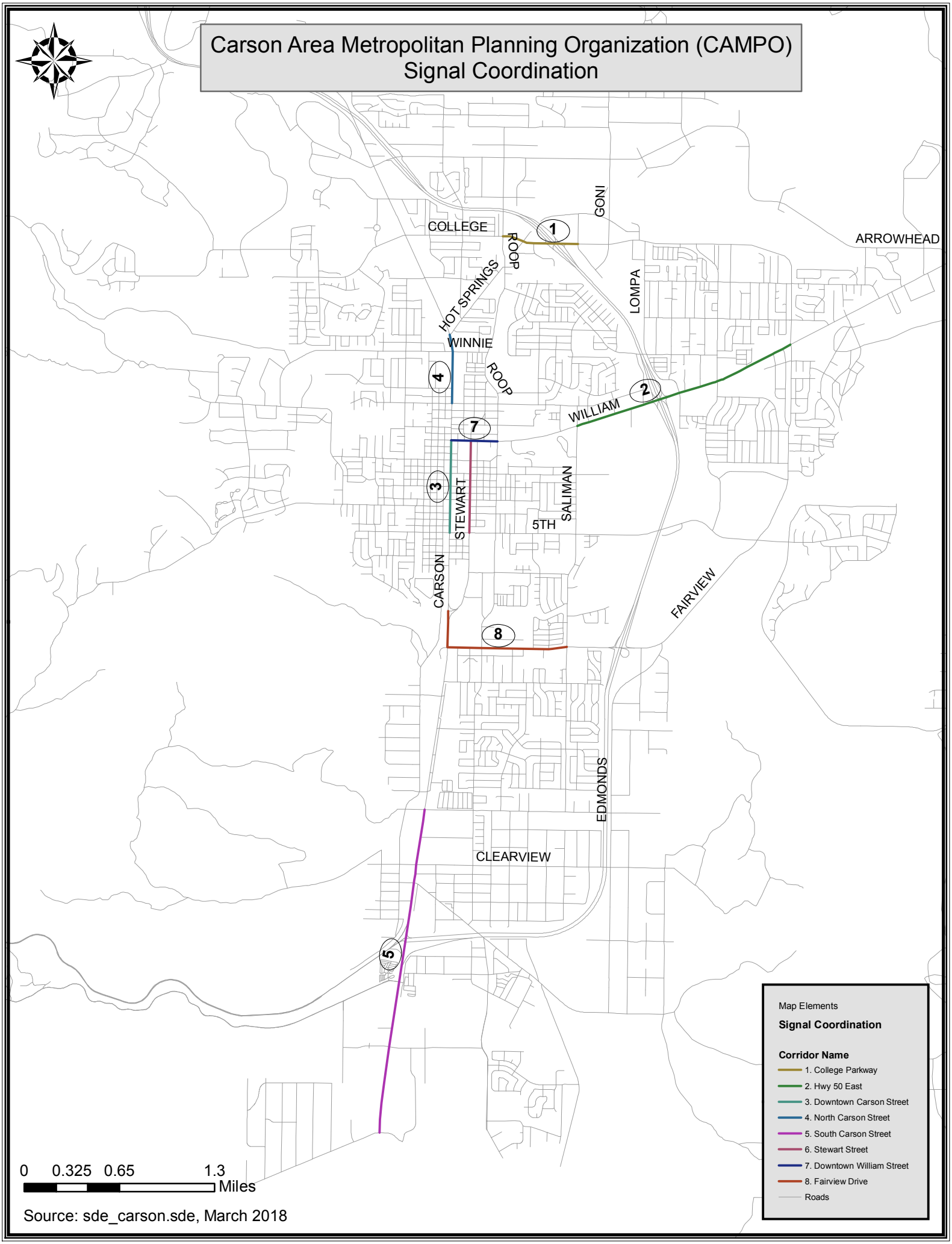
Is it currently budgeted? ☐ Yes ☒ No

Explanation of Fiscal Impact: N/A

Alternatives
N/A

Supporting Material
-Map of Signal System Coordinated Groups
-"Developing a Quality of Signal Timing Performance Measure Methodology for Arterial Operations", UNR Research Proposal
-PowerPoint

Carson Area Metropolitan Planning Organization (CAMPO)
Signal Coordination



Developing a Quality of Signal Timing Performance Measure Methodology for Arterial Operations

Fiscal Year 2017 Research Proposal (17Q1-E4-02)

July 2017

Prepared for the Nevada Department of Transportation

Submitted by

Zong Tian and Hao Xu
Center for Advanced Transportation Education and Research (CATER)
University of Nevada, Reno
E-mail: zongt@unr.edu; haox@unr.edu
Tel: (775) 784-1232

PROBLEM DESCRIPTION

Performance-oriented and outcome-based transportation planning has been greatly emphasized in both MAP-21 and the FAST Act. While various performance measures for freeway operations have been well established and are relatively mature, methodologies for establishing arterial performance measures are still being sought by transportation agencies in the nation. In Nevada's urban areas, signalized arterials carry nearly 40% of the total VMTs, thus they play a critical role in the overall transportation system's efficiency. Unlike freeways where limited engineering solutions (e.g., ramp metering) can be applied, arterial performance can be significantly affected by the quality of signal timing and coordination, one of the most cost-effective engineering solutions. Conventional approaches to arterial performance measurement include the analytical methods documented in the Highway Capacity Manual (HCM), traffic simulation, and floating-vehicle technologies. These methods describe arterial performance with traffic delay and stops, which is helpful to understand the congestion level of a road. However, none of these methods can directly tell the quality of signal timing on an arterial road. The FHWA's Every Day Counts Initiative promotes technologies and methodologies for achieving automated signal performance measures as a proactive traffic management strategy. One of the urgent needs in both Nevada and the nation is to establish performance measures criteria, which can be used to judge the quality of signal timing and coordination along major arterials. Efficient arterial operations and desirable performance outcomes could not be achieved without the traffic signals operating at their optimal levels. There must also be an established evaluation and data collection methodology for assessing the quality of signal performance.

BACKGROUND SUMMARY

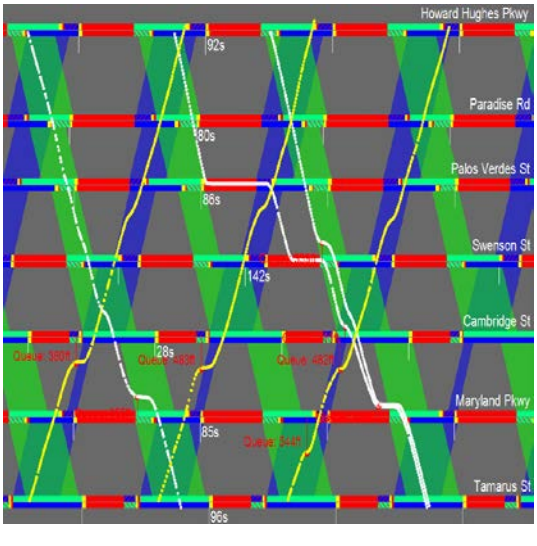
Performance measurement of arterial signal timing, or the so-called "quality of signal timing", is important for transportation agencies to allocate resources and evaluate the effectiveness of traffic signal improvement. The analytical methods documented in the HCM are widely used to estimate control delay and vehicle queues. Simulation is another common method to provide a more accurate and micro-level description of traffic delay and stops. The floating-vehicle technology is mainly used for conducting before-and-after evaluation on signal re-timing projects. Nevertheless, none of these methods directly provide an indicator on the quality of signal timing to suggest if traffic signals are operating at their optimal levels. The difficulty of quantitatively assessing the quality of signal timing lies in the fact that many factors could contribute to the performance outcome. For example, a poor arterial performance could be simply due to high traffic demand or close signal spacing, but not the quality of the signal timing itself.

A Federal Highway Administration (FHWA) report [1] pointed out that even the best agencies find it difficult to measure the performance of signal systems and stay focused on their objectives. The quality of signal timing and coordination can hardly be described quantitatively with existing methodologies and techniques. A study conducted by the Texas Transportation Institute (TTI) [2] described how engineers and technicians with the Texas Department of Transportation (TxDOT) assess the performance of traffic

signals through interviews. The study identified that engineers and technicians briefly evaluated the performance of signal timing by the duration of the green, yellow and red intervals for each phase. There is a lack of methodologies to quantitatively assess the performance of arterial signal timing. The same issue exists in Nevada and other jurisdictions.

The Purdue Coordination Diagram (PCD) method [3, 4] developed by Purdue University allows a qualitative appraisal of coordinated phase performance. With data from the spot sensors, the PCD is a powerful tool for measuring coordination performance at an individual intersection approach or the link level. Using a simple linear model, the PCD can also be used to predict the impact of changes to arterial offsets. FHWA has initiated a major effort on implementing the Purdue system in several states' urban areas including Las Vegas [5, 6]. Even though such a system can automatically collect a large amount of high-resolution data, which can provide valuable insights on the quality of signal operations, there is still no established criteria to judge the quality of signal operation by excluding the biases caused by traffic condition and road properties. As a link-based evaluation method, the PCD does not provide a convenient view of an overall arterial signal performance.

In recent years, performance-driven transportation solutions are greatly emphasized at both the national and local levels [7, 8]. Many agencies in the nation are seeking signal performance measures and standards. Orange County in California is the only known agency who has implemented a Corridor Signal Performance Index (CSPI) [9] for quantitative signal performance evaluation. It is a scoring process that mainly considers speed, stop, and intersection density. Arterials can be grouped into various tiers based on the CSPI scores and be ranked for signal timing projects. Researchers at the Center for Advanced Transportation Education and Research (CATER) at the University of Nevada, Reno (UNR) enhanced Orange County's index function by including additional factors such as duration of stops and signal cycle length. This methodology has been implemented into a software tool with an illustration shown in Figure 1 below.



Arterial: Flamingo Raod
Timing Plan: MD-UNR2

Timing	GPS File Name	Average Speed (mph)	% Speed	Speed Score	No. of Stops	Stand No. of Stops	% Stop	Stop Score	Original Score	Cycle Adj.	Spacing Adj.	Adjusted Score	Quality of Signal Timing
MD-UNR2 (WB)	Flamingo East-WB-2017-02-08 12-06-25	27	60%	70	1	0.3	4%	97	89	87(-2)	87(+0)	87	B+
MD-UNR2 (WB)	Flamingo East-WB-2017-02-08 12-19-48	26.7	59%	69	1	0.3	5%	97	89	87(-2)	87(+0)	87	B
MD-UNR2 (WB)	Flamingo East-WB-2017-02-08 12-57-18	25.7	57%	67	0	0	0%	100	90	88(-2)	88(+0)	88	B+
MD-UNR2 (EB)	Flamingo East-EB-2017-02-08 11-36-59	26.4	59%	69	1	0.4	5%	97	88	86(-2)	86(+0)	86	B
MD-UNR2 (EB)	Flamingo East-EB-2017-02-08 12-00-50	16.2	36%	46	3	3.4	49%	29	34	32(-2)	32(+0)	32	F
MD-UNR2 (EB)	Flamingo East-EB-2017-02-08 12-14-13	26	58%	68	2	0.8	11%	95	87	85(-2)	85(+0)	85	B

Figure 1. Arterial Quality of Signal Timing Performance Developed by UNR CATER

The UNR methodology uses similar data from probe vehicle runs such as average speed and number of stops. Scoring functions were developed based on these measures and then adjusted by cycle length and signal spacing. Corresponding vehicle trajectories were collected using a mobile device to illustrate correlation with the signal timing plan, i.e., the time-space diagram. While considered a major step forward in quality of signal timing evaluation, the methodology is still considered as a preliminary framework without an extensive field validation. To adequately address the quality of signal timing aspect, the traffic demand level must be taken into consideration. Other parameters assumed in the methodology also need to be validated through well-defined case studies.

In summary, previous and on-going studies have primarily focused on developing and implementing automated data collection systems for signal performance measurement. Software tools have been developed for identifying common signal operational issues such as split failures and poor efficiency of progression at isolated intersections. On the contrary, methodologies for evaluating the quality of signal timing along arterials are scarce. The lack of such methodologies has already become an obstacle of utilizing the multi-source data to guide signal-retiming work for many agencies.

PROPOSED RESEARCH

CATER has assembled a highly qualified research team to address the various task needs for this research. The ultimate goal is to develop a scoring methodology for assessing the quality of signal timing along signalized arterials. It is envisioned that the methodology will yield an index score based on common performance measures obtained through either probe vehicle travel runs or sensor and timing data from signal controllers. The index will solely reflect the quality of signal timing aspect, suggesting if the signal operations along an arterial, particularly in coordination and progression, are at the optimal level or if there is room for further improvement. This quality of signal timing index provides valuable insights on how much an arterial performance, such as the HCM's Level of Service, is contributed by the signal timing.

The research tasks as well as the plan to complete these tasks are described next. The research plan well demonstrates the knowledge and experience of the research team in each task area.

Task 1. Project Management

The UNR team will work closely with the NDOT project manager to ensure the scope of work and deliverables meet NDOT's needs. A technical panel will be formed to guide the direction of this project. It is very important that the panel includes experienced traffic signal engineers from various jurisdictions in Nevada. Over the years, members of the team have worked closely with major transportation agencies throughout the state on various signal timing related projects, thus the team has initially identified the following candidates to serve on the technical panel. Certainly, additional panel members will be added based on recommendations.

- **Andrew Jayankura** and **Blaine Petersen** from RTC Washoe
- **Kurt Dietrich** from the City of Reno

- **Jim Herman** from the City of Sparks
- **James Jacklett** from Carson City
- **Peter Aiyuk, Denise Inda** and **Rodney Schilling** from NDOT
- **Brian Hoeft**, **David Crisler** and **Gang Xie** from FAST

The technical panel will review project achievements and offer input for the project team. The project team will meet quarterly with the panel to discuss progress and resolve any issues that may arise. A meeting agenda will be prepared before each meeting and meeting minutes will be sent to the panel after each meeting.

Deliverables:

1) Quarterly progress reports
2) Project meeting minutes

Task 2. Comprehensive Literature Review

UNR CATER has performed a preliminary literature review when preparing this proposal. A comprehensive review will be completed to document the state-of-the-art methodologies for performance measurement of arterial signal timing. The literature review will cover the following major topics:

- Current practices of performance measurement of traffic signal timing
- Methodologies for converting performance measures into quality indicators of signal timing
- Data sources used for signal performance measurement

The UNR team will reach out to the agencies that have implemented signal performance measurement systems to gain more knowledge and experience in this subject.

Deliverables:

1) Literature review reports and working papers

Task 3. Selection of Arterials and Data Collection

The UNR team will work with the technical panel to identify at least three arterials (one in northern Nevada and two in southern Nevada) as the case study sites. Ideally, the selected arterials will have different congestion levels and different road properties, such as number of lanes and intersection spacing. Availability of various data sources (e.g., INRIX, PCD) would be another factor when selecting the sites. The UNR team is very familiar with the traffic signal systems in both northern and southern jurisdictions. The Purdue System has been implemented at around 600 signals in the Las Vegas region, however, only two arterials (e.g., Sahara Avenue) have advanced detectors in place to have the capability of reporting PCD. The Purdue System has not yet been implemented in northern Nevada but plans have been made to implement the system at one selected arterial in Reno. INRIX has a good coverage of the

major arterials in Las Vegas and the UNR team has prior experience of using the INRIX data for assessing arterial signal timing improvements.

The UNR team will work closely with the technical panel for the site selection and will work with the local agencies on collecting relevant data. The data to be collected includes, but is not limited to:

- Road properties, such as intersection spacing and speed limits or free-flow speed
- Signal timing plans
- GPS trajectories of travel runs
- Traffic demand and travel time information from INRIX and other data vendors, such as Wave
- High-resolution data from the automatic Purdue signal performance system

Traffic signal timing data are already made available to UNR CATER through VPN access to the central systems. High-resolution data from the Purdue System in Las Vegas is also accessible online, but the UNR team will coordinate with FAST to get access to the raw data for the purpose of data analysis and visualization tool development. UNR CATER also has access to the INRIX system as part of the research agreement with NDOT. GPS trajectories of travel runs along the selected arterials need to be collected by the team. Traffic demand data will be gathered from various sources, including TRINA, recent project reports, and manual data collection.

Deliverables:

1) Selected arterials (at least 3) and associated data

Task 4. Definition of Quality Levels of Arterial Traffic Signal Timing

Quality of signal timing levels will be defined in letter grades A through F, which will be determined by the index score. In order to analyze the various influencing factors, VISSIM traffic simulation will be used as the primary tool. This allows varying traffic demand levels, which would not be possible through just field data. Initial traffic simulation models will be established and calibrated using data from the selected arterials. Simulation scenarios will be created by changing the traffic demands and signal timing plans. For each arterial with the given traffic demand, the UNR team will first optimize the arterial signal timing and suggest its quality as Level A, the best timing possible. The optimized signal timings on different arterials will be presented and reviewed by the technical panel. The signal timing optimized by the team may be adjusted based on panel feedback. The signal timing will not be considered as performance Level A until the panel agrees that it is the best signal timing for the arterial given the specific traffic demand and road properties. The team will then work with the signal timing in simulation, to define the quality levels of B through F. For each quality level, a general definition will be given. The performance levels of arterial signal timing and the definitions will be presented to the technical panel for review and comments. The research team will also consider the ITE forum for a survey about how to define the different performance levels.

Deliverables:

1) Definition of performance levels of arterial traffic signal timing

Task 5. Development of Measurement Function of Arterial Traffic Signal Timing

With the collected data, simulation scenarios, simulation results (speed, delay and stops) and signal performance levels of the selected arterials, the existing CATER scoring function described earlier will be applied to score the performance of each simulation scenario. The scores will be compared to the performance levels graded by the team and the technical panel. Thus, the existing CATER scoring function can be trained by the known input and output (performance levels). Additional factors with strong influence on signal timing performance will be identified by statistical analysis of the training dataset and be added into the function. Parameters will be calibrated and justified by the training dataset with regression analysis. In this task, the developed scoring function for performance measurement of arterial signal timing will be compared with performance measurement of the PCD method and the Orange County index to ensure a certain degree of consistency among different methods.

Deliverables:

1) A scoring function for performance measurement of arterial traffic signal timing

Task 6. Evaluation and Implementation

Two arterials in Nevada, different from the ones used for function development, and two arterials in Arizona will be selected for testing the proposed methodology. This is to ensure practicability and acceptability of the methodology in general applications. There are two particular reasons for selecting testing sites in Arizona. Firstly, it ensures the proposed methodology gains acceptance by other agencies outside of Nevada, implying a broader impact of the research outcome. Secondly, there is on-going collaboration between UNR and Dr. Yao-Jan Wu at the University of Arizona (UA) who is also a team member of this project. The on-going collaboration between UNR and UA involves arterial improvement strategies using multi-source data. In addition to the data mentioned earlier for performance evaluation, UA can also provide probe vehicle data from Bluetooth devices installed along two major arterials in Tucson, AZ. One other unique data source is from Metropia, a navigation mobile app invented by UA that provides high-resolution vehicle trajectories similar to those by Uber and other navigation systems. These additional data will be made available at no cost to this project team.

The UNR team will organize a workshop to introduce the scoring function and performance levels to a group of traffic engineers in Nevada.

Deliverables:

1) Evaluation results on four testing arterials in Nevada and Arizona
2) Finalized definition of performance levels of arterial signal timing
3) Finalized scoring function for performance measurement of arterial signal timing
4) A workshop to introduce the scoring function and performance levels

Task 7. Final Report

A final project report will be prepared to document all the major findings and work from the above tasks and will be submitted to NDOT for review. NDOT's comments on the draft report will be addressed and a comment response summary will be submitted to NDOT with the final report.

Deliverables:

1) Final report

URGENCY AND ANTICIPATED BENEFITS

Improving urban arterial operations through high-quality signal coordination is one of the most cost-effective strategies to reduce travel delay, decrease fuel consumption and air pollution as well as improve intersection safety. Signalized arterials play a decisive role in the overall transportation system's efficiency in Nevada, as they carry nearly 40% of the total VMTs nowadays. Efficient arterial operations could not be achieved without the signal timing being set and maintained at their optimal level. Currently, many urban arterials in Nevada are not operating at their optimal level due to resource constraints and are costing travelers millions of dollars each year in wasted time and fuel. The lack of performance measure evaluation methodology also results in the inefficient management of our limited resources. Poor signal operations could be substantially improved by introducing proposed methodologies in this project to identify and report problems to engineering staff. It is very timely as NDOT and other states are determined to move forward with establishing statewide transportation system performance measures beyond financial constraints.

IMPLEMENTATION PLAN

The proposed research falls under the Stage 5 of research deployment: "Specification & Standards with Full Corporate Deployment Stage". The project deliverables are ready for use at NDOT and no institutional, political, or socio-economic barriers to implementation are seen at this stage. The performance levels of arterial signal timing and the score function can be directly applied for the automatic performance measurement in Nevada. The research results can be used by the state and local traffic agencies to evaluate existing arterial signal timing, select signal timing projects and estimate performance of new signal timing. The implementation would require close collaboration with local agencies that maintain the signal systems.

PROJECT SCHEDULE

The proposed project is planned to start on Oct. 1, 2017 and end on Sep. 30, 2019 for a total of 24 months. A preliminary schedule for the major research tasks is shown in Table 1.

Table 1. Schedule of Major Tasks

Performance Measurement of Traffic Signal Timing for Arterial Operation																								
TASKS	START	MONTH	2017			2018											2019								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Task 1 Project mangement	1	24																								
Task 2 Comprehensive literature review	1	2																								
Task 3 Selection of arterials and data	3	2																								
Task 4 Definition of quality levels	5	5																								
Task 5 Development of a score function	10	6																								
Task 6 Evaluation and implementation	16	6																								
Task 7 Final report	22	3																								

FACILITIES AND EXPERTISE

Facilities that will be required for completing this project include field data collection devices, computers, data extraction and analysis software packages. The Center for Advanced Transportation Education and Research (CATER) at UNR has an advanced Transportation Laboratory that is equipped with all the necessary technology for conducting this research.

CATER has assembled a uniquely qualified team that can fulfill all of the requirements to conduct the research. This is shown by thorough understanding of traffic signal timing performance. Dr. Zong Tian, Professor and Center Director of UNR CATER, will serve as the Principal Investigator (PI) of the project and Dr. Hao Xu of UNR will serve as the Co-Principal Investigator. Dr. Yao-jan Wu from the University of Arizona, Tucson will serve as a key researcher through a subcontract.

Dr. Zong Tian of UNR has served as PI on numerous research projects with total funding of more than $10 million. He has over 80 referred journal and conference publications, with the majority in the areas of traffic signal control and highway capacity analysis. He is a member of two TRB committees: the Traffic Signal Systems Committee and the Highway Capacity and Quality of Service Committee. He also serves as the chair of the Urban Traffic Control Group under the World Conference on Transport Research Society (WCTRS), where he has helped bring international perspectives to innovative signal design and control, which could be used to improve U.S. practices.

Dr. Hao Xu's recent research are in the areas of Roadside LiDAR for traffic safety and mobility, vehicle operation cost evaluation, driving behavior analysis and modeling, connected-vehicle applications, and data-driven traffic safety analysis. All these areas are closely related to this project. Dr. Xu has managed approximately $2,300,000 research projects as PI or Co-PI, and has published extensively with findings from the projects. Dr. Xu is a registered professional engineer in Nevada. He has been actively involved in TRB traffic safety and ITS related committees, and is the invited member of the Traffic World Conference on Transport Research Society (WCTRS). Dr. Xu keeps close collaboration relationships with local transportation agencies including NDOT, the Washoe RTC and the City of Reno. He has been collaborating with multidisciplinary researchers on autonomous/connected vehicles, cybersecurity of

transportation systems and smart cities. He was a key team member in the City of Reno's proposal for the USDOT Smart Cities Challenge.

Dr. Yao-jan Wu has more than 16 years of experience in Intelligent Transportation Systems (ITS), traffic operations and safety research. He is also a national expert of traffic detection and sensor technologies, and big data analytics. Dr. Wu has published 36 peer-reviewed journal papers and more than 40 conference papers. He has presented his research findings more than 40 times at national and international conferences, and at invited speaker events. Dr. Wu's research highlights a strong connection between information technology (IT) and traditional transportation research. His research broadly covers four major fields: 1) traffic safety (e.g., accident modeling and analysis, and advanced safety vehicles), 2) intelligent transportation systems (e.g., development of advanced traffic detection technology, sensor data quality control, and computer vision applications), 3) large-scale network analyses (e.g., online data management and analysis systems, performance measurement and traveler behavior analysis) and 4) sustainable transportation planning & transit.

BUDGET

The budget for completing all the research tasks is estimated to be $272,986 for the planned 24-month project term. The budget includes the salaries of professors (Dr. Zong Tian and Dr. Hao Xu), a Letter of Appointment (LOA) researcher and two graduate students who will work on this project. Tuition of the graduate students is also included. A subcontract of $11,000 is planned for Dr. Yao-jan Wu with the University of Arizona, who will evaluate the developed performance function on arterials in Arizona and provide feedback of the function performance. Travel budget was planned for travels of data collection and meeting with technical panel members in southern Nevada. The operating cost is budgeted for preparation of the final report and all deliverables. The details of the budget are shown in Table 2.

PROJECT CHAMPION

Peter Aiyuk, P.E.
Performance Analysis Chief
Nevada Department of Transportation
1263 S. Stewart St.
Carson City, NV 89712
(775) 888-7192

Table 2. BUDGET ITEMIZATION FOR DEPARTMENT RESEARCH PROJECTS

Project Title: Driver Compliance and Effectiveness of Rectangular Rapid-Flashing Beacons in Nevada
Project Duration: 24 Months

Name	Position	% Fringe Benefit	Total Fringe Benefit	Salary or Wage	Monthly % Salary or Hours	Total Monthly Wage	Total Year 1
Zong Tian	Professional	4%	$635	$15,875	100%	$15,875	$16,510
Hao Xu	Professional	4%	$422	$10,558	100%	$10,558	$10,980
TBD	LOA	10%	$1,680	$16,800	1200%	$1,400	$18,480
TBD (2)	Graduate	16%	$7,296	$45,600	2400%	$1,900	$52,896
Year 1 Total			$10,033	$88,833		$29,733	$98,866

Name	Position	% Fringe Benefit	Total Fringe Benefit	Salary or Wage	Monthly % Salary or Hours	Total Monthly Wage	Total Year 1
Zong Tian	Professional	4%	$635	$15,875	100%	$15,875	$16,510
Hao Xu	Professional	4%	$422	$10,558	100%	$10,558	$10,980
TBD	LOA	10%	$1,680	$16,800	1200%	$1,400	$18,480
TBD (2)	Graduate	16%	$7,296	$45,600	2400%	$1,900	$52,896
Year 2 Total			$10,033	$88,833		$29,733	$98,866

	Year 1	Year 2	Year 3
A. Personnel	$98,866	$98,866	$
B. Travel	$3,000	$3,000	$
C. Operating Costs	$0	$300	$
D. Final Report Preparation and Submission	$0	$0	$
E. Equipment	$0	$0	
F. Other Costs	$0	$0	$
G. Subtotal of Direct Costs (sum of A thru F)	$101,866	$102,166	**$**
H. Total Indirect Cost (% of F at current rate of 23% for UNR and UNLV)	$23,429	$26,028	**$**
I. Student Tuition and Fees	$4,248	$4,248	$
J. Contractor >$1,000.00 (Chris Cunninghan)	$0	$11,000	$
K. TOTAL PROJECT COSTS PER YEAR (sum of F thru I)	$129,544	$143,443	$
TOTAL PROJECT COST			**$272,986**

REFERENCES

1. Denney Jr, R. W. (2009). *Improving Traffic Signal Management and Operations: A Basic Service Model (No. FHWA-HOP-09-055).*
2. Balke, K. N., Charara, H. A., & Parker, R. (2005). *Development of a traffic signal performance measurement system (TSPMS)* (No. FHWA/TX-05/0-4422-2). Texas Transportation Institute, Texas A & M University System.
3. Day, C. M., Smaglik, E. J., Bullock, D. M., & Sturdevant, J. R. (2008). *Real-Time Arterial Traffic Signal Performance Measures*. Publication FHWA/IN/JTRP-2008/09. Joint Transportation Research Program, Indiana Department of Transportation and Purdue University, West Lafayette, Indiana, 2008. doi: 10.5703/1288284313439.
4. Day, C. M., Haseman, R., Premachandra, H., Brennan Jr, T. M., Wasson, J. S., Sturdevant, J. R., & Bullock, D. M. (2010). *Visualization and assessment of arterial progression quality using high-resolution signal event data and measured travel time*. Transportation Research Record.
5. Day, C. M., Bullock, D. M., Li, H., Remias, S. M., Hainen, A. M., Freije, R. S. & Brennan, T. M. (2014). *Performance measures for traffic signal systems: An outcome-oriented approach. Retrieved from* http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1002&context=jtrpaffdocs
6. Day, C. M., Bullock, D. M., Li, H., Lavrenz, S. M., Smith, W. B., & Sturdevant, J. R. (2016). *Integrating Traffic Signal Performance Measures into Agency Business Processes. Retrieved from* http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1023&context=jtrpaffdocs
7. Day, C. M. (2010). *Performance-based management of arterial traffic signal systems.* Report NCHRP Project 3-79a, Purdue University.
8. NCHRP 03-122 (2016). *Performance-Based Management of Traffic Signals. Project introduction. Retrieved from* http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3985.
9. Orange County Transportation Authority. (2015). Corridor Operational Performance Report. *Retrieved from* http://www.iterisprojects.com/octec/downloads/OCTA.pdf

Multi-Source Data for Arterial Signal Performance Measures

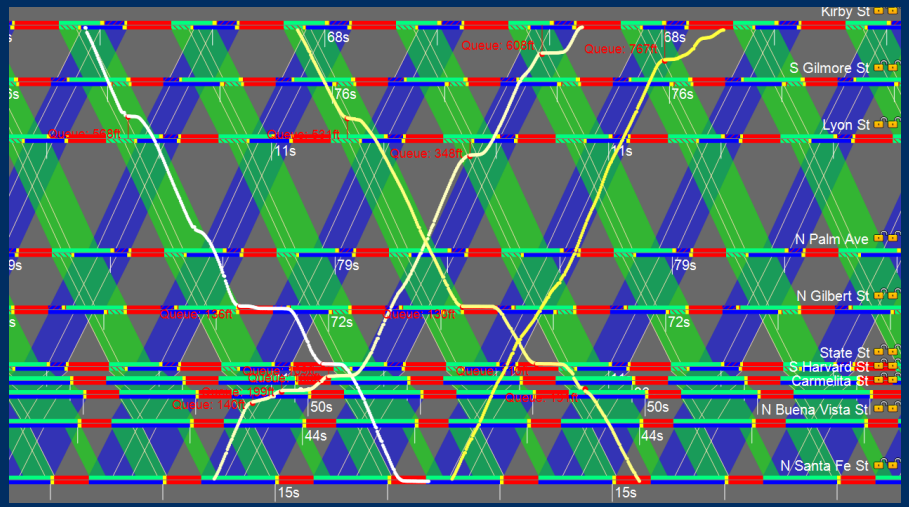
Zong Z. Tian, Ph.D., P.E.

Center for Advanced Transportation Education and Research (CATER)

University of Nevada, Reno

Outline

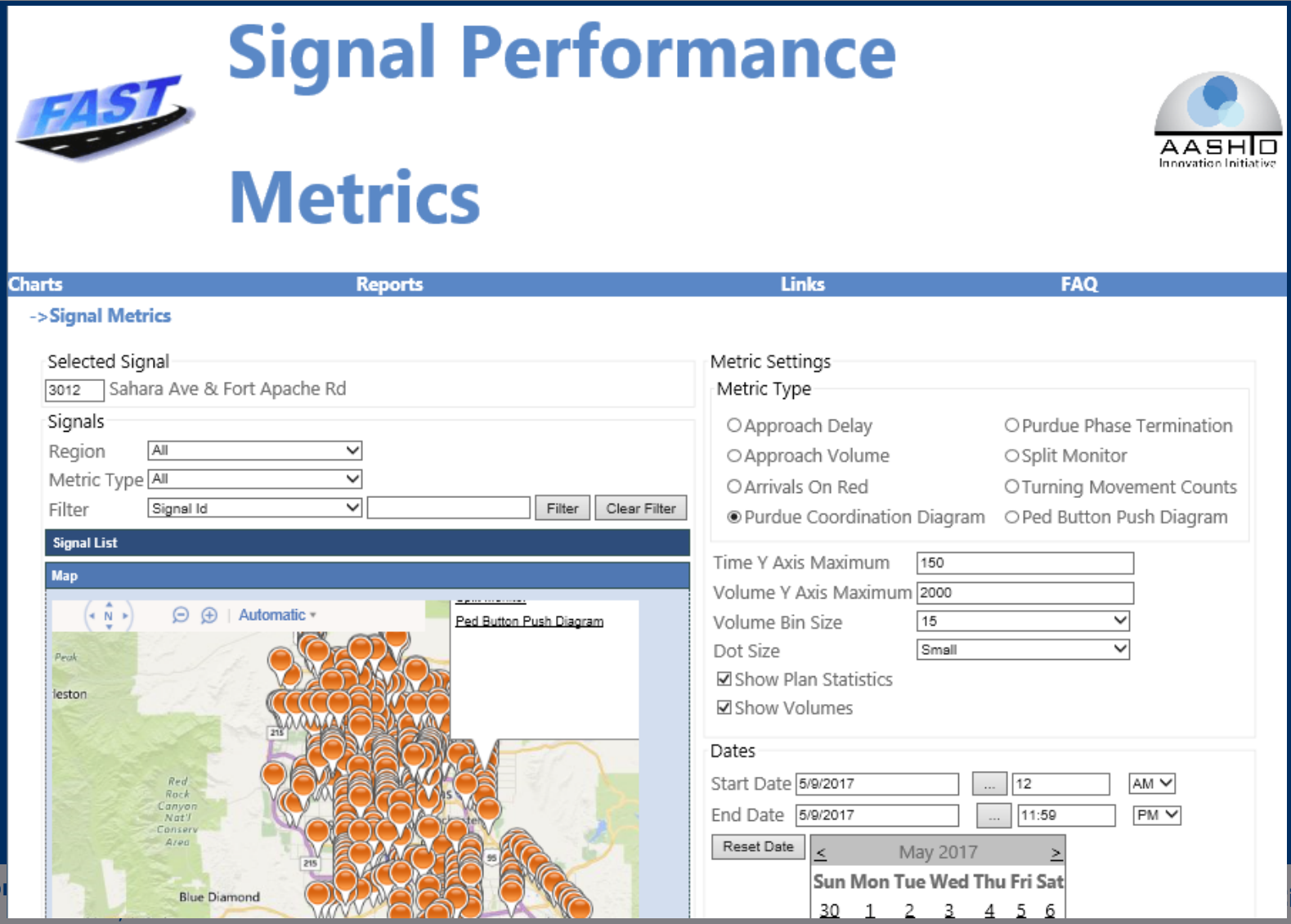
- Multi-Source Data: Purdue, UNR, INRIX
- Case of Flamingo Rd, Las Vegas
- Other Signal Timing Projects



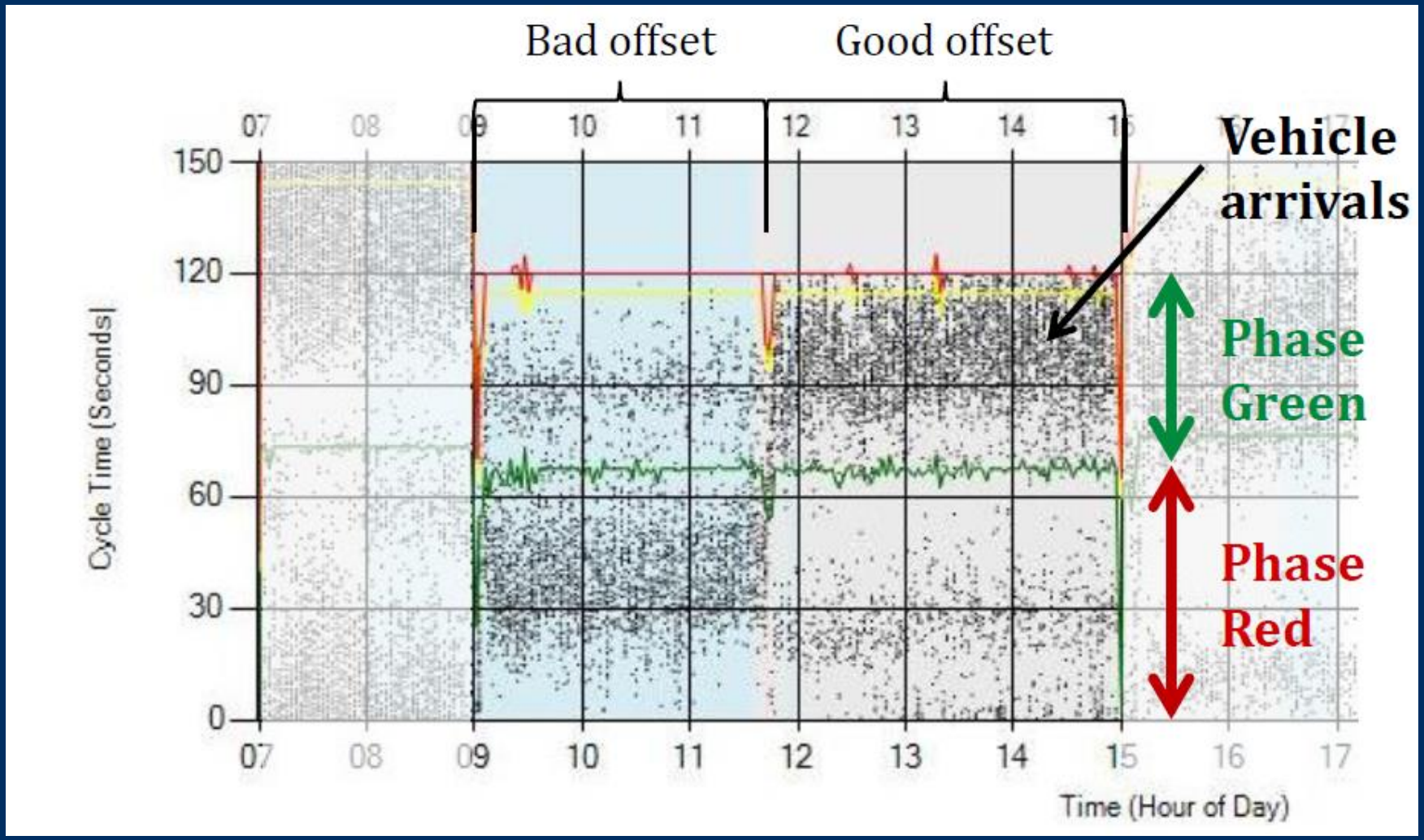
About Performance Measures

- PMs tell us how we are doing or how well we have done
- PMs DO NOT tell us how to do better
- Freeway operation and its PM are relatively more mature compared to arterials
- Arterial performance is largely dependent on the quality of signal operations
- No established PMs yet on signal operations

Purdue's Automated SPMs



Purdue's Automated SPMs



Orange County's CSPI

- Measures of Effectiveness (MOEs)
  - Average Speed (S)
  - Green per Red (GpR)
  - Stops per Mile (SpM)
- Performance index (PI)

PI = 1.5*(S - 10) + GpR*8 + 40 - SpM*10

= 1.5*(30-10)+4*8+40-1*10

= 92

OCTA's CSPI

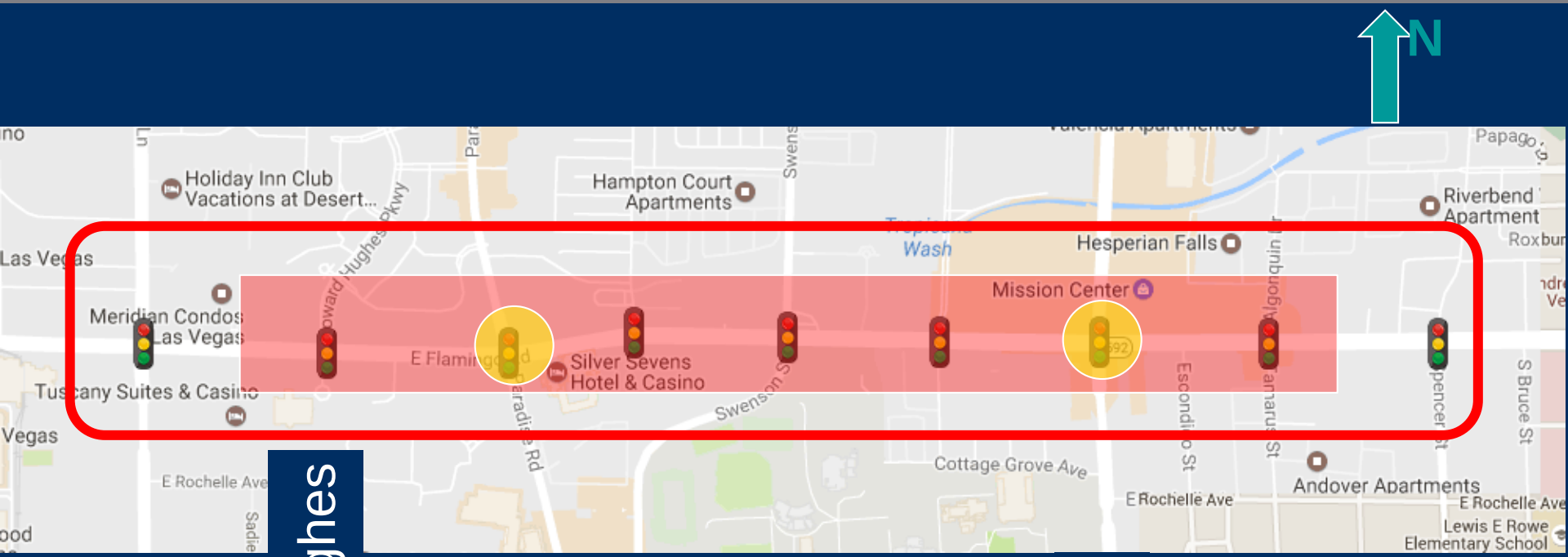
CSPI Score	Signal Synchronization Description	Level
>=80	Very good progression – traveling through signalized intersections with minimal stops and favorable travel speeds.	Tier 1
70-80	Good progression – traveling through signalized intersections with few stops and good travel speeds.	Tier 2
60-70	Fair progression – traveling through signalized intersections with moderate stops and fair travel speeds.	Tier 3
50-60	Limited progression* – traveling through signalized intersections with moderately high stops and slower travel speeds.	Tier 4
< 50	Very limited progression* – traveling through signalized intersections with frequent stops and slow travel speeds.	Tier 5

INRIX

Speed for FLAMINGO RD between Koval Ln and S Eastern Ave using INRIX data
February 01, 2017 through February 07, 2017

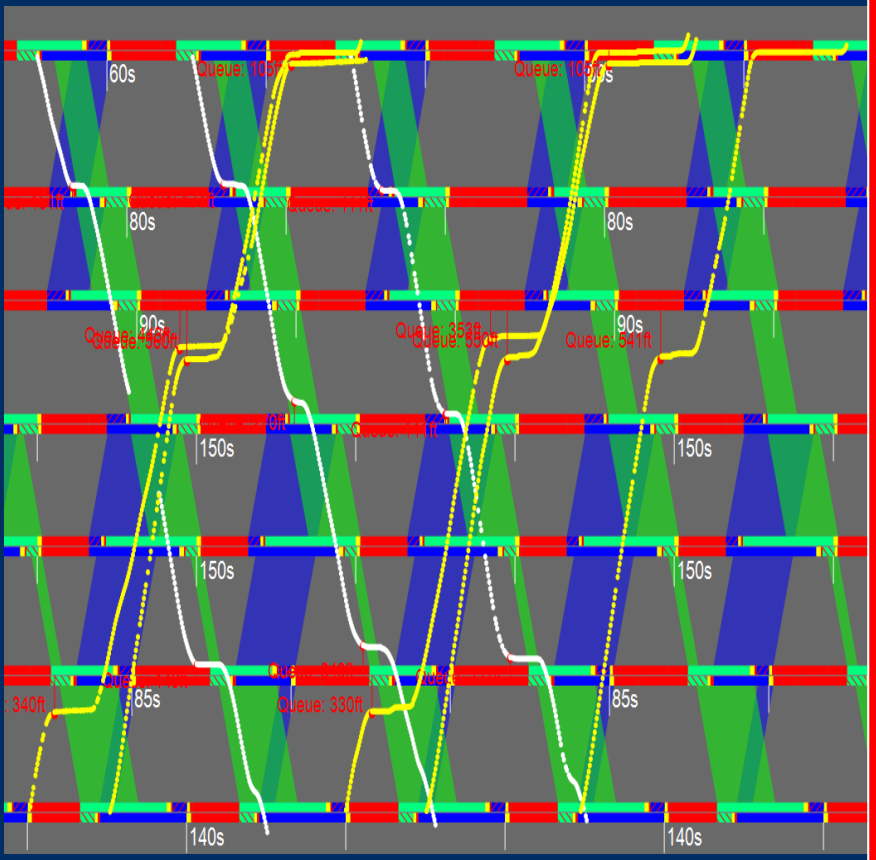
TMC CODE	NAME	MILES	12:00 AM	12:15 AM	12:30 AM	12:45 AM	1:00 AM
106-08455	S EASTERN AVE	1.01141	27.88	29.56	25.6	26.69	29.57
106N08455	S EASTERN AVE	0.01206	16.32	18.09	17.36	15.67	19.23
106-08454	SPENCER ST	0.51619	21.91	25.3	25.31	26.02	26.16
106-08453	S MARYLAND PKWY	0.5149	20.57	22	24.19	26.06	23.1
106N08453	S MARYLAND PKWY	0.00831	10.21	16.77	19.96	19.02	13.63
106-08452	SWENSON ST	0.46809	24.04	21.29	16.96	20.88	23.73
106N08452	SWENSON ST	0.00659	19.82	21.06	14.91	21.87	18.45
106-08451	PARADISE RD	0.42115	22.17	19.33	17.76	20.68	20.5
106N08451	PARADISE RD	0.01018	15.32	18.43	12.88	15.61	16.79
106-08450	KOVAL LN	0.54866	16.28	16.45	18.34	19.45	18.42
106N08450	KOVAL LN	0.00989	14.01	8.57	6.93	8.28	18.84

Case Example
Flamingo Rd, Las Vegas

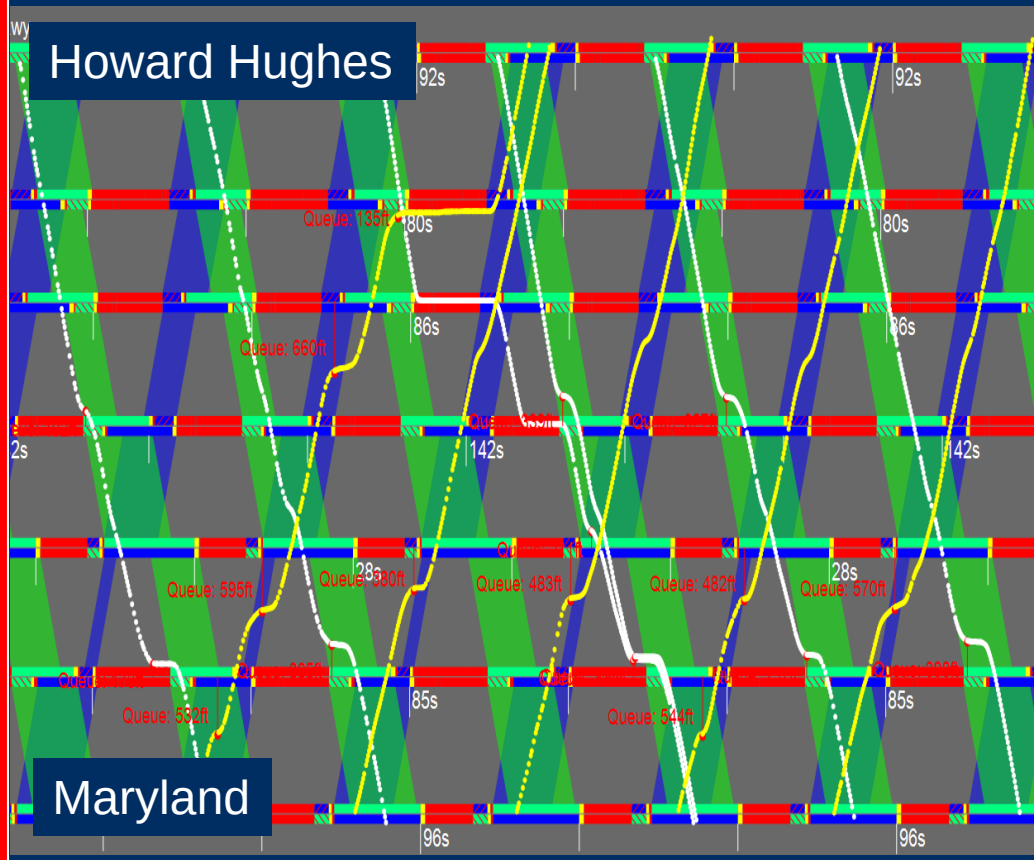


UNR TranSync Data

Before



After



UNR Performance Index

Before

Corridor Synchronization Performance Index

Summary

Arterial: Flamingo Training

Timing	No. of Runs	Average Speed Score	Average Stop Score	Average Score	Quality of Signal Timing
MD (Avg)	8	53	57	54	F
MD (WB)	5	50	37	39	F
MD (EB)	3	58	89	78	C+

After

Corridor Synchronization Performance Index

Summary

Arterial: Flamingo Training

Timing	No. of Runs	Average Speed Score	Average Stop Score	Average Score	Quality of Signal Timing
MD-UNR2 (Avg)	11	65	85	77	C+
MD-UNR2 (WB)	5	64	86	77	C+
MD-UNR2 (EB)	6	66	85	77	C+

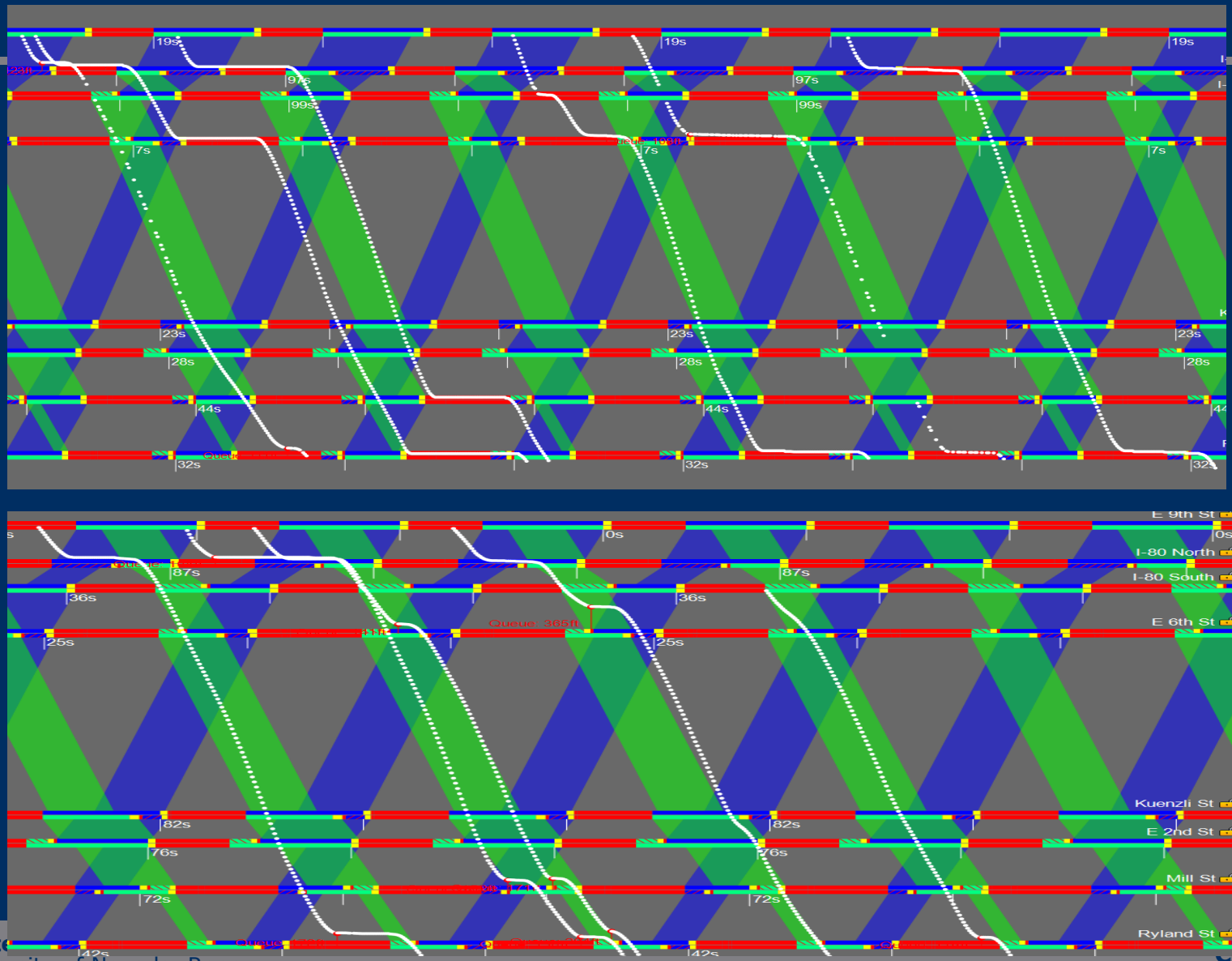
TranSync Demo

Flamingo Rd – Las Vegas

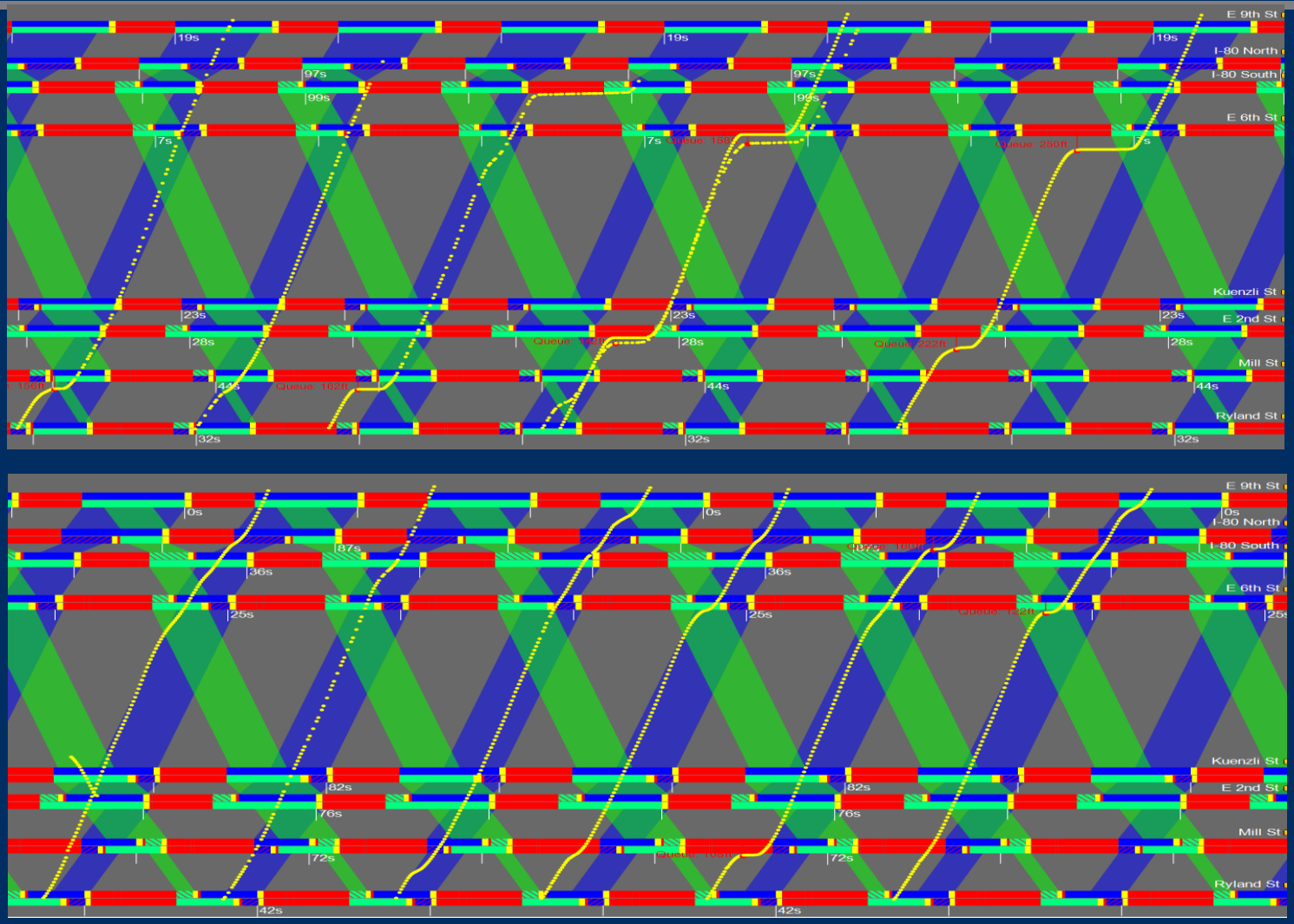
Caltrans D8 – LT Gap out

Caltrans D8 – Preemption

Wells Avenue (MD)



Wells Avenue (MD)



Wells Avenue Re-timing Benefits

- The travel time savings per day is about **244** hours.
- The fuel savings per day is about **285** gallons.
- The average annual savings per traveler is about **$68**.
- The total annual savings in both delay and fuel is about **$1.5 million**.
- The benefit-cost ratio for one year of operation is about **62.5 to 1**.

Summary

- Automated SPMs is a future trend and will change the way we do signal timing.
- Much needs to be done beyond SPMs and improving signal operations is the goal.
- Signal timing plans must be adequately developed and maintained for optimal performance.

Carson Area Metropolitan Planning Organization
C A M P O

STAFF REPORT

Report To: The Carson Area Metropolitan Planning Organization (CAMPO)

Meeting Date: April 11, 2018

Staff Contact: Lucia Maloney, Transportation Manager

Agenda Title: (**Informational**) To conduct a public hearing and accept public comment on the Draft FY 2019-2020 Unified Planning Work Program (UPWP).

Staff Summary: Staff has developed a UPWP for fiscal years 2019 and 2020 (July 1, 2018 – June 30, 2020). The UPWP establishes the budget for proposed CAMPO activities and describes how federal Consolidated Planning Grant (CPG) funds will be administered during the 2019 and 2020 fiscal years.

Agenda Action: Other/Presentation **Time Requested:** 15 minutes

---

Proposed Motion
N/A

Background/Issues & Analysis
CAMPO receives annual funding from the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) for regional transportation planning activities. The FHWA funding is from the metropolitan planning program and the FTA funds are allocated from Section 5303 metropolitan planning program (also referred to as 5305(d) from more recent federal legislation). These two funding sources are combined as Consolidated Planning Grant (CPG) funds, used to reimburse MPO staff, at a rate of 95%, for eligible activities consistent with an approved Unified Planning Work Program (UPWP). The CPG funds are allocated to CAMPO based on an agreed distribution formula between NDOT and Nevada's three other MPOs.

Prior to 2017, CAMPO had previously submitted a single-year UPWP in advance of each fiscal year. However, CAMPO is currently completing its first successful two-year FY 2017-2018 UPWP, during which the region has seen the value and benefit of a longer-term planning document. These benefits include the ability to undertake more significant work tasks within an appropriate time frame and to better coordinate related work tasks.

Although CAMPO may approve and submit a two-year document, it is not allowed to charge for tasks or be reimbursed for any Federal funding beyond what was obligated in a given fiscal year.

CAMPO's Public Participation Plan requires a 30-day public comment period before the draft UPWP document may be approved. The 30-day public comment period opened on March 26, 2018 and will close end of day, April 24th. Notice of the public comment period and CAMPO's April 11th public hearing were published in the Record Courier on Friday March 23rd and the Nevada Appeal on Sunday March 26th. Public comments are accepted in person at the April 11th CAMPO meeting and throughout the public comment period via the following options:

Mail or In Person:	Carson Area Metropolitan Planning Organization, 3505 Butti Way, Carson City, NV 89701
Phone:	775-887-2355
E-mail:	Comments@CarsonAreaMPO.com

Applicable Statute, Code, Policy, Rule or Regulation
N/A

Financial Information
Is there a fiscal impact? ☒ Yes ☐ No

If yes, account name/number: See explanation below.

Is it currently budgeted? ☒ Yes ☐ No

Explanation of Fiscal Impact: The 2019 fiscal year proposed UPWP budget is for $382,050. This is reimbursable by Federal Consolidated Planning Grant (CPG) funds at a rate of 95%. For fiscal year 2019, the 5% local match is approximately $19,103, which will be split among the three member counties of Carson City, Douglas County, and Lyon County.

Alternatives
N/A

Supporting Material
-Draft FY2019/FY 2020 Unified Planning Work Program

Carson Area Metropolitan Planning Organization

Fiscal Years 2019-2020: July 1, 2018 – June 30, 2020

DRAFT UNIFIED PLANNING WORK PROGRAM

Final Approval: [DATE]

Contact Information:
Carson Area Metropolitan Planning Organization
3505 Butti Way
Carson City, NV 89701
Office: (775) 887-2355
Email: CarsonAreaMPO@Carson.com
www.carson.org

This report was funded in part through grants from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation and member agencies, including Carson City, Douglas County, and Lyon County. The views and opinions of the Carson Area Metropolitan Planning Organization expressed herein do not necessarily state or reflect those of the U.S. Department of Transportation. Carson Area Metropolitan Planning Organization fully complies with Title VI of the Civil Rights Act of 1964 and related statutes and regulations in all programs and activities. The Carson Area MPO does not discriminate on the basis of race, color, national origin, sex, religion, age or disability in the provision of services. This document can be made available in alternative formats. For more information please contact the Carson Area MPO at (775) 887-2355 or CarsonAreaMPO@Carson.com.

This page intentionally left blank for two-sided printing.

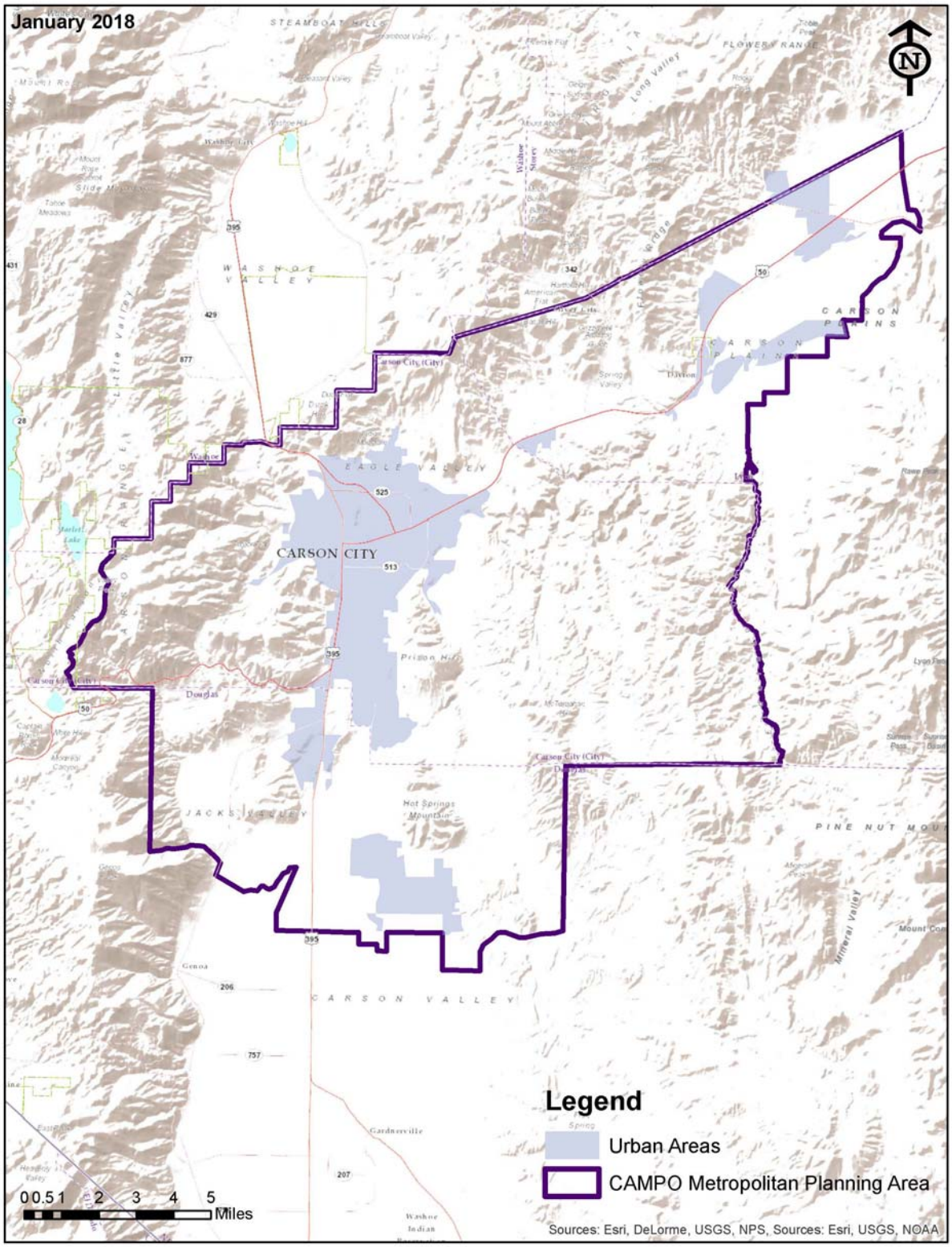
Carson Area Metropolitan Planning Organization
FY 2019 and FY 2020 CAMPO Unified Planning Work Program
Table of Contents

This page intentionally left blank for two-sided printing.

1.0 Introduction

The Unified Planning Work Program defines the continuing, comprehensive, and cooperative regional transportation planning process for the Carson Area Metropolitan Planning Organization (CAMPO) planning area. It establishes regional planning objectives for Fiscal Years 2019/2020 covering the period of July 1, 2018 through June 30, 2020 and includes a corresponding budget to complete the work. This strategic management tool is organized by Work Elements that identify activities and products to be accomplished during the two-year period. These activities include core metropolitan planning functions, mandated metropolitan planning requirements, and other regional planning activities. As detailed in 23 CFR 450.308, each activity listed in the UPWP must indicate who will do the work, the schedule for completing the work, the resulting product, the proposed funding, and a summary of total amounts and sources of Federal and matching funds. Funding for metropolitan planning activities is made possible through the U.S. Department of Transportation – both the Federal Highway Administration and the Federal Transit Administration – and through the three local entities – Carson City, Douglas County, and Lyon County. Figure 1.1 depicts the CAMPO Metropolitan Planning Area.

Figure 1.1 CAMPO Metropolitan Planning Area



1.1 Organization Overview

A Metropolitan Planning Organization is an organization of local governments in areas with a collective population of 50,000 or over, termed an Urbanized Area. As a condition for receiving Federal transportation dollars, MPOs must have a continuing, cooperative, and comprehensive transportation planning process in cooperation with the State. The MPOs are to cooperate with the State in developing transportation plans and programs for urbanized areas. This transportation planning process results in plans and programs consistent with the area's locally adopted comprehensive plans. On December 4, 2015, the Fixing America's Surface Transportation (FAST) Act was signed into law, reaffirming the role of MPOs. This is a five-year transportation bill which extends most of the provisions in the previous two-year bill, Moving Ahead for Progress in the 21st Century Act (MAP-21).

What is the Carson Area Metropolitan Planning Organization?

In 2002, the US Census Bureau announced the release of the Carson City Urbanized Area geography (according to the 2000 Census), with a population that had surpassed the threshold of 50,000. The urbanized area consists of Carson City, as well as the adjacent, relatively densely inhabited portions of Douglas and Lyon Counties. As a result of surpassing the population criteria of 50,000, the area was required to form a Metropolitan Planning Organization for its transportation planning and programming activities. The Nevada Governor, in accordance with Federal regulations, designated the Carson Area Metropolitan Planning Organization (CAMPO) as a newly formed MPO in the State of Nevada. In 2012, the Census Bureau updated the urbanized area boundaries based on data collected during the 2010 Census, though changes were minor.

CAMPO carries out transportation planning activities within the Metropolitan Planning Area (MPA), shown on Figure 1.1. The MPA encompasses the urbanized area and a larger area that is likely to continue to urbanize within the next 20 years. Currently, there are two urban clusters, as defined by the US Census Bureau, within the MPA. They are the Johnson Lane area in Douglas County and Dayton in Lyon County.

Carson City Public Works staff serves as support staff to CAMPO. There are five staff members that carry out the daily operations and they include the Transportation Manager, Senior Transportation Planner, Transportation Planner, Transit Coordinator, and Bicycle and Pedestrian Coordinator. In addition, CAMPO utilizes Geographic Information Systems (GIS) staff on occasion for geographic analyses, the production of various maps, and other related tasks.

Carson City operates a transit system within the CAMPO planning area. Additionally, through an agreement with RTC Washoe, Carson City provides partial funding for an intercity transportation service based in Reno that operates within the CAMPO planning area. The representation on the MPO Policy Board from Carson City also represents the interests of the transit system.

1.2 CAMPO Policy Board and Staff

CAMPO's Policy Board is comprised of seven (7) members including the five (5) members of the Regional Transportation Commission of Carson City as appointed by the Carson City Board of Supervisors, one representative from Douglas County appointed by the Douglas County Board of Commissioners, and one

representative from Lyon County appointed by the Lyon County Board of Commissioners. A representative from the Nevada Department of Transportation also serves as an ex-officio, non-voting member.

Table 1.1 CAMPO Policy Board

Member	Governmental Body Represented
Mr. Brad Bonkowski, Chairperson	Carson City
Ms. Lori Bagwell, Vice-Chairperson	Carson City
Mr. Don Alt	Lyon County
Mr. Mark Kimbrough	Carson City
Mr. Chas Macquarie	Carson City
Mr. Barry Penzel	Douglas County
Ms. Sondra Rosenberg*	Nevada Department of Transportation
Mr. Greg Stedfield	Carson City

*Non-Voting ex-officio member

Additionally, CAMPO staff works closely with the CAMPO Policy Board for development of the UPWP and to carry out related tasks. All tasks identified in the UPWP are undertaken by staff with periodic updates to the CAMPO Policy Board.

Table 1.2 CAMPO Staff

Staff Member	Title
Mrs. Lucia Maloney, PMP	Transportation Manager
Mr. Dirk Goering, AICP	Senior Transportation Planner
Ms. Hailey Lang	Transportation Planner
Ms. Cortney Bloomer	Bicycle and Pedestrian Coordinator
Mr. Graham Dollarhide	Transit Coordinator

1.3 Responsibilities and Priorities

The primary responsibility of CAMPO is the continued, cooperative, and comprehensive planning process; to provide for consideration and implementation of projects, strategies, and services that address the following factors:

- Increase the safety of the transportation system for motorized and non-motorized users
- Maintain a sustainable regional transportation system
- Increase the mobility and reliability of the transportation system for all users
- Maintain and develop a transportation system that supports economic vitality
- Provide an integrated transportation system

1.4 Organizational Procedures and Documents

The following list of documents includes organizational policies and procedures, programming documents, transportation planning studies, and other required documents, which are available on CAMPO's website: www.CarsonAreaMPO.com.

- CAMPO Policies & Procedures
- CAMPO Public Participation Plan
- CAMPO FFY 2018-2021 Transportation Improvement Program
- CAMPO Unified Planning Work Programs
- CAMPO Pedestrian Safety Guidelines
- Carson City Freeway Corridor Multi-Use Path Alignment Studies
- CAMPO Fare & Service Change Policy
- Notice of Protection Under Title VI
- CAMPO Disadvantaged Business Enterprise (DBE) Program
- CAMPO Disadvantaged Business Enterprise (DBE) FFY 2014-16 Goal
- CAMPO Complete Streets Performance Monitoring Program
- FFY 2017 Annual Obligation Report
- CAMPO Travel Demand Model Validation Report 2015
- CAMPO Bicycle Friendly Community Report Card 2014
- CAMPO Regional Transportation Plan

1.5 Public Involvement

Public involvement is a critical component of the MPO transportation planning process and the development of plans, programs, and policy. CAMPO's regional transportation planning program establishes an important forum for discussing and resolving regional transportation issues. Some examples of executing the continuing, comprehensive, and cooperative planning process include board meetings, public workshops, technical advisory committees, project- and issue-specific meetings, public hearings, and formal public document review periods. Specific policies and procedures for public involvement have been developed and are contained within CAMPO's *Public Participation Plan (PPP)* available on the CarsonAreaMPO.com website. The PPP emphasizes efforts to coordinate with and involve all stakeholders and members of the public in the transportation planning process, including development of this Unified Planning Work Program.

The CAMPO region is also home to the Washoe Tribe of Nevada. CAMPO staff conducts government-to-government communication with the Washoe Tribe to consider tribal needs in the planning and programming process.

2.0 Summary of FY 2017 & FY 2018 Accomplishments and Work Efforts

In working with the U.S. Department of Transportation (U.S. DOT) and Nevada Department of Transportation (NDOT), it was determined that CAMPO would develop a two-year UPWP for the first time for FY 2017 and FY 2018. This allowed greater flexibility for CAMPO and its planning partners to complete more significant work tasks within a reasonable timeframe, and to better coordinate work tasks with the funding cycle. A two-year work program does not mean that two years' worth of funding is available in the first year. CAMPO cannot, and did not, seek reimbursement of funds in advance of obligation.

The following are the primary tasks that were undertaken during FY 2017 and FY 2018:

- *South Carson Street Complete Streets Study* – Staff worked with a consultant to help guide the vision for South Carson Street from Fifth Street to the I-580/Spooner Junction intersection. This is one of the primary travel corridors within the CAMPO area.
- *Travel Demand Model Update* – CAMPO staff hired a consultant team to update the travel demand model in anticipation of the next Regional Transportation Plan (RTP) update and in response to planning and/or completion of several major projects that will have a significant impact on the CAMPO region, including: completion of the Carson City Freeway, completion of the Downtown Carson Complete Street project, and further development of the Tahoe Reno Industrial Center (TRIC).
- *2017 Carson City Pavement Survey* – Carson City's roadway network was inventoried and the pavement conditions were reassessed in partnership with a contractor. This practice is performed every couple of years to strengthen the existing database and track historical benchmarks to provide a more robust analysis of pavement maintenance needs. This process ensures the most informed and efficient decisions are being made to address pavement health.
- *2017 Jump Around Carson (JAC) Transit User Survey* – This survey identified needs and concerns of the existing ridership base. Feedback received provided staff direction on what is working well with the system and where improvements can be made to better serve riders.
- *Adoption of Federally-Required Performance Measures and Targets* – On December 4, 2015, the Fixing America's Surface Transportation (FAST) Act was signed into law. In partnership with State and Federal planning partners, as well as fellow MPOs, staff continued to develop federally-mandated performance measures and targets, including adoption of Transit Asset Management (TAM) and Safety performance measure targets.
- *Transportation Improvement Program (TIP) Activities* – The TIP includes a four-year list of projects and is consistent with all Federal planning regulations. All federally funded projects must be included in the TIP. CAMPO staff worked updated the TIP, resulting in adoption of the FFY 2018-2021 TIP. Regular maintenance of the document was required through formal and administrative amendments.
- *Collection of Baseline Complete Streets Performance Information* – CAMPO began collection of baseline performance information, used to evaluate and monitor the performance of Complete Streets measures. Staff collected data on the Downtown Carson Complete Streets project and other key corridors throughout Carson City to understand changes or trends as a result of implementation of the City's Complete Streets Monitoring Program and Complete Streets Policy.
- *Ongoing MPO Activities* – These tasks included general administration, MPO representation, public participation efforts, regional consistency review, training, and UPWP development.

3.0 Federal Planning Emphasis Areas/FAST Act Planning Factors

The Federal Highway Administration (FHWA), in consultation with the Federal Transit Administration (FTA), develops Planning Emphasis Areas (PEAs) to promote policy, procedural, and technical topics that

are to be considered by metropolitan planning organizations in preparation of work plans. The PEAs address a mix of planning issues and priority topics identified as requiring additional focus by MPOs. In addition to PEAs, the FAST Act expanded the scope of factors to consider in the transportation planning process. The sections below introduce PEAs and the FAST Act Planning factors and discuss how both are addressed across work elements in the UPWP.

3.1 Federal Planning Emphasis Areas

In 2014, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) issued a statement encouraging MPOs to give priority to certain planning emphasis areas when updating their unified planning work programs. The three planning emphasis areas described below are FAST Act Implementation (recently updated from MAP-21), Regional Models of Cooperation, and Ladders of Opportunity.

MAP-21/FAST Act Implementation - Transition to Performance Based Planning and Programming. The development and implementation of a performance management approach to transportation planning and programming that supports the achievement of transportation system performance outcomes.

Models of Regional Planning Cooperation - Promote cooperation and coordination across MPO boundaries and across State boundaries where appropriate to ensure a regional approach to transportation planning. Coordination across MPO and across State boundaries includes the coordination of transportation plans and programs, corridor studies, and projects across adjacent MPO and State boundaries. It includes collaboration among State DOT(s), MPOs, and operators of public transportation on activities such as: data collection, data storage and analysis, analytical tools, and performance based planning.

Ladders of Opportunity - Access to essential services - as part of the transportation planning process identify transportation connectivity gaps in access to essential services. Essential services include housing, employment, health care, schools/education, and recreation. This emphasis area could include MPO and State identification of performance measures and analytical methods to measure the transportation system's connectivity to essential services and the use of this information to identify gaps in transportation system connectivity that preclude access of the public, including traditionally underserved populations, to essential services. It could also involve the identification of solutions to address those gaps.

3.2 FAST Act Planning Factors

The metropolitan transportation planning process specified by the FAST Act and the implementing regulations contained in Title 23 Part 450 of the Code of Federal Regulations (CFR) requires CAMPO to maintain a cooperative, continuous, and comprehensive framework for making transportation investment decisions in the metropolitan area.

The FAST Act carries forward and expands the performance-based transportation planning framework established under MAP-21. This UPWP includes data collection and analytical tasks that will facilitate annual reporting about safety, travel delay, pavement condition, alternative mode share, and other performance metrics. This UPWP includes tasks to continue evaluation of the transportation

performance measures and performance targets established in the RTP. It anticipates that these performance measures will be refined based on statewide MPO/NDOT coordination in the development of future RTPs.

Transportation legislation lists ten factors that must be considered as part of the transportation planning process for all metropolitan areas. The following factors shall be explicitly considered, analyzed as appropriate, and reflected in the planning process products (23 CFR Section 134 (h)):

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;
- Increase accessibility and mobility of people and freight;
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight;
- Emphasize the preservation of the existing transportation system;
- Promote efficient system management and operation;
- Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and
- Enhance travel and tourism.

3.3 Overview of FY 2019 and FY 2020 Work Efforts

CAMPO developed its first two-year UPWP in FY 2017. In working with U.S. DOT and NDOT, it was agreed that CAMPO would continue to implement its UPWP in a two-year cycle, which allows greater flexibility for CAMPO and its planning partners to complete more significant work tasks within a reasonable timeframe and to better coordinate work tasks with the funding cycle. A two-year work program does not mean that two years' worth of funds are available in the first year. CAMPO cannot seek reimbursement of funds in advance of obligation, but a two-year work program does provide certain advantages as described.

The following are the primary tasks to be undertaken during FY 2019 and FY 2020:

- Administer a survey of transit non-riders (residents and visitors who do not ride the Jump Around Carson (JAC) transit system) to identify needs and concerns. Feedback received will provide staff direction on what is working well with the system and where improvements can be made to better serve the community.
- The Carson City ADA Transition Plan will be updated. While the initial plan was developed in 2015, only a small portion of the City was inventoried due to budget constraints. It was anticipated that further inventory of the City would be done incrementally in the future. It is also a requirement to update the Transition Plan on a periodic basis. Now that

development of the plan has occurred, more funding can go toward further inventory of facilities than previously. Consultant involvement is expected for this task.

- Roadways within the Douglas County portion of the CAMPO area will be inventoried, using a consultant, to reassess pavement conditions. This practice is performed every couple of years for Carson City and needs to be conducted in other portions of the CAMPO planning area to build a strong database and establish historical benchmarks, thereby providing a more robust analysis of pavement maintenance needs. This process ensures the most informed and efficient decisions are being made to address pavement health.
- Implementation of a Pavement Management Plan to support ongoing planning and programming activities related to roadway infrastructure in Carson City.
- The travel demand model, with a consultant team, will be maintained in anticipation of the next RTP update. As the economy continues to improve to pre-recession levels and our region grows, CAMPO expects changes in land use due to development projects, shifting socio-demographic characteristics, and continued updates to the roadway network. The model will be maintained with the most recent traffic volumes, population, and land use assumptions.
- A Long Range Transit Plan with a short range element will be developed. These will combine to identify the immediate needs of the transit system over the next five year period, as well as a longer-term vision for the service. The plan will document opportunities and challenges of the transit system.
- A Coordinated Transit-Human Services Transportation Plan will be developed and will include interdisciplinary coordination. This plan relates specifically to FTA Section 5310 funds. Projects selected for funding under the Enhanced Mobility for Seniors and Individuals with Disabilities (5310) Program must be included in a locally developed, coordinated public transit-human services transportation plan.
- Current performance of Coordinated Traffic Signal Systems within the CAMPO planning area, with a focus on corridor-level traffic signal coordination, will be evaluated and a Traffic Signal Timing and Coordination Plan will be developed. Staff will utilize a contractor to assess and document current performance levels and develop a plan that relies on corridor-level performance measures to monitor and evaluate system performance over time.
- Ongoing tasks that include general administration, MPO representation, public participation efforts, regional consistency review, training, and UPWP development.
- On December 4, 2015, the Fixing America's Surface Transportation (FAST) Act was signed into law. Staff will monitor applicable transportation legislation and respond to any potential requirements of the new bill. In addition, staff will use this task to work with our State and Federal planning partners, as well as fellow MPOs, to continue to develop performance measures initially mandated by MAP-21.
- Update and maintain the Transportation Improvement Program (TIP) through the new eSTIP platform.

3.4 Federal Planning Emphasis Areas/FAST Act Planning Considerations and UPWP Tasks

Table 3.1 outlines FY 2019/FY2020 2-year UPWP Work Elements that address and support each Federal Planning Emphasis Area and FAST Act Planning Consideration. As illustrated below, all Federal Planning Emphasis Areas and FAST Act Planning Considerations are integrated into CAMPO's FY 2019/FY 2020 two-year work program.

Table 3.1 FY 2019/FY 2020 2-Year UPWP Work Elements and Federal Planning Emphasis Areas/Planning Considerations

		Work Elements				
		1.0	**2.0**	**3.0**	**4.0**	**5.0**
PEAs	**MAP-21/FAST Act Implementation**	X	X	X	X	X
	Models of Regional Planning Cooperation	X	X	X	X	
	Ladders of Opportunity		X	X	X	
FAST Act Planning Factors	**Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency**			X	X	X
	Increase the safety of the transportation system for motorized and non-motorized users			X	X	X
	Increase the security of the transportation system for motorized and non-motorized users			X	X	X
	Increase accessibility and mobility of people and freight			X		X
	Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns		X	X		
	Enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight		X	X	X	X
	Promote efficient system management and operation	X			X	X
	Emphasize the preservation of the existing transportation system				X	X
	Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation			X		X
	Enhance travel and tourism		X	X		

4.0 FY 2019 – FY 2020 Unified Planning Work Program

CAMPO planning activities are divided into five work elements. Funding sources for CAMPO planning activities include a combination of federal transit and highway programs, as well as local funding used as the "match" for federal consolidated planning grant (CPG) funding. Table 4.1 lists the five work elements and total estimated cost for each. The following pages contain a detailed description of each of the work elements for the FY 2019/FY 2020 2-year UPWP, including work tasks, work products, estimated benchmarks, and estimated costs. A detailed summary table containing estimated cost and funding sources for all work elements is attached at the end of this document. Except where noted below for each task, work will be completed by CAMPO staff.

Table 4.1 Total Budgeted Amount by Work Element and Task

Work Element	Description	Total Budgeted Amount
1.0	MPO Administration	$300,000
2.0	Regional Coordination and Engagement	$33,000
3.0	Regional Multimodal Planning	$132,000
4.0	Transportation Performance Management	$124,000
5.0	Asset Planning and Management	$119,000
Total		$708,000

WORK ELEMENT 1.0 – MPO Administration

The tasks in this work element cover activities related to the overall administration of CAMPO's transportation planning program. All tasks are annual or ongoing activities undertaken to maintain compliance with federal/state regulations, organize and manage MPO activities, and improve staff skills.

TASKS

1.1 General Administration and Work Program Oversight

Description: This task includes general administrative functions concerning the transportation planning program including preparation of administrative reports, analyses, budgets, goals and objectives, correspondence, documents, memos, etc.

Task Elements:

- Preparation of required MPO reports and memoranda supporting the activities of CAMPO.
- Management and administration of budgets and agreements.
- Preparation of quarterly and end-of-year task/activity summaries and reports.
- Preparation of billings and reimbursement requests and other related activities.
- Grant management and oversight of transportation planning grants.
- Application and management of Consolidated Planning Grant (CPG) funds for CAMPO operations.
- MPO Board Support, including: providing special reports, researching MPO issues, preparation of board/public meeting materials, and attendance at MPO regular and special meetings.

Expected Products:

- Monthly agenda and meeting materials for CAMPO board meetings and other public hearings, as needed.
- Miscellaneous reports, analyses, correspondence, task summaries and memoranda, and funding management and invoicing for CAMPO and local transit operators, as needed.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing

Funding:

CPG	$152,000
Local	$8,000
Total	$160,000

1.2 Unified Planning Work Program (UPWP) Development and Administration

Description: This task includes administration of the FY 2019/FY 2020 2-year UPWP, and development of the FY 2021/FY 2022 2-year UPWP in cooperation with other local, regional, and statewide agencies. This task also includes UPWP amendments, as needed.

Task Elements:

- Administration of the FY 2019/FY 2020 2-year UPWP document.
- Implement the UPWP including amendments, as required.
- Development and preparation of the FY 2021/FY 2022 2-year UPWP.

Expected Products:

- FY 2018 UPWP 4th quarter report.
- FY 2019/FY 2020 2-year UPWP quarterly reports.
- Amendments to the FY 2019/FY 2020 2-year UPWP, as needed.
- An adopted FY 2021/FY 2022 2-year UPWP.

Estimated Benchmarks: Draft FY 2021/FY 2022 2-year UPWP, March 2020

Estimated Completion Date: Ongoing Tasks

Funding:

CPG	$14,250
Local	$750
Total	$15,000

1.3 MPO Representation

Description: Staff will represent the MPO at events and meetings not related to specific other UPWP tasks. This task includes coordination with other regional MPOs, NDOT, Carson City, Douglas County, Lyon County, and other agencies and organizations to ensure development of transportation related projects that serve the best interests of the region. This task includes participation in the statewide planning process, including attendance and participation in the TPAC, the development and coordination of the Statewide Transportation Improvement Program (STIP), project selection, and participation in other advisory committees, as appropriate.

Task Elements:

- Preparation and attendance at events and meetings not related to specific other UPWP tasks.
- Ongoing coordination with other regional MPOs, NDOT, Carson City, Douglas County, Lyon County, and/or other agencies/organizations, as needed.
- Participation in statewide planning activities, as needed.

Expected Products:

- A well-represented MPO with ongoing inter- and intra-regional coordination.
- Coordinated State planning processes and documents.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing

Funding:

CPG	$66,500
Local	$3,500
Total	$70,000

1.4 Professional Development

Description: This task focuses on professional development that enhances the capabilities of staff in exercising the responsibilities of the MPO, including training time and materials. This task includes memberships in related professional organizations, subscriptions to related professional periodicals, and dues/fees required for obtaining and maintaining professional certifications.

Task Elements:

- Facilitation and/or attendance at training courses/seminars directly related to transportation planning as appropriate, including, but not limited to: TransCAD, GIS, planning best practices, State/federal grants administration, performance-based planning, asset management, professional services procurement, etc.
- Internal cross-training that promotes diverse staffing capabilities in regional transportation planning.
- Memberships in related professional organizations and subscriptions to related professional periodicals.
- Dues/fees required for obtaining and maintaining professional memberships/certifications.

Expected Products:

- Enhanced staff capabilities.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing

Funding:

CPG	$52,250
Local	$2,750
Total	$55,000

WORK ELEMENT 2.0 – Regional Coordination and Engagement

Tasks within this work element include public participation, regional coordination, and engagement tasks necessary to carry out a continuing, comprehensive, and cooperative regional transportation planning activities. Tasks are ongoing activities designed to continue public participation and engagement efforts related to planning for all modes with all stakeholders, and to meet the requirements set forth in CAMPO's Public Participation Plan.

2.1 Public Participation

Description: Ongoing public participation efforts will be conducted throughout the program period related to numerous work study tasks including: necessary TIP or RTP amendments; development of corridor/specific studies; preparation of updates to regional planning documents and policies; development of the UPWP for the next fiscal years; public information campaigns to promote planning initiatives and programs; coordination with Tahoe MPO (TMPO) and Washoe County Regional Transportation Commission (Washoe RTC); and other related activities. This task includes publication of notices and maintenance of the CAMPO website, as the website is a useful tool for informing constituents of CAMPO's purpose and current activities.

Task Elements:

- Public noticing and stakeholder engagement for necessary TIP or RTP amendments.
- Activities necessary to host/coordinate public participation activities.
- Property owner outreach resulting from development of corridor/specific studies or local development projects.
- Public outreach and noticing needed for development of the next UPWP and next TIP.
- Development of public information campaigns that promote planning initiatives and programs.
- Continuous maintenance of the CAMPO website.

Expected Products:

- Hosted/coordinated public participation activities.
- Published notices.
- An operational website for distribution of current, accurate, and transparent public information.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing

Funding:

CPG	$19,000
Local	$1,000
Total	$20,000

2.2 Regional Transit Coordination and Engagement

Description: There are five transit services operating within the CAMPO planning area (Eastern Sierra Transit Authority, BlueGo, Jump Around Carson, Douglas Area Rural Transit, and RTC Intercity) that are subsidized by member counties. This task includes regional coordination of transit services by CAMPO staff, development and implementation of a transit non-rider survey, and ongoing stakeholder engagement.

Task Elements:

- Development and preparation of transit non-rider survey materials and workforce, and implementation of distribution channels.
- Hosted/coordinated public participation activities related to transit planning and implementation.
- Participation in local and regional planning processes for public transportation projects in which the Carson area has a vested interest.

Expected Products:

- Coordination and communication among transit operators.
- Analysis of survey results from transit non-riders.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing, Draft/Final Transit non-rider survey results Fall/Winter 2018

Funding:

CPG	$12,350
Local	$650
Total	$13,000

WORK ELEMENT 3.0 – Regional Multimodal Planning

The activities in this work element carry out and support the integration of federal, state, and local transportation planning processes; complete activities and products to satisfy core planning functions and State and federal metropolitan planning requirements; consider all modes of transportation in implementing regional transportation goals; support transportation policy development and analyses; support the incorporation of various modal and corridor/specific plans into the Regional Transportation Plan and Transportation Improvement Program; and support ongoing and strengthened partnerships with government partners, organizations and agencies, and the public to further our regional transportation goals.

3.1 2040 Regional Transportation Plan (RTP)

Description: The 2040 RTP was adopted by CAMPO in August 2016. This task includes maintenance of the 2040 RTP and any necessary administrative modifications or amendments. Community outreach on the document will continue, as well as coordination with partner agencies and local governments.

Task Elements:

- Administration of the 2040 RTP, including ongoing coordination with federal, State, and local partners to explore funding opportunities to implement the plan.
- Participation in public and interagency meetings as a transportation technical resource.
- Continued public outreach on RTP goals and concepts that promotes vibrant communities and improves public health.
- Processed RTP administrative modifications and/or amendments, as necessary.
- Project review that ensures consistency with established transportation plans and policies.
- Incorporation of federally required performance measures and/or targets as necessary.

Expected Products:

- RTP modifications and amendments, as necessary.
- Continued community outreach and education on the 2040 RTP.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing

Funding:

CPG	$14,250
Local	$750
Total	$15,000

3.2 Transit Planning

Description: This task incorporates responsibilities required of CAMPO as the direct recipient of FTA Section 5307 funds. CAMPO must apply for and manage these funds, including compliance activities and participation in regular federal reviews and audits. Staff will develop a Long Range Transit Plan that incorporates a Short Range element. These will combine to identify the immediate needs of the transit system over the next five year period, as well as a longer term vision for the service. The plan will document opportunities and challenges of the transit system and present a budget for operation of the system. This task also includes development, maintenance, and administration of transit policies and procedures that support implementation of regional transit planning documents. Projects selected for funding under the Enhanced Mobility for Seniors and Individuals with Disabilities (5310) Program must be included in a locally developed, coordinated public transit-human services transportation plan. The Coordinated Transit-Human Services Transportation Plan will be developed within this task, and it includes interdisciplinary coordination and relates specifically to FTA Section 5310 funds. The public outreach and coordination activities within this task specifically relate to transit planning and do not duplicate public outreach and coordination that is conducted under other tasks within this UPWP.

Task Elements:

- Community outreach.
- Coordination with partner agencies.
- Participation in public and interagency meetings.
- Long Range Transit Plan Development.
- Development of a Coordinated Public Transit-Human Services Transportation Plan.
- Title VI Program updates.
- DBE Program updates.
- DBE Goal updates.
- Transit responsibilities as a direct recipient – CAMPO, in coordination with NDOT, works with transit operators in the region to identify projects and distribute FTA funds among eligible operators and projects. Efforts under this subtask include training, project identification, allocation of funding, and coordination with FTA, NDOT, and transit operators.

Expected Products:

- Long Range Transit Plan and Incorporation of other inter-regional or statewide transit studies conducted by NDOT or other agencies, as appropriate.
- Coordinated Public Transit-Human Services Transportation Plan.
- Project identification and allocation of funds among regional transit operators to allow for implementation of FTA transit programs.
- Title VI Program document for FFY 2020-22.

- DBE Program document for FFY 2020-22.
- DBE Goal creation for FFY 2020-22.

Estimated Benchmarks: Draft Coordinated Public Transit-Human Services Transportation Plan, Summer 2018; Final Coordinated Public Transit-Human Services Transportation Plan, Winter 2018; Draft Long Range Transit Plan, Spring 2019; Final Long Range Transit Plan, Fall 2019; Title VI and DBE Program documents, Summer 2019.

Estimated Completion Date: Ongoing

Funding:

CPG	$42,750
Local	$2,250
Total	$45,000

3.3 Intelligent Transportation Systems (ITS) Planning

Description: This task includes an evaluation and report on current performance of Coordinated Traffic Signal Systems within the CAMPO planning area, with a focus on corridor-level traffic signal coordination. CAMPO staff will utilize a contractor to assess and document current performance levels and develop a plan that relies on corridor-level performance measures to monitor and evaluate system performance over time. The plan is expected to provide baseline data and benchmarks for future reassessment of system efficacy utilizing identified performance measures.

Task Elements:

- Evaluation and report on current condition of traffic signal timing and coordination within the CAMPO planning area.
- Identification of performance measures to assess corridor-level traffic signal timing and coordination within the CAMPO planning area.
- Draft and Final Traffic Signal Timing and Coordination Plan.

Expected Products:

- Current Conditions Assessment.
- Draft and Final Traffic Signal Timing and Coordination Plan.

Estimated Benchmarks: Current Conditions Assessment January 2019, Draft Traffic Signal Timing and Coordination Plan, July 2019, Final Traffic Signal Timing and Coordination Plan, December 2019.

Estimated Completion Date: December 2019; Ongoing

Funding:

CPG	$25,650
Local	$1,350
Total*	$27,000

**Consultant involvement is expected*

3.4 Updates to Supporting Regional Planning Documents

Description: This task includes an inventory and update to the Carson City Americans with Disabilities Act (ADA) Transition Plan. Staff will work with a consultant to identify new areas of Carson City to be inventoried and added to the ADA Transition Plan and to update the existing planning document with no information. This task includes updates to CAMPO's Public Participation Plan (PPP). Finally, this task includes development, maintenance, and administration of transportation policies that support implementation of regional transportation planning documents.

Task Elements:

- Development of ADA Transition Plan updates.
- Development of Public Participation Plan updates.

Expected Products:

- Updated and expanded ADA Transition Plan.
- Updated Public Participation Plan.

Estimated Benchmarks: N/A

Estimated Completion Date: Updated Public Participation Plan, September 2018; Updated ADA Transition Plan, January 2019.

Funding:

CPG	$33,250
Local	$1,750
Total*	$35,000

**Consultant involvement is expected*

3.5 Regional Consistency Review

Description: Development or capital improvement projects proposed within the CAMPO boundaries will be subjected to a review by staff to determine consistency with the RTP and TIP. Reviews will examine the effectiveness of proposed projects as they relate to the ability to relieve/prevent congestion, consideration of likely impacts of transportation policy on land use and development decisions, preservation and efficient utilization of transportation facilities, and other matters as required by federal or State regulation. The activities within this task do not duplicate routine reviews of proposed developments that are conducted by constituent units of government.

Task Elements:

- Provide input on proposed developments of regional significance with regard to the RTP and TIP.
- Annual growth management reviews.

Expected Products:

- Periodic transportation system review and reports.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing

Funding:

CPG	$9,500
Local	$500
Total	$10,000

WORK ELEMENT 4.0 – Transportation Performance Management

The activities in this work element support and implement federal and State requirements for performance-based planning to inform decision-making, including: transportation data collection and management; travel demand modeling and forecasting; development of performance measures and targets; and various other information gathering, analyses, monitoring and reporting, as needed. This task includes development and implementation of the Transportation Improvement Program (TIP).

4.1 MAP-21/FAST Act Implementation and Performance Measures

Description: Under this task, staff will work to comply with new requirements under MAP-21 and the FAST Act as they continue to be communicated from the U.S. Department of Transportation (U.S. DOT), with an emphasis on developing performance measures and establishing performance targets.

Task Elements:

- Coordination of data collection across CAMPO partner jurisdictions, transit operators, NDOT and FHWA in response to established performance measure target-setting requirements.
- Conduct technical analyses and model outputs that support development and implementation of MAP-21/Fast Act performance-based planning requirements.
- Preparation and development of documentation as required.

Expected Products:

- Compliance with MAP-21/FAST Act.
- Documentation as required.
- Ongoing participation in Nevada's Planning Executive Group (PEG) and PEG Performance Measures Working Group.

Estimated Benchmarks: Adopted performance measure targets that meet MAP-21/Fast Act requirements.

Estimated Completion Date: Ongoing

Funding:

CPG	$25,650
Local	$1,350
Total	$27,000

4.2 Update and Maintain the Transportation Improvement Program

Description: This task supports the selection, funding, and implementation of transportation projects that meet State and federal regulations. The MAP-21/FAST Act compliant Federal Fiscal Year (FFY) 2018-2021 Transportation Improvement Program (TIP) was adopted by the Regional Transportation Commission (RTC) on August 9, 2017. Activities under this task include administration and maintenance of the current FFY 2018-2021 TIP, including processing of modifications and amendments as needed, and development of the FFY 2020-2023 TIP in cooperation with other local, regional, and statewide agencies. The TIP includes a current four-year listing of projects and will be consistent with all Federal planning regulations. The format of the TIP will reflect consistency with NDOT's eSTIP platform. This task includes project tracking and financial tracking that is performance-based and consistent with the goals and objectives of MAP-21 and the FAST Act.

Task Elements:

- Determine that sufficient federal, State, and local revenue sources are available to fund projects programmed in the TIP.
- Coordinate administration and maintenance of the TIP within the Statewide TIP (STIP).
- Provide reasonable opportunity for public comment in accordance with the Public Participation Plan and federal regulations.
- Incorporate Environmental Justice and ADA considerations, as appropriate.
- Consider best available performance information, including performance measures and targets, in prioritization of transportation improvement projects that are expected to support achievement of adopted targets MAP-21/FAST Act performance measures.
- Prepare modifications and amendments to the TIP, as needed.
- Coordinate modifications and amendments of the TIP program with the STIP to ensure changes are incorporated into the STIP.
- Develop and prepare the FFY 2020-2023 TIP for adoption.
- Ongoing participation in Nevada's Planning Executive Group (PEG) initiatives related to programming.
- Coordination with FHWA NV Division office, FTA, NDOT, and CAMPO partner agencies on project development and funding.
- Develop annual list of obligated projects.
- Document continuing, coordinated and comprehensive processes that include traditionally underrepresented and underserved populations and their community leaders (e.g., elderly, disabled, low income, and minorities).

Expected Products:

- FFY 2018-2021 TIP that is updated appropriately to include administrative modifications and amendments, as needed.
- Adopted FFY 2020-2023 TIP.

- Annual Federal Obligations Report.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing

Funding:

CPG	$23,750
Local	$1,250
Total	$25,000

4.3 Maintain Travel Demand Model

Description: Staff will work with a consultant to maintain the travel demand model in preparation for the next Regional Transportation Plan update and to meet ongoing forecasting needs. The model will be maintained with the most recent traffic volume counts available (segments/intersections) as well as population and land use assumptions. There are periodic needs to provide information to other agencies both within and outside the CAMPO planning area that is derived from, or is an input to, the modeling process. The majority of task costs are associated with consultant costs, with staff project management also included.

Task Elements:

- Ongoing travel demand modeling services through consultant service, including model maintenance activities to incorporate most current population and transportation network data.
- Using a contractor, produce requested model outputs for alternatives analysis, planning studies, or other regional activities as needed/requested.
- Using a contractor, update travel demand model and associated forecasting software and tools as necessary.
- Provision of information from the modeling process as needed/requested.

Expected Products:

- Validated and maintained travel demand model.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing

Funding:

CPG	$39,900
Local	$2,100
Total*	$42,000

**Consultant involvement is expected*

4.4 Data Management, Collection, and Performance Measurement

Description: This task builds from prior UPWP tasks and supports monitoring of transportation performance measures included in the 2040 RTP. Staff will continue to collect baseline information to evaluate and monitor the performance of Complete Streets and transportation infrastructure within CAMPO's planning area. Staff will collect data, record any changes or trends, and provide recommendations that may be used to inform future transportation improvement projects or policies. This task includes an update to CAMPO's Complete Streets Performance Monitoring Program, which will expand the program from identified complete streets corridors to include data collection, monitoring, and reporting procedures across all transportation modes within the CAMPO area.

Task Elements:

- Ongoing data collection along facilities identified within the Complete Streets Performance Monitoring Program.
- Ongoing data collection related to safety, regional bicycle and pedestrian counts, vehicular movements, and other transportation infrastructure data as needed.
- Analyses of collected data on auto, transit, bicycle, and pedestrian use.
- Updates to the Complete Streets Performance Monitoring Program to comprehensively include all transportation modes within the CAMPO area.
- Coordinate the dissemination and consideration of transportation-related performance data.
- Periodic recommendations and/or reports.
- Development of an annual performance measure tracking report.

Expected Products:

- Updated Complete Streets Performance Monitoring Program document.
- FY 2019 and FY 2020 Annual Performance Measure Tracking Reports.

Estimated Benchmarks: Draft Updated Monitoring Program document, January 2019; Final Monitoring Program document, June 2019; FY 2019 Annual Performance Measure Tracking Report, September 2019.

Estimated Completion Date: June/September 2019 and Ongoing

Funding:

CPG	$28,500
Local	$1,500
Total	$30,000

WORK ELEMENT 5.0 – Asset Planning and Management

The activities in this work element support multi-modal asset management throughout the CAMPO planning area using ongoing data collection, analyses, and reporting to inform decision-making that promotes: efficient system management and operation; improves the resiliency and reliability of the transportation system; and emphasizes preservation of the existing transportation system. This task includes development and implementation of the Transportation Improvement Program (TIP).

5.1 Maintain Pavement Management System

Description: This task involves regular updates and maintenance of the Pavement Management System following improvements or changes to the street network or land uses. A consultant will be hired to collect data on the Douglas County roadway network within the CAMPO planning area. Staff will use this task to provide data to CAMPO to report on performance measures as they relate to pavement maintenance.

Task Elements:

- Conduct regular updates and maintenance of the Pavement Management System.
- Using a contractor, collect pavement survey data for the Douglas County roadways within the CAMPO planning area in a format that meets the individual needs of both Douglas County and CAMPO.

Expected Products:

- Up-to-date pavement management system.
- Pavement data.

Estimated Benchmarks: Completed pavement survey for Douglas County roadways within the CAMPO planning area.

Estimated Completion Date: Douglas County pavement survey, Fall 2018; Ongoing

Funding:

CPG	$47,500
Local	$2,500
Total*	$50,000

**Consultant involvement is expected*

5.2 Roadway Asset Management

Description: CAMPO staff recently completed an initial draft of a Pavement Management Plan to support ongoing planning and programming activities related to roadway infrastructure in Carson City. This task begins implementation of that plan and includes activities required to amend the plan to incorporate future roadway condition data, or other amendments, as needed.

Task Elements:

- Implementation and Ongoing Maintenance of the Pavement Management Plan.

Expected Products:

- Up-to-date Pavement Management Plan.
- Ongoing activities supporting implementation of the plan, including annual pavement assessments supporting performance-based pavement rehabilitation investments.
- Reports to CAMPO on plan implementation and performance, as appropriate.

Estimated Benchmarks: N/A

Estimated Completion Date: Ongoing

Funding:

CPG	$28,500
Local	$1,500
Total	$30,000

5.3 Non-Motorized Asset Management

Description: Staff will continue to evaluate the existing bicycle and pedestrian network, work with member agencies and local advocates, and pursue grant opportunities to improve the accessibility and connectivity of the system. Using a consultant, this task includes a comprehensive sidewalk and bicycle facility inventory that will be mapped using ArcGIS. The inventory may be used to update maps within CAMPO's 2040 RTP.

Task Elements:

- Conduct a comprehensive non-motorized asset inventory (sidewalks, bicycle facilities).
- Conduct mapping activities that support integration of inventory data with CAMPO's web-based mapping platform.

Expected Products:

- Improved access and connectivity of the bicycle and pedestrian network.
- Sidewalks and bicycle facilities inventory.
- Maps of non-motorized assets, including sidewalks and bicycle facilities, integrated into CAMPO's web-based mapping platform.

Estimated Benchmarks: Sidewalks and bicycle facilities inventory, Spring 2019; Ongoing

Estimated Completion Date: Ongoing

Funding:

CPG	$25,650
Local	$1,350
Total*	$27,000

**Consultant involvement is expected*

5.4 Transit Asset Management

Description: The activities within this task include development of a Transit Asset Management (TAM) Plan that is compliant with the FAST Act. Ongoing maintenance of the Plan, including annual performance target setting, will also be included.

Task Elements:

- Conduct an inventory and projection of transit assets, life expectancies, replacement costs, and maintenance activities and costs.
- Ongoing monitoring and updating of performance targets.

Expected Products:

- Draft and Final TAM Plan.
- Annual performance target updates in accordance with Federal requirements.

Estimated Benchmarks: Attainment of performance targets annually, and adherence to maintenance and replacement schedule established in the TAM Plan.

Estimated Completion Date: Ongoing and October 2018.

Funding:

CPG	$11,400
Local	$600
Total	$12,000

5.0 FY 2019 – FY 2020 Unified Planning Work Program Budget

CAMPO receives an annual apportionment of Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) funds that may be used for transportation planning activities. The FHWA funds are from the planning (PL) program and the FTA funds are allocated from the Section 5303 program. These two funding sources are combined as Consolidated Planning Grant (CPG) funds and may be used to reimburse up to 95% of eligible expenses. The CPG funds are allocated to CAMPO based on an agreed-upon distribution formula between NDOT and Nevada's three other MPOs. See the individual work elements and tasks described earlier in this UPWP and the budget table, below, for additional budget information.

Table 5.1 CAMPO FY 2019 and FY 2020 UPWP Cost/Funding Summary
3/26/2018

Major Work Element	Work Task		Funding Breakdown		
	Number	Description	CPG	Local Match	Total Cost
1.0 MPO Administration	1.1	General Administration and Work Program Oversight	$152,000	$8,000	$160,000
	1.2	UPWP Development and Administration	$14,250	$750	$15,000
	1.3	MPO Representation	$66,500	$3,500	$70,000
	1.4	Professional Development	$52,250	$2,750	$55,000
2.0 Regional Coordination and Engagement	2.1	Public Participation	$19,000	$1,000	$20,000
	2.2	Regional Transit Coordination and Engagement	$12,350	$650	$13,000
3.0 Regional Multimodal Planning	3.1	2040 Regional Transportation Plan (RTP)	$14,250	$750	$15,000
	3.2	Transit Planning	$42,750	$2,250	$45,000
	3.3	ITS Planning*	$25,650	$1,350	$27,000
	3.4	Updates to Supporting Regional Planning Documents and Policies*	$33,250	$1,750	$35,000
	3.5	Regional Consistency Review	$9,500	$500	$10,000
4.0 Transportation Performance Management	4.1	MAP-21/FAST Act Implementation and Performance Measures	$25,650	$1,350	$27,000
	4.2	Update and Maintain the Transportation Improvement Program	$23,750	$1,250	$25,000
	4.3	Maintain Travel Demand Model*	$39,900	$2,100	$42,000
	4.4	Data Management, Collection, and Performance Measurement	$28,500	$1,500	$30,000
5.0 Asset Planning and Management	5.1	Maintain Pavement Management System*	$47,500	$2,500	$50,000
	5.2	Roadway Asset Management	$28,500	$1,500	$30,000
	5.3	Non-Motorized Asset Management*	$25,650	$1,350	$27,000
	5.4	Transit Asset Management	$11,400	$600	$12,000
		Total Funding	$661,200	$35,400	$708,000

**Consultant involvement is expected*