CONGESTION MANAGEMENT PROCESS

FOR THE SHREVEPORT / BOSSIER CITY, LOUISIANA
METROPOLITAN PLANNING AREA (MPA)

NW LOUISIANA COUNCIL OF GOVERNMENTS ADOPTED: 03.04.2022

PICTURED: I-220 @ I-20 NEW INTERCHANGE CONSTRUCTION FOR THE BARKSDALE A.F.B. NEW GATE ACCESS ROAD PROJECT - CONGESTION RELIEF FOR ALL BARKSDALE A.F.B. POINTS OF ENTRY, SECURED ACCESS OPERATIONS (ANTICIPATED COMPLETION SPRING OF 2022)

This document was prepared by:
The Northwest Louisiana Council of Governments (NLCOG)
In cooperation with
The Louisiana Department of Transportation and Development (LADOTD)

This plan updates the Congestion Management Process (CMP) adopted July 31st, 2009, for the NLCOG Metropolitan Planning Area (MPA) encompassing Caddo, Bossier, DeSoto, and Webster Parishes in Louisiana.

State Project No. and Federal Project No.

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Congestion Management Process (CMP)

Record of Adoption

ITEM	Date(s)
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Adopted by Resolution: MPO Transportation Policy Committee (TPC)	**03.04.2022**

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Chapter 2 - CMP Overview – The Federal eight-step CMP is outlined, and a general overview of the process is provided. Regional goals and objectives derived from the recently completed MTP (04.2021) are utilized in the CMP.

Chapter 3 – Study Area-Network Identification – A description of the area of application and transportation network used for the CMP process is provided.

Chapter 4 - Development of Performance Measures – A summary of congestion related Performance Metrics/Measures are established. Performance Metrics are calculated utilizing the traffic flow datasets identified in Chapter 3 and they are used to monitor the effectiveness of the CMP. Further, documentation of the source(s) of traffic flow datasets employed and their statistical significance during the System Performance determinations.

Chapter 5 - Congested Corridor Determinations – This chapter describes how congested corridors and their respective study segments are identified employing the performance metrics identified in Chapter 4.

Chapter 6 - Congested Corridor Prioritization – Utilizing a NLCOG Staff produced prioritization scheme "Severely Congested" determined sub-corridors are ranked by improvement need.

Chapter 7 – Regionally Effective CMP Improvement Strategies – This chapter lists the various improvement strategies that can be used to reduce/minimize congestion along the identified sub-corridors.

Chapter 8 - System Performance Monitoring Plan and the Role of the CMP – The overview of the monitoring plan oversees the modal data to be collected in the region, the system performance monitoring of congestion, and the evaluation of the efficiency and effectiveness of implementation actions. CMP's role in the MPO Transportation Planning Process.

CHAPTER 1 – CMP INTRODUCTION

PURPOSE OF THE CONGESTION MANAGEMENT PROCESS (CMP)

The CMP process is required in accordance with the 23rd Code of Federal Regulations, section 450.320, in the Federal Register, under the U.S. Department of Transportation. A CMP provides state Department of Transportations and MPOs with an empirically derived methodology and rational framework for addressing congestion. Federal rules require that a CMP area and network be defined by each MPO. In air quality non-attainment areas, projects that increase capacity for Single Occupancy Vehicles (SOV's) must be derived from a CMP.

The Congestion Management Process (CMP) is a management system and process conducted by Metropolitan Planning Organizations (MPOs) to improve traffic operations and safety utilizing strategies that reduce travel demand or the implementation of operational improvements. The public will typically benefit from having a functional CMP in place because it can improve travel conditions through the development of low-cost improvements or strategies.

The Federal Highway Administration (FHWA) defines a CMP as "a systematic approach collaboratively developed and implemented throughout a metropolitan region, that provides for the safe and effective management and operation of new and existing transportation facilities through the use of demand reduction and operational management strategies."

Further, Census defined metropolitan areas with more than 200,000 population, are classified as Transportation Management Areas (TMAs – i.e., NLCOG) and must maintain a Congestion Management Process plan. The intent of the CMP plan is to inform decisionmakers concerning the status, a "snapshot", of travel performance along identified study corridors and provide them with recommended strategies to improve highly congested roadway corridors/intersections. Improvement projects/strategies developed through the CMP plan will align and support NLCOG's adopted Performance Based Planning Measures and the travel performance Targets established within the MPO's four Parish Metropolitan Planning Area (MPA).

Projects identified through the CMP process may also be added to future updates of the MPO's Metropolitan Transportation Plan (MTP) should they require additional funding or a longer time frame for implementation.

Figure 1.1: A.R. Teague Parkway Extension - looking south; congestion relief for southern Bossier City/Bossier Parish

The CMP mirrors the elements of the NLCOG's transportation planning process. The strong similarities between the activities in both the CMP and the overall transportation planning process facilitate the integration of the CMP into the planning process. The development of regional objectives for the CMP responds to the goals and vision for the region established early in the transportation planning process. Through the development of the CMP update, NLCOG will utilize the regional transportation goals and objectives derived from the recently adopted (04.2021) *"Northwest Louisiana Metropolitan Transportation Plan (MTP) Update – 2045"*. The regional goals / objectives formulated through this effort identified congestion and its impacts throughout the public outreach process (as documented in a subsequent section). Further, the public, as well as regional transportation stakeholders/officials, recently participated in the MTP's outreach effort and performing another similar solicitation effort would likely result in participant fatigue and wasted resources considering the level of anticipated participation.

PERFORMANCE BASED PLANNING (PBP) AND THE CMP

With the 2012 passage of the Federal surface transportation legislation, "Moving Ahead for Progress in the 21st Century Act" (MAP-21), performance-based planning (PBP) has taken on even greater significance. With the passage of the FAST ACT in 2015 and its subsequent extensions, an emphasis of performance-based planning continues which mandates statewide and metropolitan planning processes to incorporate a more comprehensive performance-based approach to their decision-making.

The legislation requires the U.S. Department of Transportation, in consultation with states, MPOs and other stakeholders, to establish performance measures in these areas (as shown in Figure 1.2).

To monitor the performance of the transportation system, and the effectiveness of programs and projects as they relate to the National Goals, a series of performance measures were established in the areas of safety (PM1), infrastructure condition (PM2), and system performance (PM3). These measures are outlined in 49 USC 625 and 23 CFR 490.

As it relates to the development of the CMP, identified improvement strategies/projects will directly affect the "Congestion Reduction" measure but could potentially cause secondary impacts on all the other performance measures as outlined in Figure 1.2.

SAFETY
To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

INFRASTRUCTURE
To maintain the highway infrastructure asset system in a state of good repair.

CONGESTION REDUCTION
To achieve a significant reduction in congestion on the National Highway System.

SYSTEM RELIABILITY
To improve the efficiency of the surface transportation system.

FREIGHT MOVEMENT
To improve the National Highway Freight Network, strengthen rural communities' access to national and international trade markets, and support regional economic development.

SUSTAINABILITY
To enhance the performance of the transportation system while protecting and enhancing the natural environment.

REDUCED PROJECT DELAYS
To reduce project costs, promote jobs, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

Figure 1.2 – Federal/State/MPO Performance Goals

An Objectives-Driven, Performance-based Approach

The CMP is intended to use an objectives-driven, performance-based approach to planning for congestion management. Utilizing congestion management objectives and performance measures, the CMP provides a mechanism for ensuring that investment decisions are made with a clear focus on desired outcomes. This approach involves screening of strategies using objective criteria, relying on system performance data, analysis, and evaluation. In turn, this approach can help to demonstrate which congestion management strategies are most effective over time, assess why they work (or do not), and help practitioners to target individual strategies to those locations where they may be most successful at reducing congestion. In some regions, the CMP may function as a primary mechanism for an objectives-driven, performance-based approach to integrating management and operations (M&O) strategies into the planning process. The connections provide opportunities for conducting the CMP in conjunction with, or completely integrated with, the overall metropolitan transportation planning process.

PRIMARY CAUSES OF CONGESTION

The process of congestion management begins by understanding the cause of the problem. Six major causes of congestion are identified: bottlenecks are the largest cause of congestion nationally, followed by traffic incidents and bad weather. Adverse weather cannot be controlled, but policies and improvements can be implemented to control traffic incidents and bottlenecks. Due to the lack of comprehensive local studies on the causes of congestion, these national data are widely used in CMPs. The data suggest that local causes are likely to be similar, with bottlenecks and traffic incidents typically being the top two causes of congestion.

- **Bottlenecks** – points where the roadway narrows or regular traffic demands (typically at traffic signals) cause traffic to back up; these are the largest source of congestion and typically cause a roadway to operate below its adopted level of service standards. "Recurring Congestion" occurs at bottlenecks as a result deficient roadway geometrics, inefficient/poor system operations (TS&O) or safety issues occurring at a specific location and/or time of day.

- **Traffic Incidents** – crashes, stalled vehicles, debris on the road; these incidents cause about one quarter of congestion problems. "Non-Recurring Congestion" is typically associated with traffic incidents since these random events occur at various locations and times throughout the roadway network

- **Work Zones** – for new road building and maintenance activities, such as resurfacing roadways; caused by necessary activities, but the amount of congestion caused by these actions can be reduced through a variety of strategies.

- **Bad Weather** – cannot be controlled, but travelers can be notified of the potential for increased congestion and signal systems can adapt to improve safety.

- **Poor Traffic Signal Timing** – the faulty operation of traffic signals or green/red lights where the time allocation for a road does not match the volume on that road; poor signal timings are a source of congestion on major and minor streets.

- **Special Events** – cause "spikes" in traffic volumes and changes in traffic patterns; these irregularities either cause or increase delay on days, times, or locations where there usually is none.

CHAPTER 2 – CMP PROCESS / OBJECTIVES

FHWA CONGESTION MANAGEMENT PROCESS (GUIDEBOOK)

A nationally recognized resource that details the rational development of a Congestion Management Process Plan was issued in April of 2011. The FHWA released the *Congestion Management Process: A Guidebook* which provides guidance and recommended best practices regarding the MPO's development and implementation of the congestion management process. This guidebook includes an eight-step process that summarizes the key parts of a continuous congestion management process.

Figure 2.0 - Federal Eight Step Congestion Management Process

REGIONAL GOALS SETTING WITHIN THE CMP FRAMEWORK

The tenets, goals, objectives, and related performance measures from the plans were compiled and reviewed alongside the federally prescribed goals, objectives, and performance measures to develop the goals for this MTP update. The NLCOG 2045 MTP Goals (Values) represented a synthesis of previous planning efforts, current scoring criteria, and national performance goals. These proposed goals were crafted to help create a unified regional perspective on long-range transportation planning and inform the project scoring and public involvement processes.

A series of CMP goals were developed to guide the process of monitoring congestion and improving the mobility of persons and goods for the area served by NLCOG. These were compiled, in part, based on the previously adopted goals developed through the Long-Range Transportation Plan (i.e., MTP) update effort. The goals are presented below. They will be used as a tool for selecting strategies and performance measures for strategy monitoring and evaluation.

Figure 2.1 – MTP 2045 Update Goals (Values) – Applicable to the CMP

MTP 2045 UPDATE: PUBLIC ENGAGEMENT OUTCOMES AND THE CMP

As required by the FAST Act and 23 CFR §450.316, MPOs must provide opportunity for the ***public*** *to comment on the development and content of the MTP, TIP, and any other revisions to major plans (Including the CMP – emphasis added).*

The **public** includes "citizens, affected public agencies, representatives of public transportation employees, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian walkways and bicycle transportation facilities, representatives of the disabled, and other interested parties" [1201(i)(6)(A)].

NLCOG conducted multiple public and stakeholder outreach efforts to better understand the community's transportation challenges, needs, and opportunities. Public engagement strategies used in developing the NLCOG 2045 MTP, included online visioning exercises, public surveys, stakeholder meetings, and the virtual public comment platform. The entire MTP 2045 Update Chapter 3 regarding "Public Engagement" is accessible through the nlcog.org website (Chapter 3 document link: http://www.nlcog.org/pdfs/LRTP2045/Chapter%203%20-%20Public%20Engagement.pdf

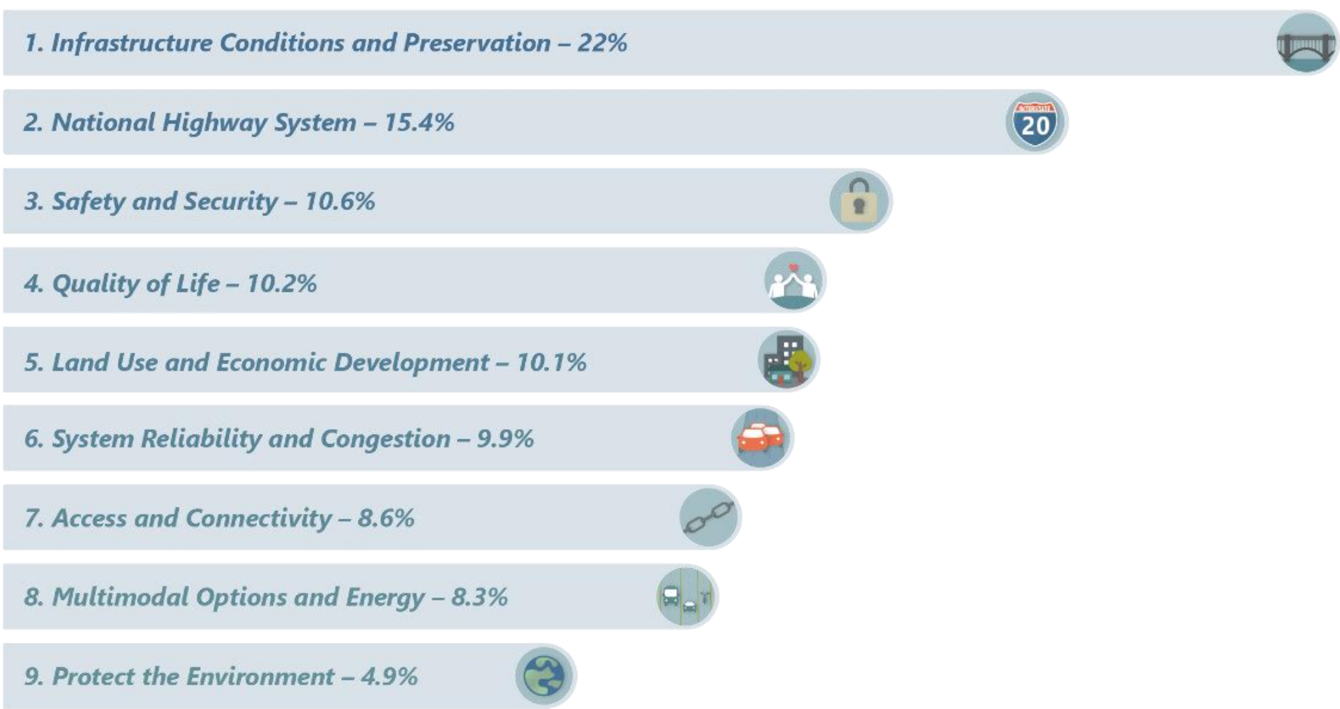
It's reasonable to conclude, the MTP – 2045 Update public outreach effort yielded a regional vision and goals that would be similar, if not identical, to the ones generated through a unique CMP public outreach effort. This assumption is based upon the recency and relevancy of the MTP public outreach (please refer to Chapter 3 of the MTP 2045 Update document linked above).

From the documentation, the MTP 2045 Update public outreach is comprehensive and quite robust in its approach. The multi-level, solicitation effort offered Northwest Louisiana residents the opportunity to voice their concerns regarding transportation issues, needs, and requested improvements throughout the region's multi-modal, transportation network.

From this comprehensive public solicitation undertaking, system reliability/congestion, when prioritized against other regional transportation issues, respondents felt congestion was somewhat concerning but not nearly as critical as the condition/preservation of the region's transportation network. Specifically, public comments that were logged through the online portal (i.e., interactive map), respondents pinpointed congestion "hot spots" (e.g., morning traffic backs up at the Benton Rd @ I-220 interchange) located throughout our roadway network.

However, from the public responses gathered, congestion/delay issues are "spot specific" and not corridor or regionally systemic. The public's concerns are substantiated through the documented "MTP Update 2045 – Chapter 4 Multi-modal Analysis" Travel Demand Model (TDM) existing conditions determinations. The MTP Update found that poorly performing roadways, as a result of vehicle delay, are primarily located around individual roadway sections/signalized intersections or roadways that have 2 or 3 inadequately spaced signals (e.g., near Interstate ramp facilities).

Figure 2.3 – Results MTP 2045 Update Regional Transportation Goals Prioritization



"Quality of Life is providing adequate transportation so that average citizens can travel from home to work to school to play while spending an acceptable amount of time traveling including sitting in traffic."

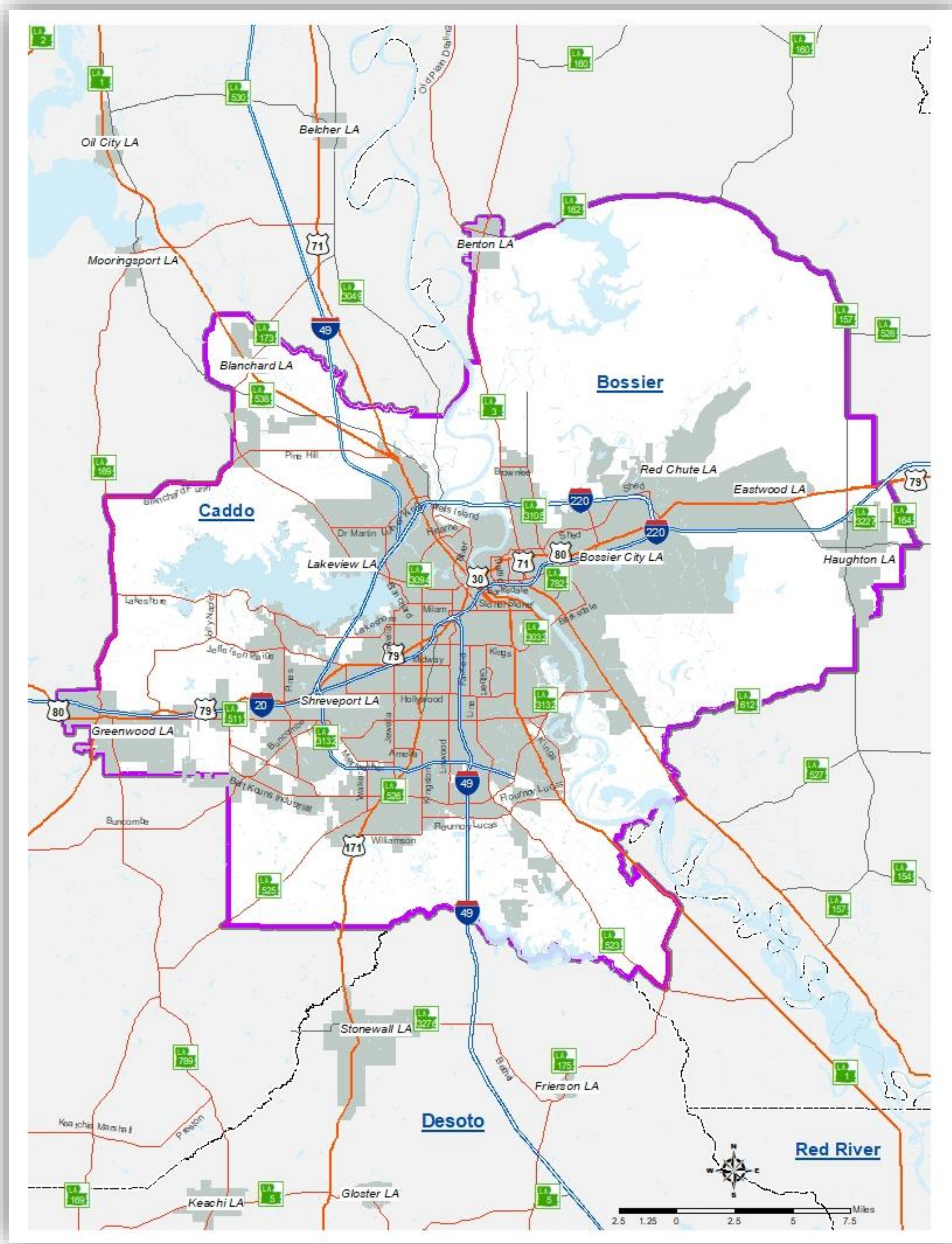
– Public Comment

CHAPTER 3 – ESTABLISH STUDY AREA / NETWORK

CMP STUDY AREA DETERMINATION

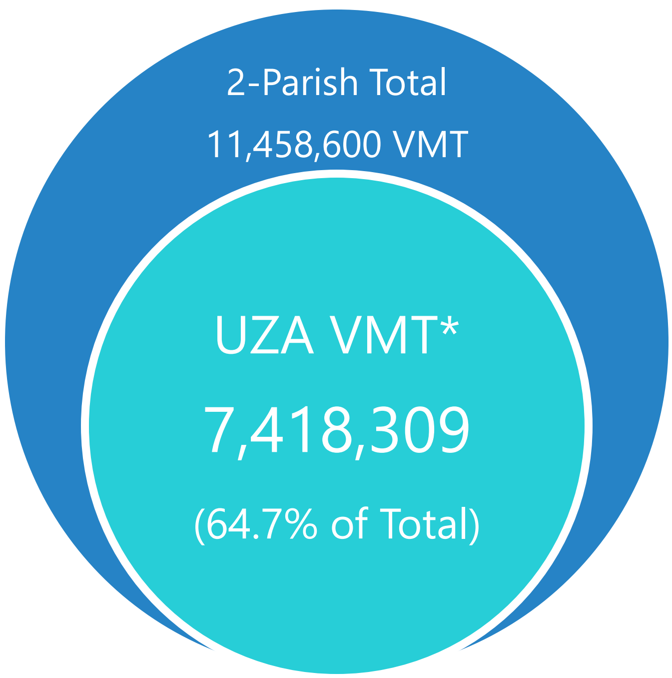
The CMP Study Area includes the transportation system that is to be evaluated and monitored and where congestion management policies, procedures and physical improvements need to be applied.

Figure 3.1 – NW Louisiana's Defined CMP Study Area (Boundary outlined in Purple)



CMP Study Area Screening

NLCOG's (MPO) CMP study area boundaries mirror the ones that were established for the US Census designated twenty-year urban growth area… otherwise known as the 2010 Shreveport/Bossier City Urbanized Area Boundary (UZA). This boundary encompasses the Census determined Urbanized Area (UA), as well as the anticipated exurban development out from the Census UA over a 20-year period. NLCOG worked in concert with our LADOTD partners to rationally determine our regions' UZA utilizing land-use, development trends, and building permit data. For CMP purposes, the adopted 20-year Urbanized Area Boundary (UZA) Study Area will serve as the CMP's defined Study Area. This determination is substantiated by the amount of daily Vehicle Miles Traveled (VMT) occurring within the UZA as compared to the 2-Parish (Caddo and Bossier) total VMT. Nearly 65% of the total 2-Parish VMT occurs within the 20-Year Growth UZA.



Source: NLCOG's 2016 Travel Demand Model (2020 Network Scenario); Collector Classified roadways and higher

**[VMT is calculated by multiplying the amount of daily traffic on a roadway segment by the length of the segment, then summing all the segments' VMT to give you a total for the geographical area of concern. The vehicular traffic amounts are either estimates (current or past data) or they are projections (future data). VMT for this plan is expressed in miles per day. Source TxDOT]*

CMP STUDY NETWORK IDENTIFICATION

Initially, all transportation infrastructures, contained within the study area, are considered through the CMP. Since it is impractical to provide performance analysis for all transportation systems, a prioritization process is undertaken. Consistent with federal guidelines, the NLCOG CMP covers a multimodal transportation network. In addition to evaluating congestion on the roadway network, the NLCOG CMP will evaluate transit, bicycle/pedestrian/trail, and freight movement networks within its designated area of application. The CMP roadway study network is described below.

CMP Network Screening Criteria

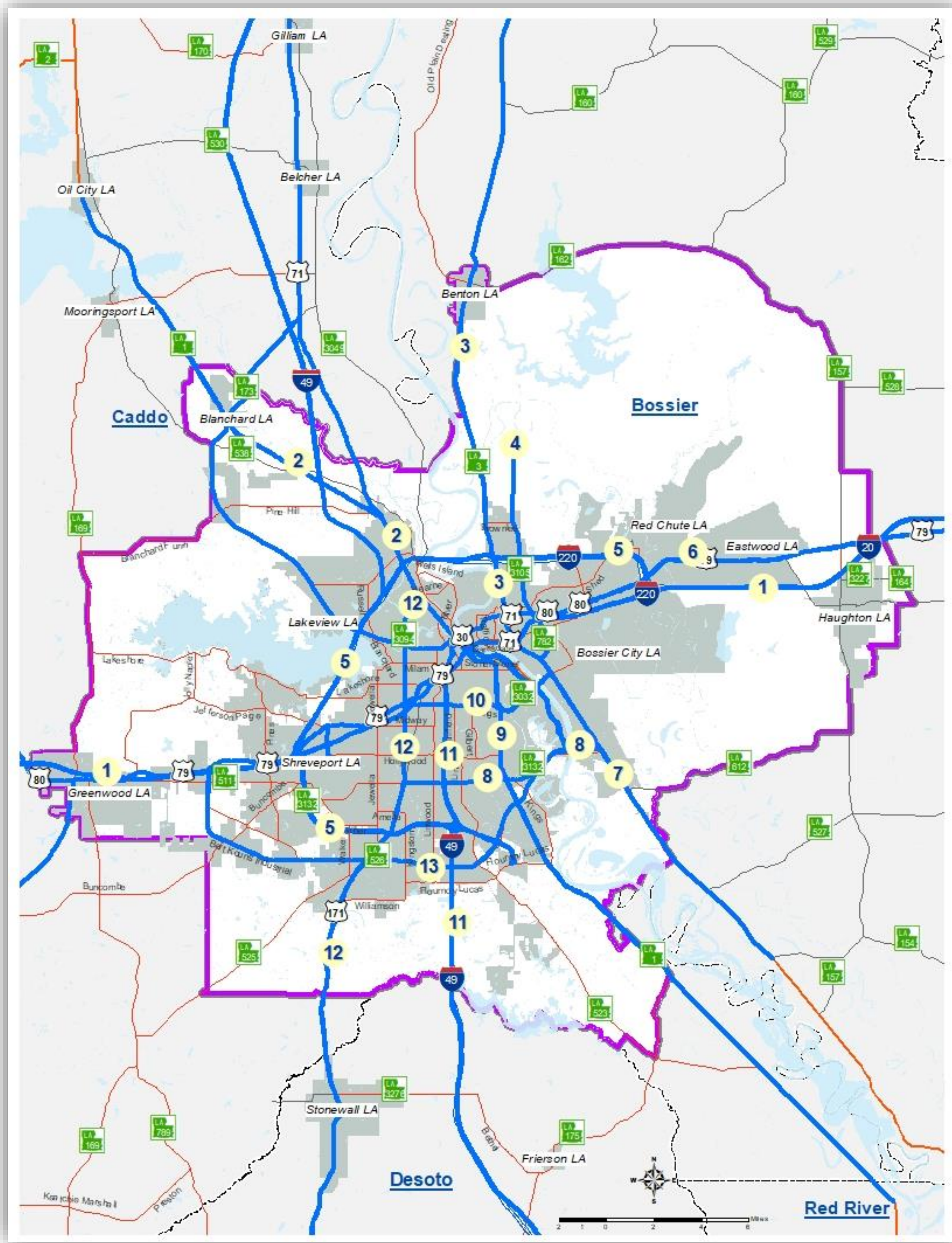
Since it is overly burdensome to analyze the entire transportation network within the CMP Study Area, a two-level screening process is utilized to identify potentially congested corridors for detailed study.

Screening Level 1 - NLCOG will focus our study upon corridors that are Federally identified as being on the National Highway System (NHS). A corridor that is a designated NHS roadway provides multiple advantages concerning the CMP study. Readily available travel time and volume data, by general vehicle type, from both National Performance Management Research Data Set (NPMRDS) and NLCOG's StreetLight data subscription are statistically significant sources of traffic flow data. Further, the MPO's requirements as it pertains to Performance Based Planning (Measures and adopted Targets),

Screening Level 2 – Utilizing NLCOG's in-house regional travel demand forecasting model (TRANSCAD), NLCOG identified potentially congested roadway facilities that met the Level 1 Screening criteria (i.e., NHS roadway). A peak-period 0.75 v/c ratio was used as the performance threshold measure. All model links (segments) operating above the threshold, during the peak-periods, are identified. Combined with AADT count and regional growth trend information, the flagged segments are joined together, along with other acceptable performing segments, to form continuous CMP Study Corridors. On the following page, Figure 3.2, illustrates the physical extent of the thirteen lowest performing CMP Study Corridors.

Study Segments Defined: The physical extent of a roadway study segment is dependent upon the vehicular access provided. Limited access, grade separated facilities, where vehicles can enter/exit at interchanges (i.e., Interstates / Freeways) have study segments located between those interchanges. Surface streets (i.e., Arterials and Collectors), with cross street intersections, have study segments defined by the length of roadway between major points of conflict (i.e., typically signalized intersections - where the most delay is encountered).

Figure 3.2 – Defined CMP Study Area – Study Network (13 Corridors – in Blue / w Map ID#)



The following table (3.1) summarizes the 13 CMP Study Corridors that met the network screening criteria as located in the CMP Study Area (Figure 3.2). The distinction is made between the total length of CMP study corridor mileage and the study corridor mileage that is identified on the National Highway System (NHS) since it has a bearing upon the selection of appropriate source traffic flow data. National Performance Management Research Data Set (NPMRDS) is available for NHS designated roadways. This factor led to the decision to utilize our procured (MTP 2045 update) Streetlight traffic flow data-application user license to obtain consistent performance data across all study corridors.

Table 3.1 – NLCOG's CMP Study Corridor Extents

Map ID	Corridor Name	Length (miles)	NHS* (miles)	Corridor Extents
1	I-20	22.6	22.6	Pines Rd Interchange (west) – LA 157 (Haughton)
2	LA 1/ N. Market	13.1	13.1	UZA Boundary (Blanchard) – I-20 (downtown Shreveport)
3	LA 3/ Benton Rd	13.5	13.5	UZA Boundary (Benton) – I-20 (Bossier City)
4	Airline Dr	8.9	4.0	Kingston Rd – Barksdale Blvd (US Hwy 71)
5	I-220/LA 3132	27.8	27.8	I-20 (Bossier City) – Flournoy-Lucas (LA 523)
6	US Hwy 79/80	14.9	7.5	LA 157 (Haughton) – Common St (downtown Shreveport)
7	Barksdale Blvd	5.6	3.8	Sligo Rd (LA 612) – Airline Dr
8	70th St (LA 511)	7.4	7.4	Barksdale Blvd – Mansfield Rd (US Hwy 171)
9	Youree Dr (LA 1)	8.6	8.6	Flournoy-Lucas (LA 523) – I-20 (downtown Shreveport)
10	Kings Hwy/ Westgate	5.7	2.4	Hearne Ave – Barksdale Blvd (US Hwy 71)
11	I-49	9.8	9.8	I-20 – Southern Loop
12	Mansfield/ Hearne	11.6	11.6	N. Market St (LA 1/US Hwy 71) – Williamson Way
13	LA526/ Bert Kouns	8.5	8.5	70th St (LA 511) – Walker Rd
	Totals:	**158.0**	**140.6**	**CMP Corridor Mileage Not NHS: 17.4 miles**

** Source: US DOT/FHWA National Highway System map of Shreveport, LA; rev. 10.01.2020*

CHAPTER 4 – DEVELOPMENT OF CMP PERFORMANCE MEASURES / DATA SOURCES

CMP STUDY CORRIDOR SEGMENT AND SYSTEM-WIDE PERFORMANCE MEASURE BACKGROUND

The calculation of performance along the CMP Study Area's corridors (13) is achieved utilizing two levels of analysis. First, the CMP will determine study corridor performance at the segment level or the most detailed, granular, level of performance. The intent of this level of analysis is to "pinpoint" the location of vehicle delay or speed reduction, through performance indices, along the CMP's Study Corridors.

NLCOG's CMP will reiterate the findings from the recently adopted *Metropolitan Transportation Plan (MTP) 2045: Systems Performance Report*. This report provides a high level "snapshot" of overall network (i.e., all NHS designated roadways) performance employing Travel Time Reliability indices as its measure. **The purpose of this type of determination is to provide an overarching status of the entire regional roadway system's "health" as it pertains to congestion (i.e., PM3 – System Reliability Performance Measure).** Discussion of NLCOG's *Systems Performance Report* findings will occur later in this chapter.

CMP CORRIDOR SEGMENT PERFORMANCE DETERMINATIONS

Traditionally, determining vehicle delay, by corridor segment, has been achieved through the calculation of travel time indices. Observed vehicle travel time data per study segment and direction of travel is compiled for both peak travel and off-peak time periods. Previous CMP efforts have utilized a Travel Time Index (TTI) to measure corridor segment performance.

Travel Time Index (TTI):

Travel Time Index (TTI) is the ratio of Average Travel Time in peak hours to Free-Flow Travel Time. In other words, the Travel Time Index represents the average additional time required for a trip during peak times in comparison with that trip duration in no-traffic condition. For calculating Free-Flow Travel Time, divide the road length by maximum speed limit of the road.

$$TTI = \frac{Average\ Travel\ Time}{Free\ Flow\ Travel\ Time}$$

ALL CALCULATED DATA METRICS IN THIS CMP FOLLOW THE FEDERAL GUIDANCE METHODOLOGY REFERENCED BELOW.

National Performance Measures for Congestion, Reliability, and Freight, and CMAQ Traffic Congestion: General Guidance and Step-by-Step Metric Calculation Procedures

The guidance presents recommended steps for calculating the National Highway System performance metrics (23 CFR 490.511), the Truck Travel Time Reliability metrics (23 CFR 490.611), and the Peak Hour. Further, NLCOG will apply the same methodology found in the Federal guidance utilizing the MPO's Streetlight data subscription as the source of traffic flow data (i.e., directional study segment: All vehicle volumes/travel time/travel speed by Peak period and all weekdays (M-F)) for the current CMP update. Please note, the referenced guidance details a process to calculate the SRF for the National Performance Management Research Data Set (NPMRDS). NLCOG will apply the same methodology for SRF calculation employing our procured Streetlight data/application user license.

The calculated performance metric to determine roadway segment traffic congestion levels is defined as a Speed Reduction Factor (SRF).

Speed Reduction Factor (SRF*):

(Calculated index used in FHWA's guidance to measure the level of traffic congestion)

$$\underset{\text{(SRF)}}{\text{Speed Reduction Factor}} = \frac{\text{Average Peak Period Speed (mph)}}{\text{Free Flow Speed (mph)}}$$

**The TTI and the SRF are essentially the same indices, one utilizes average segment travel time (i.e., TTI) while the other employs average travel speed (i.e., SRF) in its calculation.*

LEVELS OF CONGESTION (by the SRF metric):

(FHWA guidance (please refer to Appendix B) – as determined through the calculation of the SRF per respective roadway segment)

Freeways:

- No to Low Congestion. Speed reduction factor ranging from 90 percent to 100 percent.
- Moderate Congestion. Speed reduction factor ranging from 75 percent to 90 percent.
- Severe Congestion. Speed reduction factor less than 75 percent.

For Non-freeways:

- No to Low Congestion. Speed reduction factor ranging from 80 percent to 100 percent.
- Moderate Congestion. Speed reduction factor ranging from 65 percent to 80 percent.
- Severe Congestion. Speed reduction factor less than 65 percent.

Source: MAP-21 Measures for Congestion, Reliability, and Freight Step-by-Step Metric Calculation Procedures, FHWA Guidance (2018)

CMP ANALYSIS METHODOLOGY AND ASSUMPTIONS UTILIZING THE STREETLIGHT DATASETS/APPLICATION

Carefully developing the analysis settings, through the StreetLight online application, is critical to the data type, breadth, and format of the outputted traffic flow datasets. However, to be efficient and produce appropriate flow data for use in congested corridor/segment determinations, establishing analysis assumptions from the outset is vital.

Vehicle Class: All Vehicle types (no need for vehicle class-axle adjustment factors)

Total Number of Days*: April of 2021 (04.01.2021-04.30.2021); 30 days of data; *as per Federal guidance, the month of April calls for a monthly adjustment factor of 101% to properly reflect an AADT value

Days of Week: Weekdays (Mon.-Fri.); all weekdays for the entire month of April

Analysis Time Periods:** AM Peak (6:00a-9:00a) and PM Peak (4:00p-7:00p); **please note, federal guidance calls for four-hour Peak Periods, however, in comparison to other metropolitan areas Shreveport/Bossier City exhibits acute Peaks and adding an additional hour to the analysis would only dilute the segment SRF values, thus, a three-hour Peak Period is preferred.

STREETLIGHT TRAVEL-TIME DATA VALIDATION RESEARCH / DOCUMENTATION

NLCOG Staff took advantage of the availability (procured through the MTP 2045 Update effort) of the StreetLight traffic flow data/analysis application. The Streetlight product provided full coverage of the entire CMP Study Corridor mileage. However, to ensure that the travel-time datasets that were produced through the Streetlight application are valid and statistically significant NLCOG Staff requested any validation or substantiation independent research Streetlight has performed pertaining to their traffic flow datasets. Appendix A provides an example of one of the white papers Streetlight has undertaken concerning validation of their data.

SYSTEM-WIDE PERFORMANCE MEASURE DETERMINATIONS BY FHWA GOAL AREA (PM3) – RELEVANCY TO THE CMP

The PM3 Performance Measure is the designated measure in determining the current performance of a regional National Highway System (NHS) roadway network. This required system-wide determination is pertinent to the CMP analysis in that these measures provide an overarching status of the entire regional roadway system's "health" as it pertains to congestion. Travel Time Reliability (TTR) measures are calculated for NHS roadways to determine its level of performance (Table 4.1).

Table 4.1 – Federal/State DOTs/NLCOG PM3 Performance Measures for Goal Area PM3

Goal Area	Measure
FHWA PM3 System Performance/Freight/ CMAQ	**System Performance:** Percentage of person-miles traveled on the Interstate that are reliable (LOTTR)
	System Performance: Percentage of person-miles traveled on the non-Interstate NHS that are reliable (LOTTR)
	Freight Movement: percentage of Interstate system mileage providing for reliable truck travel time (TTTRI)
	***CMAQ:** Annual Total Tailpipe CO2 Emission on NHS
	***CMAQ:** Annual Hours of Peak Hour Excessive Delay (PHED) per capita
	***CMAQ:** Percent of Non-SOV Travel on network

**Applies to areas designated as nonattainment or maintenance for ozone, carbon monoxide, or particulate matter and is not currently applicable to the NLCOG MPA.*

Travel Time Reliability (TTR) Performance Measures:

Travel Time Reliability (TTR) measures help in calculating the unexpected delays. The following measures are the main components of TTR.

LOTTR (Interstate and non-Interstate): Level of Travel Time Reliability (LOTTR) is defined as the ratio of the 80th percentile travel time of a reporting segment to a "normal" travel time (50th percentile), using data from FHWA's free National Performance Management Research Data Set (NPMRDS) or equivalent. (0.1 mi. segments along **ALL NHS** Classified facilities).

TTTRI: Freight movement will be assessed by a Truck Travel Time Reliability (TTTRI) Index. The TTTRI ratio will be generated by dividing the 95th percentile Truck Classified vehicle time by the normal time (50th percentile) for each segment (0.1 mi. segments along Interstate Classified facilities).

Current system performance and freight reliability measures and targets are presented in Table 4.2 for both LADOTD and NLCOG.

Table 4.2 – System Performance and Freight Reliability Performance Measures

Measures	NLCOG MPA PM3*	LADOTD 2-Yr. Target	LADOTD 4-Yr. Target
System Performance: Percentage of person-miles traveled on the interstate that are reliable. (LOTTR)	100	88.9	88.4
System Performance: Percentage of person-miles traveled on the non-Interstate NHS that are reliable. (LOTTR)	93.2	**	88.6
Freight Movement: Truck Travel Time Reliability Index (TTTRI)	1.11	1.37	1.4

*NLCOG PM3 represents 2020 Data from the National Performance Management Research Data Set (NPMRDS).

**No 2 Yr. Statewide Target Provided.

NLCOG MPA: PM3 ASSESSMENT OF PROGRESS

As NLCOG was not required to establish a baseline for these PM3 measures under the previous MTP and CMP updates, this baseline provides a basis to continue to monitor percentage of person-miles traveled on the interstate and non-interstate NHS that are reliable and unreliable, as well as TTTRI. These are Federal/State/MPO required performance measures and provide the region with information that suggests which segments of interstate roadway may be intermittently congested and cause increased delays for both automobile and freight traffic. Although the deficiencies analysis described in NLCOG's MTP 2045 – Chapter 4 show there are hot spots causing delay along some segments of the interstate, regional reliability and system performance measures show a trend in regional performance that is significantly better than the national and statewide average.

CHAPTER 5
CONGESTED CORRIDOR / SEGMENT DETERMINATIONS THROUGH SRF

CONGESTED CORRIDOR/SEGMENT DETERMINATIONS BY SRF

Utilizing the SRF performance metric and the federally prescribed SRF ranges outlining the level of congestion, locating underperforming study segments is feasible. NLCOG will routinely monitor, as described in Chapter 8, **SRF levels** in determining network through segment level of service. Further, future CMP evaluations will provide NLCOG with data to better identify locations of recurring congestion and insight into other regional travel behavior phenomenon (e.g., lingering impacts of COVID-19 or the effect of autonomous vehicle technology upon the local transportation network).

FEDERAL GUIDANCE: CONGESTION LEVELS DEFINED

Provided below is a descriptive summary of the Federally prescribed congestion level ranges as outlined in Chapter 4.

> No to Low Congestion Levels: Segment speed reduction does not fall below 90% for Interstate/Freeway facilities and 80% for non-Freeway roadway segments. Generally, non-congested corridors do not need to be addressed by the CMP; however, the “Severely Congested” category will typically require one or more congestion-relieving strategies (project, mobility improving program, etc.).

>> Approaching Congestion (Moderate): Corridors that are not congested but have segments that exhibit speed reduction (compared to Free Flow travel speed of the segment) of between 65% to 80% for non-Freeway facilities and between 75% to 90% for Interstates/Freeway segments.

>>> Severely Congested: Corridors/Segments that exhibit this level of performance, below 75% SRF for Freeway facilities and 65% non-Freeway segments, are flagged as candidates for appropriate congestion mitigation projects/strategies first. The performance of these flagged segments requires immediate attention especially if multiple segments or sub-corridor areas are determined at this level. From a traffic flow perspective, if left unattended over a significant period time long distances of poorly performing segments will potentially lead to the entire corridor failing.

Table 5.1 – Summary of CMP Study Corridors That Exhibited "Severely Congested" conditions (By SRF Performance Metric) By Peak Period and Roadway Type

Study Corridor	*Peak Period*	*Freeway Or Non-Freeway*	*Segment Length (mi.) Operating Under Severely Congested Conditions*	*% Severely Congested Length (Total of 158 Study mi.)*
I-20	AM	Freeway	0.0 mi.	0%
	PM	Freeway	0.0 mi.	0%
N. Market (LA 1)	AM	Non-Freeway	0.0 mi.	0%
	PM	Non-Freeway	0.02 mi.	0.01%
Benton Rd. (LA 3)	AM	Non-Freeway	0.41 mi.	0.26%
	PM	Non-Freeway	1.02 mi.	0.65%
Airline Dr (LA 3105)	AM	Non-Freeway	0.0 mi.	0%
	PM	Non-Freeway	1.55 mi.	0.98%
I-220 / LA 3132	AM	Freeway	0.0 mi.	0%
	PM	Freeway	0.0 mi.	0%
US Hwy 79/80	AM	Non-Freeway	0.07 mi.	0.04%
	PM	Non-Freeway	0.55 mi.	0.35%
Barksdale Blvd	AM	Non-Freeway	0.15 mi.	0.09%
	PM	Non-Freeway	0.11 mi.	0.07%
70th St (LA 511)	AM	Non-Freeway	0.0 mi.	0%
	PM	Non-Freeway	0.27 mi.	0.17%
I-49	AM	Freeway	0.0 mi.	0%
	PM	Freeway	0.0 mi.	0%
Kings Hwy / Westgate	AM	Non-Freeway	0.08 mi.	0.05%
	PM	Non-Freeway	0.0 mi.	0%
Mansfield Rd / Hearne Av	AM	Non-Freeway	0.05 mi.	0.03%
	PM	Non-Freeway	0.0 mi.	0%
Youree Dr (LA 1)	AM	Non-Freeway	0.05 mi.	0.03%
	PM	Non-Freeway	1.21 mi.	0.77%
Bert Kouns Ind. Loop	AM	Non-Freeway	0.03 mi.	0.01%
	PM	Non-Freeway	0.39 mi.	0.25%
Totals:			**5.96 mi.**	**3.8%**

OVERALL STUDY NETWORK/CORRIDOR SRF FINDINGS

CMP STUDY NETWORK

From an overall CMP Study Network standpoint, SRF findings show that 96.2% of all study corridors, by corridor length, are operating at a "Moderate" to "No" congestion levels. There are 5.96 miles, out of a total study corridor length of 158.0 miles, where segment performance is determined to be "Severely Congested". Since NLCOG Staff does not have a point of reference to compare these findings against other Transportation Management Areas (TMAs – MPOs with populations > 200,000) required to develop/maintain their own CMPs, the case can be made that the SRF system-wide performance determinations are validated by the findings from the FHWA PM3 analysis which provided that the Metropolitan Planning Area (MPA) NHS roadways are performing at an above average level based upon the TTR measures of LOTTR and TTTRI. NLCOG speculates that the overall roadway network is outperforming other metropolitan peer road systems not only in the percentage of "Severely Congested" length but also in its level of performance.

CMP INDIVIDUAL CORRIDORS

Out of the 13 study corridors, only three of the corridors exhibited over 1.0 mile of "Severely Congested" performance. Airline Dr. (LA 3105) PM-Peak corridor contained the largest amount of the poor performance determined at 1.55 miles. From the Streetlight data, in general terms, not one of the study corridors is considered to have failing performance during either peak-period of operation. Of note, none of the Interstate/Freeway type roadways perform at a "Severely Congested" flow level. However, the lack of debilitating congestion does not preclude NLCOG Staff from ignoring the existing, albeit minor, corridor congestion. NLCOG is committed to maintaining and improving the level of roadway performance into the future.

CMP SRF SCREENING (INTERSECTION OR STANDALONE SEGMENT)

Table 5.2 details the individual segments that exhibit "Severely Congested" performance, through the SRF metric, however this table highlights only individual segments Not multiple (sub-corridor level of improvement needs/mitigation) segments. The performance characteristics and needs of degraded single, "Standalone", intersections or mid-block segments are different as compared to multiple segment (sub-corridors) deficient segments.

Table 5.2 – "Severely Congested" (By SRF) Standalone Signalized Intersection Approach Segment or Mid-Block Location (All are non-Freeway roadways – refer to Chapter 4)

Corridor Name	Direction of Travel	Peak Period	Peak-Period AADT	Signalized Intersection and/or Impactful Development Access (e.g., School Zone)	SRF
Barksdale Bv. (US 71)	SB	AM	2,466	Sligo Rd and Parkway H.S.	58.7%
Barksdale Bv. (US 71)	NB	PM	3,579	Shady Grove Dr signal	63.4%
Benton Rd. (LA 3)	SB	AM	826	LA 162 signals	63.9%
Benton Rd. (LA 3)	NB	AM	1,948	Fronting access to Benton Middle and Intermediate	60.6%
Bert Kouns Ind. Loop (LA 526)	EB	AM	3,436	SB I-49 Ramp signals	64.5%
Kings Hwy / Westgate	EB	AM	1,538	Barksdale Bv. signal	63.3%
Mansfield / Hearne	NB	AM	1,441	Fronting W-K North Med. Ctr.	64.1%
N. Market St. (US 71-LA 1)	NB	PM	1,364	Dr. MLK Jr.-Ravendale signal	57.9%
Youree Dr. (LA 1)	SB	AM	1,461	70th St. signal	63.1%
Youree Dr. (LA 1)	NB	PM	2,896	E. Washington signal	62.5%
70th St (LA 511)	Bi-direct.	PM	8,795	Youree Dr. signal	59.0%
70th St (LA 511)	EB	PM	2,371	I-49 SB ramp signals	64.1%
70th St (LA 511)	WB	PM	1,965	Mansfield Rd signal	62.9%
US 79-80 (E. Texas St.)	EB	PM	5,015	Approach to Airline Dr signal	64.4%

CMP SRF SCREENING (MULTIPLE SEGMENTS OR SUB-CORRIDOR AREA)

For analysis purposes, NLCOG Staff organized multiple segments, or sub-areas of the overall study corridor, that exhibit "Severely Congested" operational conditions. Grouping the segments in this manner expands the options available to reduce the level of congestion over a longer corridor distance. For example, more TSM&O and TDM strategies are viable for poorly performing sub-corridors as compared to individual approaches to traffic signals. It's not feasible to implement an Access Management strategy/plan or develop a Staggered Work Hours Program for one or two congested signalized intersection approaches.

Table 5.3 – "Severely Congested" (By SRF) Sub-Corridor Determinations

Corridor Name / Extents (by cross street)	*Direction of Travel*	*Peak Period*	*Average SRF*	*Average Peak AADT*	*Fixed Route Transit*	*Programmed Improvement Project/Strategy*
Airline Dr (LA 3105) /						
Beene Bv – I-220 EB Ramp Signal	SB	PM	63.5%	5,502	Yes	Yes – TIP 2023-2026
Viking Dr – Douglas Dr	Bi-direct.	PM	58.2%	9,434	Yes	No
Shed Rd – Hilton Dr	Bi-direct.	PM	61.2%	8,911	Yes	No
Benton Rd (LA 3) /						
Hospital Dr – I-220 EB Ramp Sig.	SB	PM	61.8%	4,538	Yes	Yes – TIP 2023-2026
Tilman Dr – I-220 WB Ramp Sig.	NB	PM	58.9%	6,209	Yes	Yes – TIP 2023-2026
Benton Rd – Clovis St	Bi-direct.	PM	64.3%	8,274	Yes	No
Bert Kouns Ind. Loop (LA 526) /						
Highland Hosp. Access-Jump Run	Bi-direct.	PM	63.4%	5,873	Yes	No
US 79-80 (E. Texas St.) /						
Mid-south Loop-Bellevue Signal	WB	PM	54.4%	3,376	No	No
Hillcrest Cir-Retail access Bellevue	EB	PM	59.7%	5,071	No	No
Segment past Bellevue Rd Signal	EB	AM	62.3%	1,889	No	No
Youree Dr (LA 1) /						
Gator Dr-South Circulation Dr	SB	PM	57.7%	5,535	Yes	No
South Circulation Dr-seg past 70th	NB	PM	55.8%	4,898	Yes	No

CMP STUDY CORRIDORS WHICH DO NOT EXHIBIT (BY SRF) OVERALL CONGESTION DURING THE ANALYSIS PERIOD (04.2021) & PEAK-PERIODS

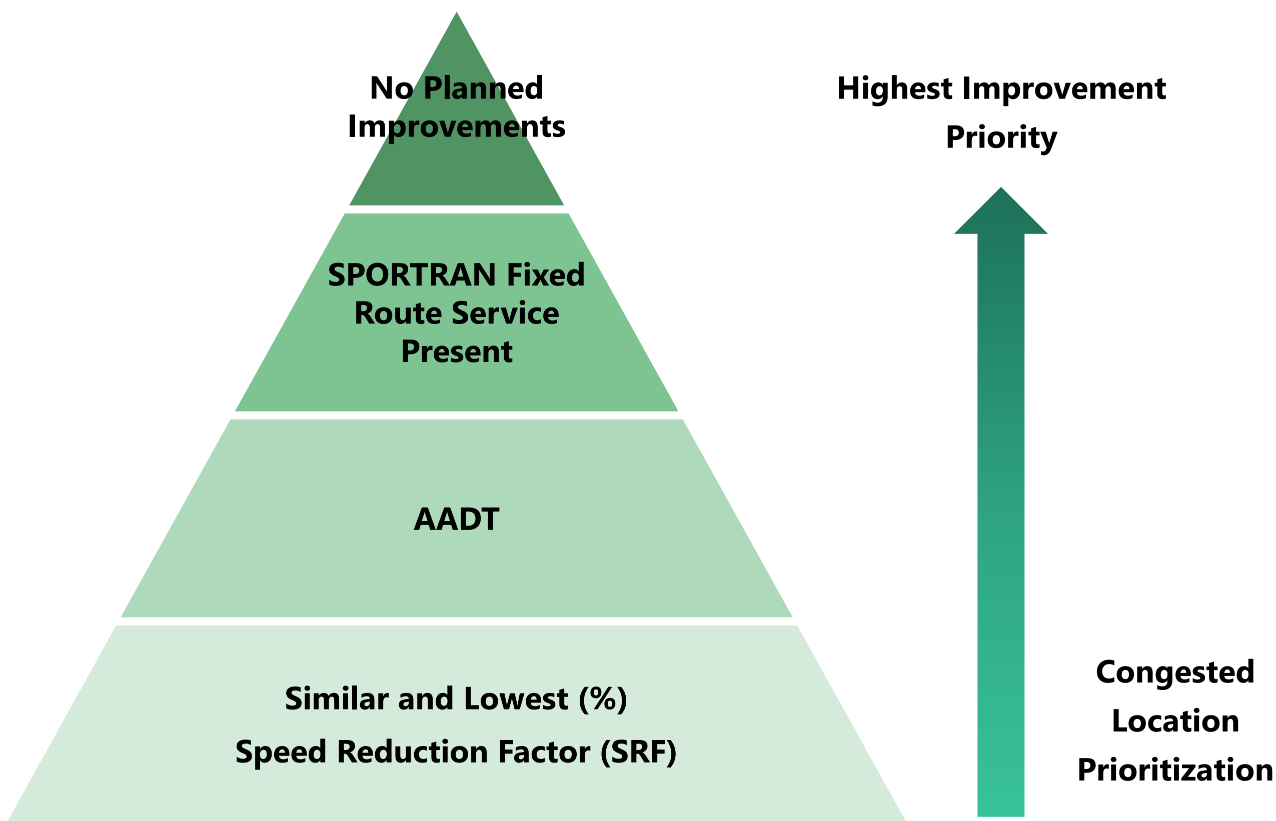
Performing the analysis through the Streetlight application revealed that some CMP Study Corridors exhibited "Moderate" to "No Congestion" SRFs across the entire corridor for both AM and PM Peak-Periods *(refer to Appendix E)*. The corridors listed below will not be considered for recommended congestion mitigation strategies/projects, however, improvement projects planned along other congested corridors/segments must account for any secondary impacts they may pose to these currently moderate to low congestion roadways.

- I-220 / LA 3132
- I-49

CHAPTER 6
CONGESTED CORRIDOR PRIORITIZATION

Locating roadway segment delay, through the SRF, is the first step in the process of prioritizing those low performing segments as candidates for improvement. Figure 6.1 illustrates the hierarchy of considerations during the ranking of congested study segments. Congested segments with similar Speed Reduction Factors (SRF) can vary tremendously regarding their need for roadway improvement. Other factors come into play and must be considered during the determination of highest improvement priority.

Figure 6.1 – CMP Sub-Corridor Prioritization Scheme



Study Segment(s) Traffic Volume (AADT)

If a congested study segments have similar SRF values (i.e., +/- 1.0%), the level of performance they are exhibiting is nearly the same given the error of the observed traffic flow data. An initial factor to consider, once the SRF is determined, is the amount of volume (adjusted to AADT) along the congested segment(s). A transportation improvement project programmed for a congested segment that carries 20,000 vehicles daily provides significantly more benefit to the transportation system as compared to an improvement upon a facility that carries 5,000 vehicles daily. For this prioritization criteria, the higher the segment's AADT, the more of impact an improvement project will have upon the overall transportation network, thus, **increasing** its priority versus other similarly congested segment(s).

Presence of Transit Service

Congestion significantly degrades transit's ability to provide efficient and economical service to its patrons. Heavily congested CMP study sections reduce fuel efficiency and increase both vehicle emissions and patron delay. The intent of a Transit Impact Rating is to identify sections that are crucial to transit service. Further, sections which are experiencing high levels of congestion **and** directly impact transit service are prioritized higher than those sections which do not handle transit operations. If transit service is present, then the priority of the poor performing segment(s) **increases**.

Identified Improvement Projects (along or adjacent to congested segment(s))

At this level of screening, if a poorly performing segment has a planned improvement project aimed at mitigating congestion and/or improving its level of safety, the need (i.e., priority) for the project **decreases** versus other candidate projects given all other factors being equal. A programmed improvement strategy or project is one that is identified in the upcoming MPO Transportation Improvement Program (TIP – FFY2023 – FFY2026).

By integrating the four ranking criteria (SRF, AADT, Presence of Transit and Planned Location-Specific Improvements) into a local prioritization scheme, a well-balanced and equitable prioritization scheme is achieved.

Table 6.1 – Prioritized Sub-Corridor/Segments Improvement Project Matrix

Corridor Name	SRF (Rank)	AADT (Rank)	SRF+AADT Composite (Rank)	Presence of Transit	Programmed Improvement	Final Prioritization (Rank)
Airline Dr (LA 3105) / Beene Bv – I-220 EB Ramp Signal	63.5% (12)	5502 (7)	19 (11)	▲	▼	**11**
Airline Dr (LA 3105) / Viking Dr – Douglas Dr	58.2% (4)	9434 (1)	5 (1)	▲	▼	**2**
Airline Dr (LA 3105) / Shed Rd – Hilton Dr	61.2% (7)	8911 (2)	9 (2)	▲	▲	**1**
Benton Rd (LA 3) / Hospital Dr – I-220 EB Ramp Sig.	61.8% (8)	4538 (10)	18 (10)	▲	▼	**10**
Benton Rd (LA 3) / Tilman Dr – I-220 WB Ramp Sig.	58.9% (5)	6209 (4)	9 (2)	▲	▼	**4**
Benton Rd (LA 3) / Benton Rd – Clovis St	64.3% (10)	8274 (3)	13 (7)	▲	▲	**6**
Bert Kouns Ind. Loop (LA 526) / Highland Hosp. Access-Jump Run	63.4% (11)	5873 (5)	16 (9)	▲	▲	**7**
US 79-80 (E. Texas St.) / Mid-south Loop-Bellevue Signal	54.4% (1)	3376 (11)	12 (6)	▼	▲	**8**
US 79-80 (E. Texas St.) / Hillcrest Cir-Retail access Bellevue	59.7% (6)	5071 (8)	14 (8)	▼	▲	**9**
US 79-80 (E. Texas St.) / Segment past Bellevue Rd Signal	62.3% (9)	1889 (12)	21 (12)	▼	▲	**12**
Youree Dr (LA 1) / Gator Dr-South Circulation Dr	57.7% (3)	5535 (6)	9 (2)	▲	▲	**3**
Youree Dr (LA 1) / South Circulation Dr-seg past 70th	55.8% (2)	4898 (9)	11 (5)	▲	▲	**5**

▲ Indicates an Increase in priority
▼ Indicates a Decrease in priority

Table 6.2 – Regrouping Sub-Corridors with Prioritization

Corridor Name / Extents (by cross street)	Direction of Travel	Peak Period	Sub-Corridor / Segment Rankings	Priority
Airline Dr (LA 3105) /				**1**
Beene Bv – I-220 EB Ramp Signal	SB	PM	11	
Viking Dr – Douglas Dr	Bi-direct.	PM	2	
Shed Rd – Hilton Dr	Bi-direct.	PM	1	
Youree Dr (LA 1) /				**2**
Gator Dr-South Circulation Dr	SB	PM	3	
South Circulation Dr-seg past 70th	NB	PM	5	
Benton Rd (LA 3) /				**3**
Hospital Dr – I-220 EB Ramp Sig.	SB	PM	10	
Tilman Dr – I-220 WB Ramp Sig.	NB	PM	4	
Benton Rd – Clovis St	Bi-direct.	PM	6	
Bert Kouns Ind. Loop (LA 526) /				**4**
Highland Hosp. Access-Jump Run	Bi-direct.	PM	7	
US 79-80 (E. Texas St.) /				**5**
Mid-south Loop-Bellevue Signal	WB	PM	8	
Hillcrest Cir-Retail access Bellevue	EB	PM	9	
Segment past Bellevue Rd Signal	EB	AM	12	

Table 6.2 regroups and summarizes the sub-corridor needs, prioritized by SRF/AADT/Presence of transit service/programmed improvements, for the entire CMP Study area. The defined Airline Dr (LA 3105) sub-corridor is prioritized as having the greatest need for improvement. Chapter 7's intent is to develop regionally effective congestion mitigation strategies or projects that, over time, have a meaningful impact upon these congested corridors.

CHAPTER 7
REGIONALLY EFFECTIVE CMP MITIGATION STRATEGIES / PROJECTS

REGIONAL CONGESTION MANAGEMENT STRATEGIES

This section of the CMP Update identifies and evaluates the strategies intended for mitigating existing and future congestion along prioritized “Severely Congested” sub-corridors (multiple segments). Through Chapter 7, alleviation strategies are provided (please refer to Appendix C – comprehensive survey of congestion mitigation strategies) which take into account physical deficiencies (i.e., geometrics), travel demand, land-use, and fiscal issues. The intent of the recommended strategies is to supply decision-makers with cost-effective improvements aimed at reducing congestion. Improvements are not only developed to improve performance along a specific high priority section; they must benefit the entire network.

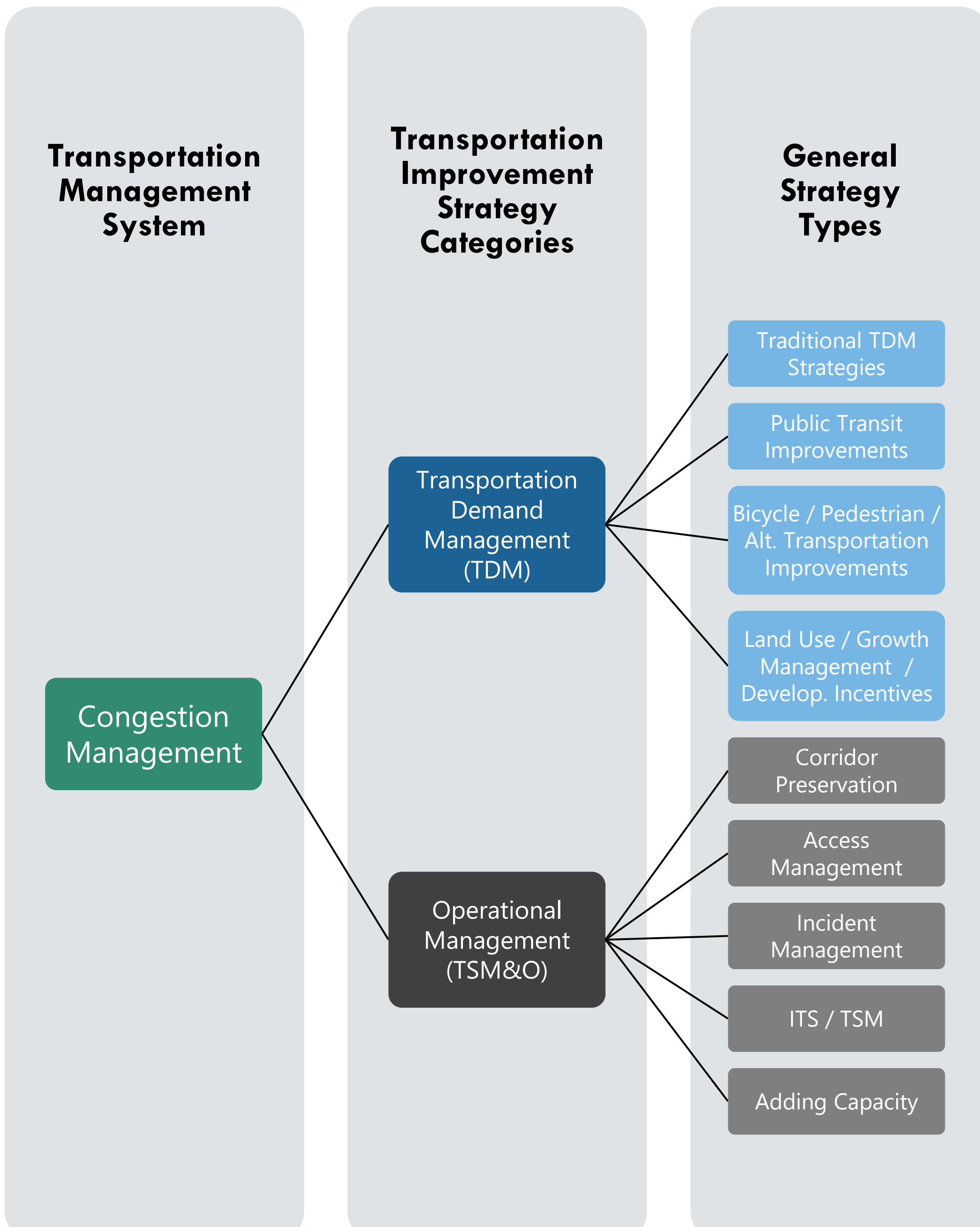
Effective CMP Improvement Strategies/Projects Considerations

- Improvement strategy/project costs
- Appropriateness of recommended strategy/project – improvement scope aligns with congestion level and extents
- Previously implemented improvement strategy/project upon the local roadway system
- Current local political willingness to implement the improvement (critical consideration)

CMP IMPROVEMENT STRATEGY/PROJECT RECOMMENDATION PROCESS

Once congested sub-corridors are selected for review, they are selectively screened to identify mitigation strategies appropriate to reduce congestion and secondarily improve its safety characteristics. The CMP Strategy Matrix (found in Appendix C) is used to address recurring congestion. The congestion mitigation strategies that are identified as having the greatest potential benefit are then evaluated in greater detail to determine the most effective improvement strategy/project. NLCOG Staff makes these improvement recommendations to the MPO’s Technical Coordination Committee (TCC – comprising of professional staff working in multi-modal, local planning and engineering endeavors). Once the TCC members accept the overall CMP document, along with the recommended improvement strategies/projects, it is recommended to the MPO's Transportation Policy Committee (TPC – comprised of locally elected/appointed officials) for Introduction and then consideration for adoption. are made for the projects or programs to be implemented. Appendix C provides a full range of potential congestion mitigation strategies. These strategies can be grouped into the following broad categories as presented in Figure 7.1.

Figure 7.1 – Congestion Management: Widely Implemented Improvement Strategy Types



CMP IMPROVEMENT STRATEGY/PROJECT RECOMMENDATION FOR INDIVIDUAL INTERSECTION APPROACH OR MID-BLOCK SEGMENT LOCATIONS

Identified in Chapter 5, the isolated congested segments listed in Table 7.1 have limited improvement options as compared to the much larger congested multiple segment/sub-corridor areas. Isolated segments are limited by the considerations for successful CMP strategies/projects described earlier in the chapter. Further, local jurisdictions have detailed operational (e.g., TSIs) and travel flow data (e.g., local traffic signal optimization plans/data) that NLCOG Staff is not privy to.

Table 7.1 – Improvement Strategy/Project Recommendation for Standalone Signalized Intersection Approach Segment or Mid-Block Location – Local Jurisdictional Responsibility

Corridor Name	Direction of Travel	Peak Period	Signalized Intersection and/or Impactful Development Access (e.g., School Zone)	Local Jurisdiction Responsibility
Barksdale Bv. (US 71)	SB	AM	Sligo Rd and Parkway H.S.	Bossier City
Barksdale Bv. (US 71)	NB	PM	Shady Grove Dr signal	Bossier City
Benton Rd. (LA 3)	SB	AM	LA 162 signals	BPPJ
Benton Rd. (LA 3)	NB	AM	Fronting access to Benton Middle and Intermediate	BPPJ
Bert Kouns Ind. Loop (LA 526)	EB	AM	SB I-49 Ramp signals	City of Shreveport
Kings Hwy / Westgate	EB	AM	Barksdale Bv. signal	Bossier City
Mansfield / Hearne	NB	AM	Fronting W-K North Med. Ctr.	City of Shreveport
N. Market St. (US 71-LA 1)	NB	PM	Dr. MLK Jr.-Ravendale signal	City of Shreveport
Youree Dr. (LA 1)	SB	AM	70th St. signal	City of Shreveport
Youree Dr. (LA 1)	NB	PM	E. Washington signal	City of Shreveport
70th St (LA 511)	Bi-direct.	PM	Youree Dr. signal	City of Shreveport
70th St (LA 511)	EB	PM	I-49 SB ramp signals	City of Shreveport
70th St (LA 511)	WB	PM	Mansfield Rd signal	City of Shreveport
US 79-80 (E. Texas St.)	EB	PM	Approach to Airline Dr signal	Bossier City

It is recommended that improvements to these segments originate from the local responsible jurisdiction. NLCOG is available to assist in configuring improvement projects and initiate the process of inclusion into the MPO's Project Selection Process (PSP).

CMP IMPROVEMENT STRATEGY/PROJECT RECOMMENDATIONS FOR SEVERELY CONGESTED SUB-CORRIDOR LOCATIONS

Provided below are the top three prioritized congested sub-corridors within the CMP's Study Area. Recommendations are compiled by NLCOG Staff in coordination with the appropriate local jurisdiction.

Priority 1: Airline Dr (LA 3105) Corridor PM-Peak / Beene Bv to I-20

Source(s) of Congestion: Physical Deficiencies – Inadequate signalized intersection spacing around the I-220 ramp signals and Viking Dr intersection; inadequate turning bay lengths at some signalized intersections; large amount of private property access out onto Airline Dr provides much of the conflict along the entire corridor.

Future Sub-corridor Travel Demand – A significant amount of continuous residential development is anticipated both north and south of this sub-corridor which will exacerbate the congestion if it is not addressed.

Land Use Factors – Above average amount of private property access located along the entire congested section serving large retail, entertainment, and commercial uses. This section serves as the primary retail and commercial development for Bossier Parish.

Short-Range Improvement(s): The proposed improvement project (new TIP FFY2023-FFY2026), Bossier City is the charged local jurisdiction, focuses on the north end of the corridor.

2023	Airline Dr Corridor	Beene Blvd to Viking Dr	Capacity/Access Management Improvements	$3,000,000	Bossier City

In addition to the aforementioned project, Bossier City has commissioned a transportation planning and engineering firm to develop an optimized traffic signal timing plan for the coordinated signal systems located along the Airline, Benton Rd., and Barksdale Blvd corridors within Bossier City. This short-range improvement will facilitate more signalized intersection throughput without having to resort to adding capacity.

Long Range (Recommended Improvement(s): Three years ago, LADOTD performed a congestion mitigation study for the Airline Dr corridor that's "Severely Congested". NLCOG Staff believes Bossier City officials are considering some of the "out of the box" innovative strategies and projects recommended through the remediation plan.

Construction of an additional southbound travel lane, from E. Texas St. signalized intersection to the I-20 Westbound entrance ramp, will reduce turning movement delay. To facilitate higher entrance ramp speeds, the added lane will transition to a dedicated right-turn lane near the I-20 interchange. This improvement will allow for the expansion of lane widths and turning bays. The improvement will ease non-recurring (i.e., special generator) congestion caused by activities originating from high density retail and commercial land uses.

Priority 2: Youree Dr. (LA 1) – PM-Peak / Gator Dr to Southernmost Retail Access Road

Source(s) of Congestion: Large retail and commercial development is built up adjacent to the entire sub-corridor's length and contribute to extreme traffic flow conflict points which are elevated during the peak-periods. Further, inadequate LT turn bay capacity, specifically at the 70^{th} St. signalized intersection exacerbates the amount of delay encountered all along the sub-corridor.

Future Sub-corridor Travel Demand – Shreveport has experienced a loss of population over the past 5 years which has resulted in a stabilization of extreme congested conditions along this sub-corridor. The overall retail market sector, by April of 2021, has not fully recovered to pre-COVID-19 conditions. Some retail attractors are limiting their hours of operation which has lessened traffic demand to the area.

Short-Range Improvement(s): A significant improvement project at the Youree Dr and 70^{th} St signalized intersection would go a long way to improve the flow throughout the sub-corridor. Some operations improvements such as dedicated RT movement lanes, double LT movement lanes from the most congested approaches would benefit the performance of the intersection significantly.

Long-Range Improvement(s): Revisit Access Management "Best Practices" limiting direct access (i.e., curb cuts) onto principal arterial-corridors will stabilize flow interruptions originating from adjacent land uses. Additionally, policy that requires large, high-volume development to provide access to adjacent land uses through shared driveways will reduce the demand for direct arterial access points. **However, since the developments have approved and established private access points out onto Youree Dr. applying Access Management strategies along the sub-corridor is that much more difficult.**

Priority 3: Benton Rd (LA 3) Corridor PM-Peak / Hospital Dr to Benton Spur Rd

Source(s) of Congestion: "Spillback" from the LT movements at the I-220 and E. Texas St. signalized intersections into the through travel lanes is a major source of delay during the peak periods. Inadequate traffic signal spacing between the I-220 ramp signals and Viking Dr intersection also leads to traffic flow conflict.

Future Travel Demand – Existing commercial/institutional attractors are located adjacent (North) area of the section; A significant amount of continuous residential development is anticipated both north and south of this sub-corridor which will exacerbate the congestion if it is not addressed.

Short-Range Improvement(s): The proposed improvement project (new TIP FFY2023-FFY2026), Bossier City is the charged local jurisdiction, focuses on the north end of the corridor.

2023	I-220 @ Benton Rd	I-220/Benton Ramp Signal (N) to I-220/Benton Ramp Signal (S)	New Ramp Traffic Signals	$475,000	Bossier City

In addition to the aforementioned project, Bossier City has commissioned a transportation planning and engineering firm to develop an optimized traffic signal timing plan for the coordinated signal systems located along the Airline, Benton Rd., and Barksdale Blvd corridors within Bossier City. This short-range improvement will facilitate more signalized intersection throughput without having to resort to adding capacity.

CHAPTER 8

CMP MONITORING / PROJECT EVALUATION AND RELATION TO THE MPO PLANNING PROCESS

INTRODUCTION

FHWA guidelines call for CMPs to include provisions to monitor the performance of strategies implemented to address congestion. Regulations require "a process for periodic assessment of the efficiency and effectiveness of implemented strategies, in terms of the area's established performance measures. If we look back at the CMP Process Framework illustrated in Chapter 2 (Fig. 2.1), improvement evaluation and CMP monitoring efforts are the last step in the Congestion Management Process cycle. The intent of this step is to assist in determining whether operational or policy adjustments are needed to make the current strategies work more efficiently. Further, it provides information about how various strategies work to implement future approaches within the CMP study area.

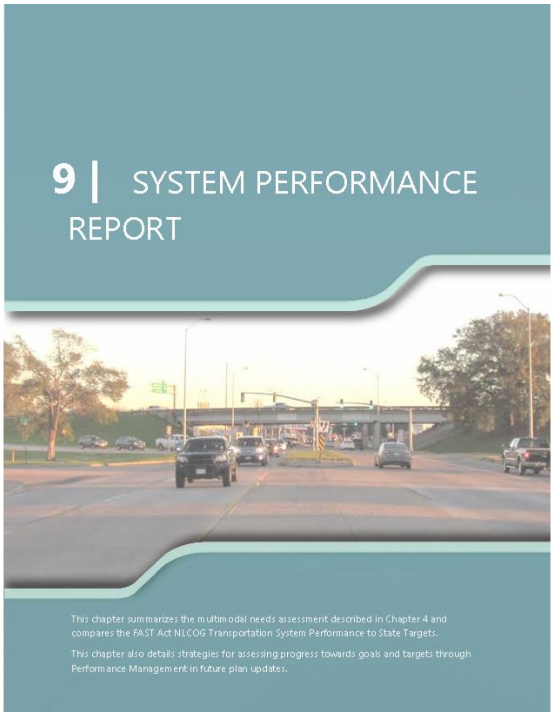
TRAFFIC FLOW DATA APPROPRIATE FOR CMP ANALYSIS AND CONGESTION DETERMINATIONS

The following lists data NLCOG staff will maintain and update periodically to support the CMP. Observed Traffic Flow Data (StreetLight Data), Adjustments and Calculated Data Metrics Utilized to Determine Roadway Congestion Levels for the CMP Update.

DATA	SOURCE	Updated (Last)	CMP Performance Indices or Improvement Project Prioritization or Other Purpose
CMP Network / Travel Time-Speed Data	NLCOG	Streetlight data: (Continuous)	SRF (segment) TT Reliability (network)
Traffic Count Data (AADT / Level of Service / V/C / VMT)	Streetlight data subscription (4-Parish MPA) / LADOTD / NLCOG	Streetlight data: (Continuous) / LADOTD: routine counts / NLCOG:	Project Prioritization: (MTP / CMP / ITS / Safety / Freight Plan. / TIP)

		project specific	
Travel Time Data (All vehicles. And Freight movements)	Streetlight data subscription (MPA)	Streetlight data: (Continuous)	CMP: SRF (segment) TT Reliability (network) / Project Impacts and Prioritization:
Incident-Crash Data / (VMT)	LA CRASH Database / (CARTS)	Continuous	MPO PM1 Performance Measures and Target setting / Safety project prioritization
Bicycle and Pedestrian Inventory	Streetlight data subscription (MPA) / Local Entities / NLCOG	Streetlight data: (Continuous) Local Sources: (October 2017)	MTP Project Prioritization
Transit Ridership	SPORTRAN	February 2018	Transit PM - TAMP
Transit Routes and Stop Locations	SPORTRAN	February 2018	Transit PM - TAMP
Regional ITS Architecture	NLCOG	May 2017	MTP Project Prioritization
Transportation Systems Management & Operations	Local Entities / NLCOG	May 2018	MTP Project Prioritization

NLCOG'S PM3 SYSTEM PERFORMANCE & FREIGHT RELIABILITY PERFORMANCE REPORT



NLCOG regional transportation performance reporting is accomplished primarily through TIP and MTP planning processes, which include targets for applicable TPM measures (including PM3: System and Freight Reliability Measures). As a key tool in the maintenance of NLCOG's CMP report the PM3 Systems Report will be updated.

The schedule for preparing the Federally required (designated Metropolitan Planning Area MPA – 4 Parish area) System Performance Report is in conjunction with the Update of the MPO's Metropolitan Transportation Plan (MTP).

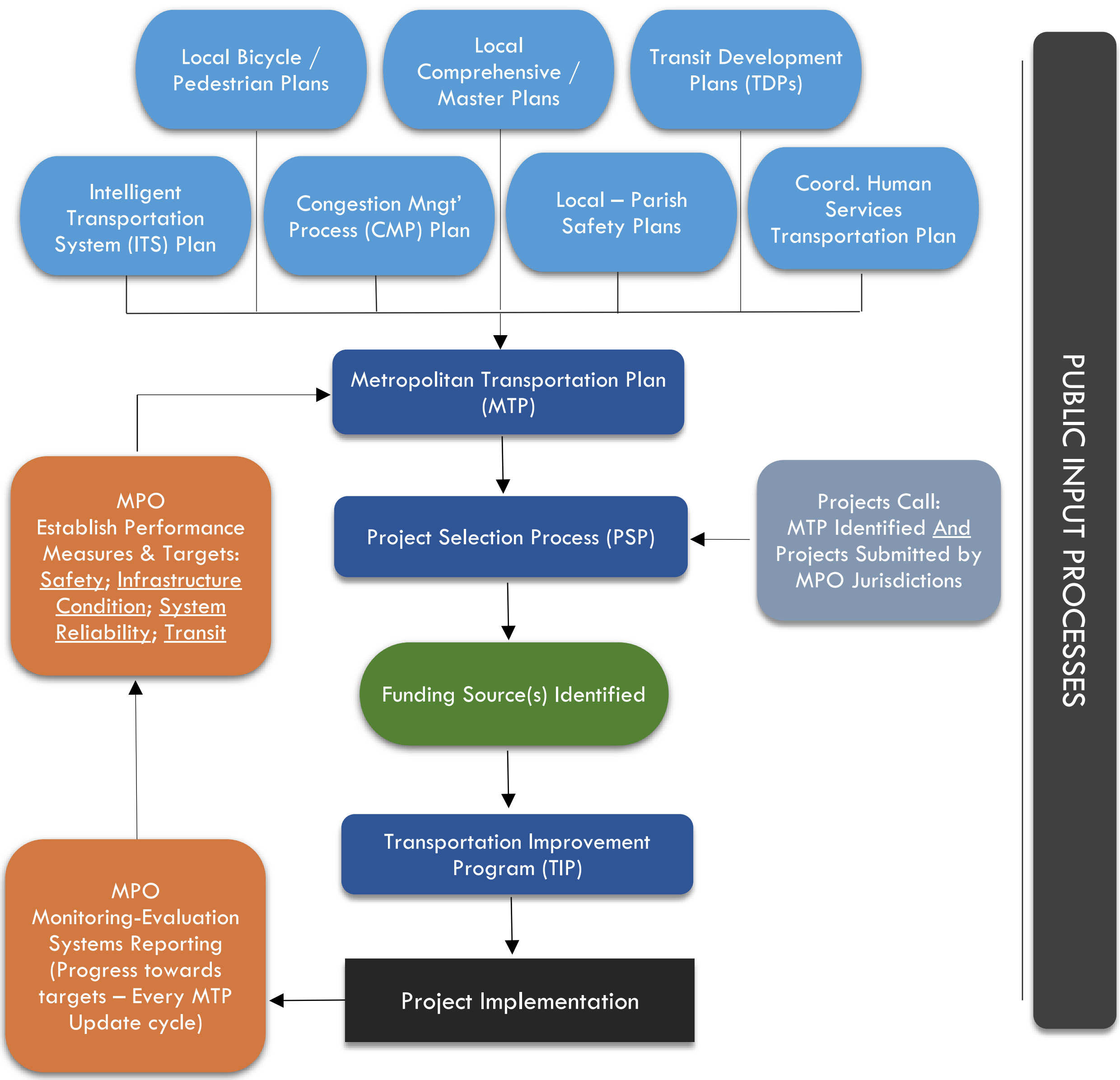
NLCOG'S CONGESTION MANAGEMENT PROCESS (CMP) REPORTING

The CMP report will track the effectiveness of the implemented strategies, to the extent possible with the available project level data, and conditions of the multimodal transportation system. The same set of quantifiable performance measures established for the CMP as established in Chapter 4 of this report will be used to measure system performance at corridor and system levels. Data collection and performance monitoring are ongoing with the various periodic assessments of roadway, transit, bicycle/pedestrian/trail, freight network performance in the region. However, this CMP also identifies the need for a process that supports the routine tracking of the effectiveness of the implemented congestion mitigation strategies and the multimodal transportation system in Northwest Louisiana.

CMP RELATION TO THE MPO TRANSPORTATION PLANNING PROCESS

NLCOG's CMP is one component in the overall MPO Transportation Planning Process. Figure 8.1 provides a graphical representation of how the CMP fits into overall MPO planning process. From this process, the CMP provides recommended transportation improvement strategies/projects based upon rationally developed performance measures and a need-based prioritization scheme utilized in the development of the MPO's Metropolitan Transportation Plan (MTP) update.

Figure 8.1 – NLCOG's (MPO) Transportation Planning Process and the CMP's Role



Performance measures and target setting are defined and adopted within the MPO's Metropolitan Transportation Plan (MTP). As identified MTP improvement projects are being prioritized through the Project Selection Process (PSP), the MPO's TCC evaluates projects on a performance-based scoring system. Once a funding source is secured per respective project, the top ranked projects are scheduled into the four-year Transportation Improvement Project (TIP). Public input and comments are an integral part of the entire MPO Transportation Planning Process and is represented along the entire sequence of the process diagram. Ultimately, programmed projects progress through the prescribed project delivery process (per LADOTD) and are Let for Construction or Implementation. Implemented improvement projects/strategies are evaluated through the Systems Performance Report which is undertaken through the update of the MPO's Metropolitan Transportation Plan (MTP).

CMP Improvement Project Potential Funding Sources

Once the Congestion Management Process (CMP) recommended projects and strategies have been evaluated the output information can be used to propose projects for inclusion in the Northwest Louisiana's Metropolitan Transportation Plan (MTP) 2045 and the corresponding TIP. Programming of CMP strategies into the TIP will be coordinated through the TCC in cooperation with the implementing agency and will be funded through federal, state, or local funds.

Responsibility for the implementation of specific congestion management strategies lies with the State of Louisiana and/or local jurisdictions. While the MPO does not receive any special funds for congestion mitigation, funding for CMP recommended improvements will be identified in the upcoming update of our current four-year TIP. The new TIP will replace the current TIP starting in FFY 2023 (Northwest Louisiana Metropolitan Planning Area TIP (2023-2026)). Other sources of funding available include transportation enhancement funds, which can be used to improve non-motorized transportation facilities, and Federal Transit Administration (FTA) Section 5307 funds, and JARC funds.

Future MPO Actions Regarding CMP Maintenance

Following through on the recommendations of the CMP, will require NLCOG staff to perform periodic traffic flow data collection activities (i.e., travel times), as well as occasional traffic surveillance. Working with SPORTRAN (primary transit provider for the urban area), LADOTD, major employers and our standing TCC, NLCOG will be able to rationally develop CMP projects for implementation.

During the annual development of the Unified Planning Work Program (UPWP), CMP monitoring and maintenance activities will be included, and any additional special projects needed to carry the CMP objectives forward will be included.

- Update the CMP on the recommended **five-year cycle** AFTER adoption of the Metropolitan Transportation Plan (MTP). Utilize the required Transportation Systems Status Report data and findings (PM3 determinations) within the update of the CMP.
- Follow data collection methodology for updating travel times on study corridors
- Continue dialogue with the TCC concerning mitigation strategy recommendations
- Include CMP monitoring/maintenance activities in the UPWP

CMP Partners

NLCOG's Congestion Management Process was developed through a cooperative effort with members of the MPO's Technical Coordinating Committee (TCC). The Technical Coordinating Committee (TCC) provides planning and engineering guidance to the MPO's Transportation Policy Committee in dealing with issues of the MPO's transportation programs (i.e., CMP). The TCC's primary function is to interpret technical data and policy mandates. Further, the TCC is used by the MPO's Transportation Policy Committee to formulate the Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP). To integrate the CMP into the planning process the development of the CMP was discussed during the TCC meetings. The member agencies and groups represented on the TCC include:

- LADOTD -Planning/Programming
- LADOTD – District 04 Traffic Engineer
- Shreveport MPC
- Bossier City MPC
- Shreveport-Bossier Port Commission
- SPORTRAN (Shreveport/Bossier City 5307 Urban Transit Provider)
- Federal Highway Administration – LA Div.
- Caddo Parish Commission
- Desoto Parish Police Jury
- Webster Parish Police Jury
- Bossier City Traffic Engineering
- Federal Transit Administration – Reg. VI
- Caddo Parish Commission
- Shreveport Traffic Engineering

APPENDIX A
STREETLIGHT TRAVEL-TIME DATA VALIDATION RESEARCH:

DATA COMPARISON TO OTHER STATE DOT OBSERVED TRAVEL-TIME STUDIES


STREETLIGHT InSight
StreetLight Speed Validation
Version 1.1
July 2021version 1.1

Speed Metric Summary

We are continuously improving our Metrics in order to bring the best results possible to our customers. StreetLight's Speed Metric algorithm has been enhanced in order to improve speed accuracy on curves, and eliminate mode confusion near transit, higher speeds near freeways, and extreme outlier speeds. This paper demonstrates data validation for three of StreetLight's available Speed Metrics: 85th percentile speeds, speed distributions and hourly speeds.

In order to validate StreetLight's Speed Metric, we looked for the highest quality publicly available speed data published by state agencies for comparison. Specifically, we utilized speed reports provided by Washington State Department of Transportation (WSDOT)[1] which published 85th percentile speeds as well as speed distributions for select locations. To evaluate hourly speed data, we relied on data published by the California Department of Transportation's Performance Management System (PeMS)[2].

In total we utilized 202 sample locations from WSDOT and 71 sample locations from PeMS for this validation. Both state agencies used permanent loop counters to collect speed data. Permanent loop counters are prone to error, however, since some counters detect only speeds within a certain range or estimate speeds in cases of single (as opposed to dual) loop detectors. Meanwhile, StreetLight speeds may be subject to error in scenarios where trip samples are limited, or road network configuration contributes to trip-locking challenges. In order to avoid atypical speeds that might have occurred in 2020 due to the COVID-19 pandemic, we compared StreetLight's Speed Metric from 2019 to published speeds from the same year. All locations were uploaded as line segment zones and run as Segment Analyses within StreetLight InSight®. StreetLight InSight® Speed Metrics are available in both the U.S. and Canada. Even though this validation just looks at locations from the U.S., the latest Metric improvements apply to Segment Analyses, Origin-Destination Analyses, and Origin-Destination through Middle Filter analyses run in both the U.S. and Canada.

85th Percentile Validation

Traffic engineers use the 85th percentile speed as a standard to set the speed limit at a safe speed, thus minimizing crashes and promoting uniform traffic flow along a corridor. For the sampled locations, StreetLight's 85th percentile speeds had a strong correlation with an R^2 value of 0.91.

[1] https://www.wsdot.wa.gov/mapsdata/travel/speedreport.htm
[2] https://pems.dot.ca.gov/

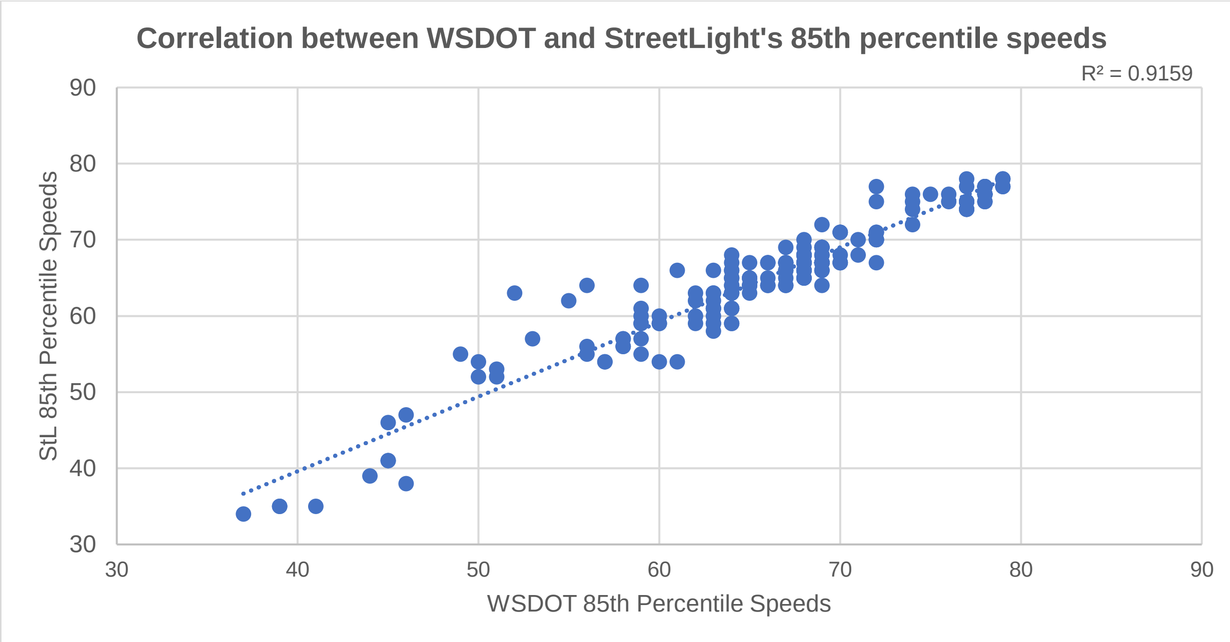


Figure 1: Scatter plot illustrating the correlation between WSDOT's 85th Percentile speeds and those reported by StreetLight. The plot shows strong correlation with an R^2 of 0.91.

Table 1 highlights the difference between StreetLight's 85th percentile speeds and WSDOT's reported values for the same locations over an entire day. Therefore, if WSDOT reports a speed of 70 mph and StreetLight reports a speed of 71 mph, the difference is "1." Table 1 illustrates the distribution of those differences as percentiles, while Figure 2 illustrates the distribution as a histogram.

Bias - 50th Percentile Difference (mph)	25th Percentile Absolute Difference (mph)	50th Percentile Absolute Difference (mph)	75th Percentile Absolute Difference (mph)	95th Percentile Absolute Difference (mph)
-1	1	2	3	6

Table 1: Distribution of the difference between StreetLight's reported 85th percentile speed and those reported by WSDOT for the same locations for an average day in April 2019. Two outliers were removed due to insufficient sample.

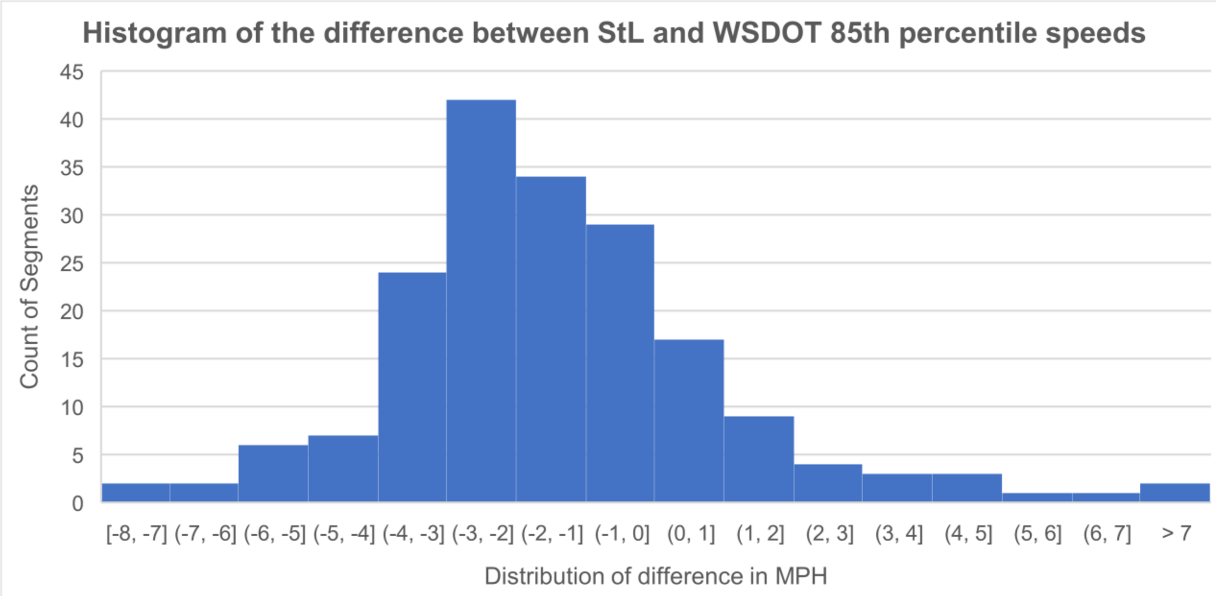


Figure 2: Histogram illustrating the difference between StreetLight's reported 85th percentile speed and those reported by WSDOT for the same locations for average days in April 2019. The majority of locations are within 3 mph of WSDOT's published values.

Speed Distribution Validation

WSDOT also published the distribution of vehicle speeds over an average day at 5 mph intervals. StreetLight evaluated similar speed distributions for the same locations across Washington State. The following figures illustrate the comparison between speed distributions at select locations. We look for the distribution between the two sources to have a similar shape, with highs and lows clustered around the same 5 mph bins.

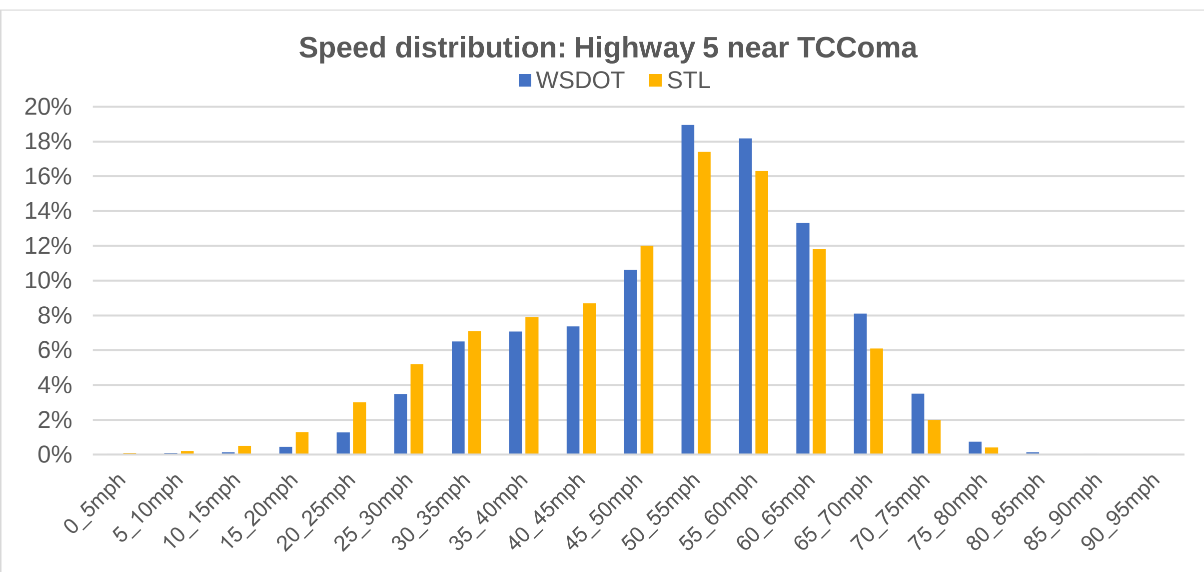


Figure 3: Comparison of speed distributions across 5 mph bins at a site on Highway 5 near Tacoma, Washington.

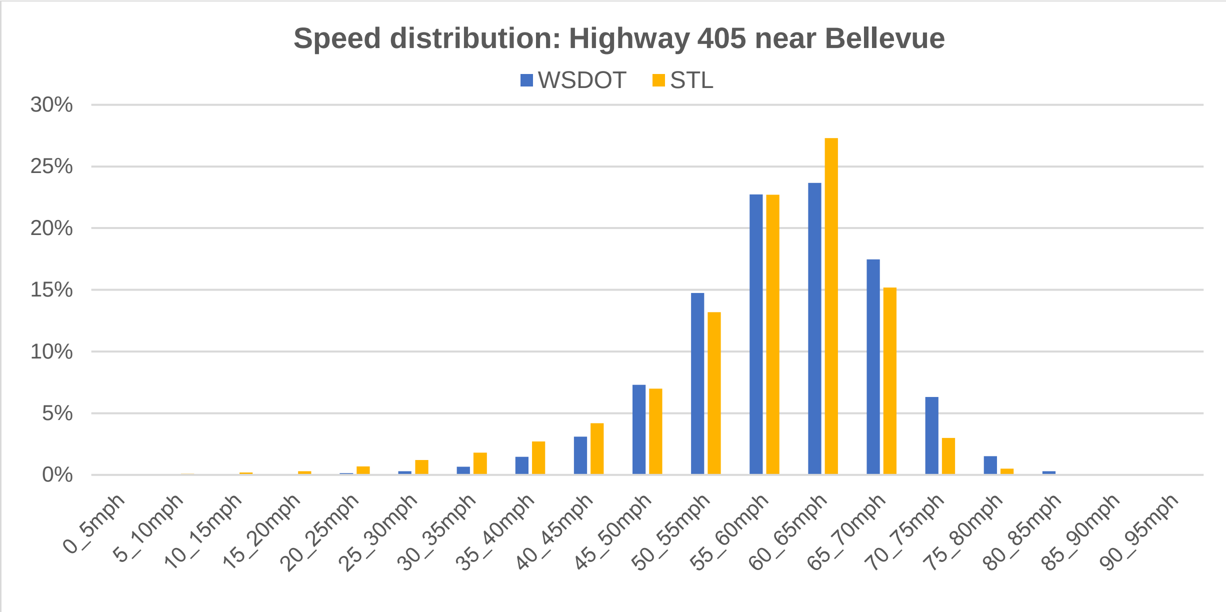


Figure 4: Comparison of speed distributions across 5 mph bins at a site on Highway 405 near Bellevue, Washington.

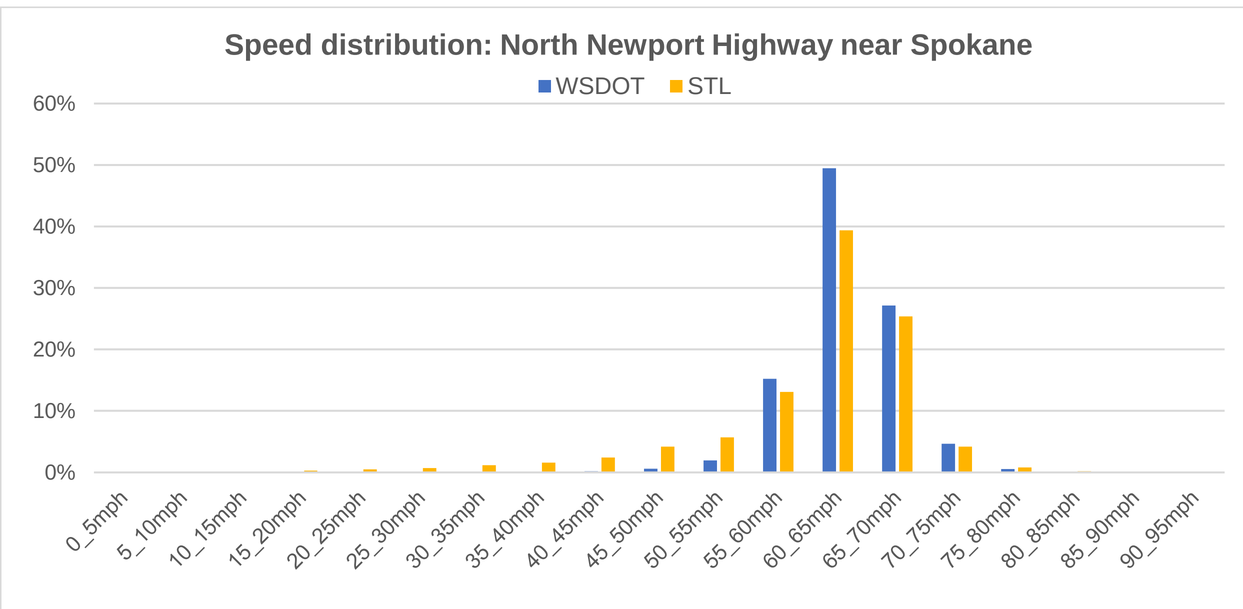


Figure 5: Comparison of speed distributions across 5 mph bins at a site on North Newport Highway near Spokane, Washington.

Hourly Speed Validation

The following validation compares 2019 PeMS speed metrics to average hourly speeds from StreetLight. In the following figures, we compare hourly average speeds across the two sources for a select location on average weekdays and weekends across 2019. For the select site, both sources show slower speeds at the peak AM and PM hours during weekdays, and relatively consistent speeds across the day on average weekends.

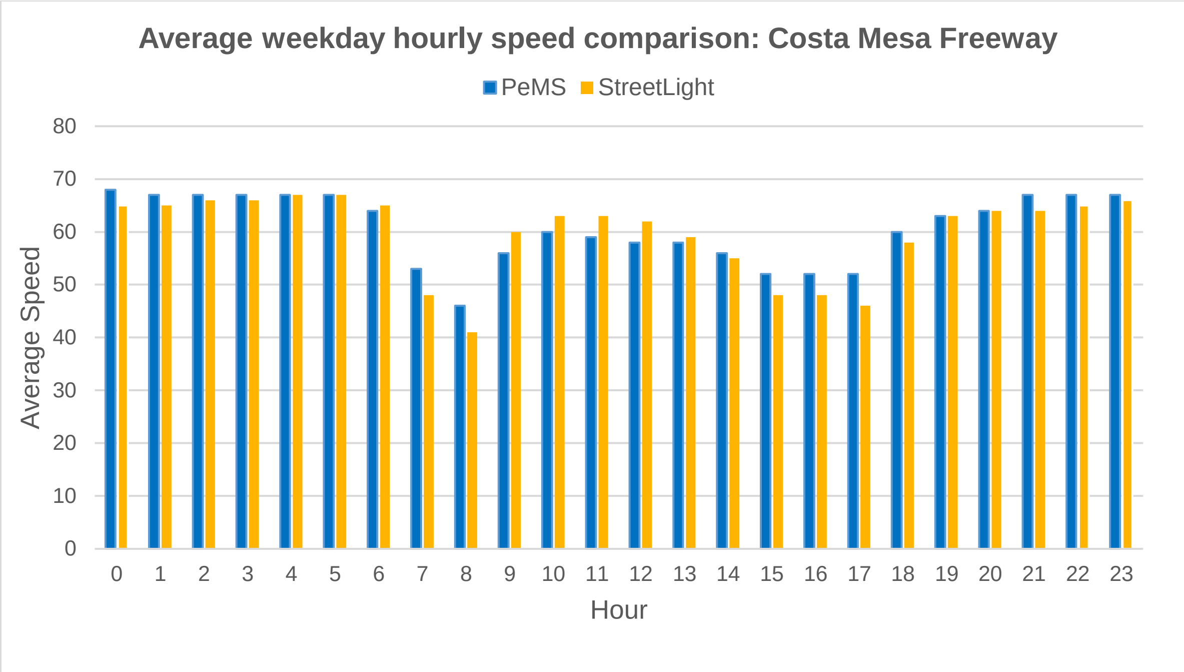


Figure 6: Comparison of average hourly speeds on weekdays at a site on Costa Mesa Highway in Orange County, California.

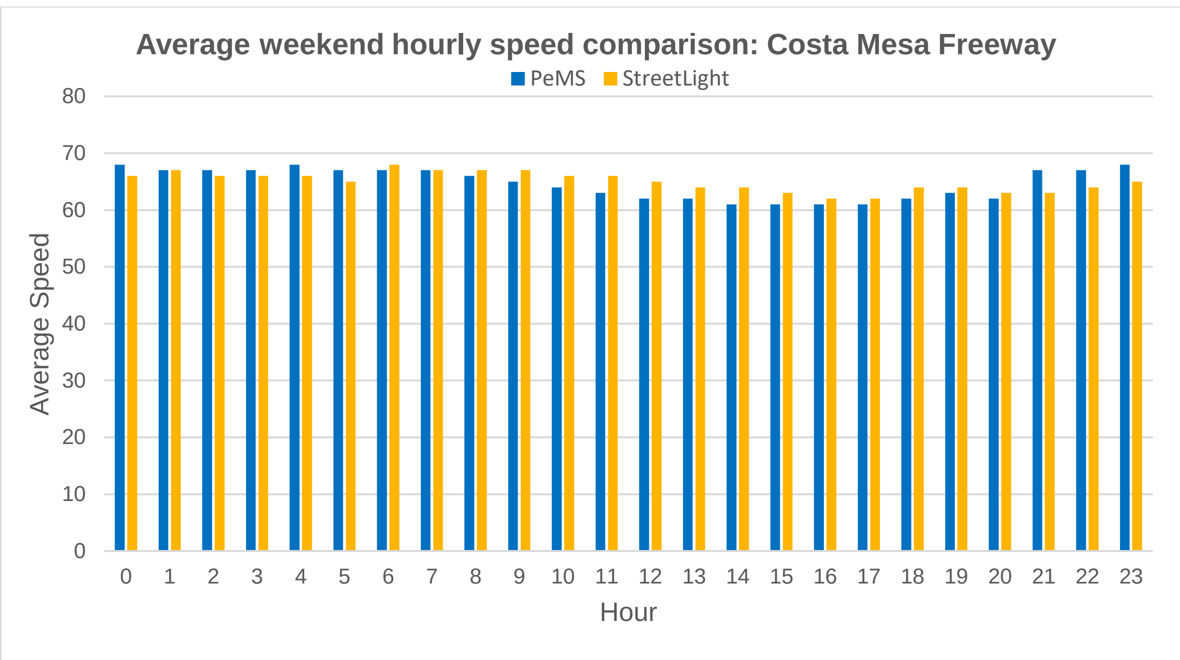


Figure 7: Comparison of average hourly speeds on weekends at a site on Costa Mesa Highway in Orange County, California.

About StreetLight Data

StreetLight Data, Inc. pioneered the use of Big Data analytics to help transportation professionals solve their biggest problems. Applying proprietary machine-learning algorithms to over four trillion spatial data points over time, StreetLight measures multimodal travel patterns and makes them available on-demand via the world’s first SaaS platform for mobility, StreetLight InSight®. From identifying sources of congestion to optimizing new infrastructure to planning for autonomous vehicles, StreetLight powers more than 6,000 global projects every month.


STREETLIGHT
DATA

APPENDIX B
FHWA GUIDEANCE PERTAINING TO METRIC CALCULATION PROCEDURES OF CONGESTION, FREIGHT AND CMAQ PERFORMANCE MEASURES

National Performance Measures for Congestion, Reliability, and Freight, and CMAQ Traffic Congestion

General Guidance and Step-by-Step Metric Calculation Procedures

U.S. Department of Transportation
Federal Highway Administration

June 2018

National Performance Measures for Congestion, Reliability, and Freight, and CMAQ Traffic Congestion: General Guidance and Step-by-Step Metric Calculation Procedures presents recommended steps for calculating the National Highway System performance metrics (23 CFR 490.511), the Truck Travel Time Reliability metrics (23 CFR 490.611), and the Peak Hour Excessive Delay metric (23 CFR 490.711).

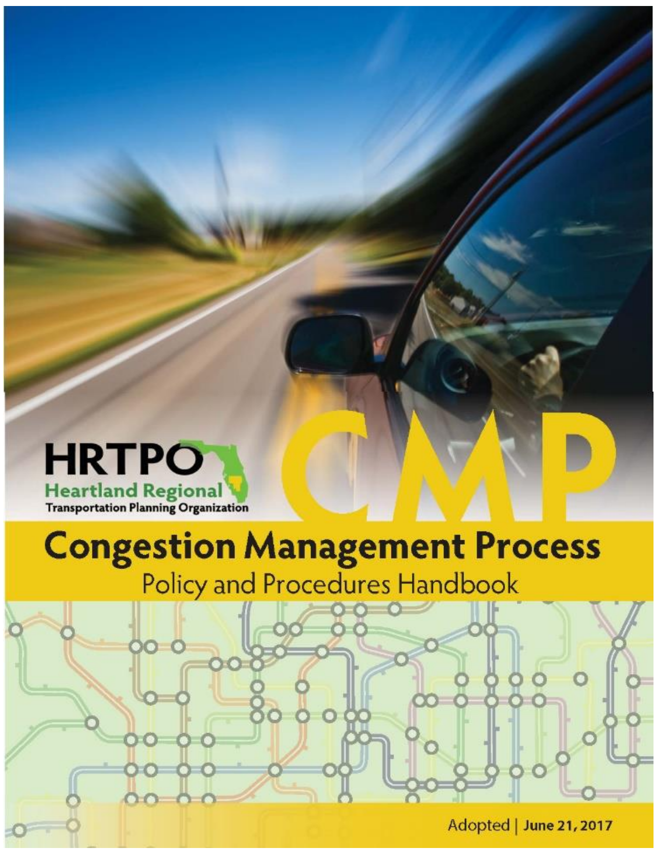
Required Adjustments to the Observed StreetLight Volume Data to Ensure Consistency with Federal Guidelines:

Under this example, the overall process for estimating hourly traffic volumes is as follows:

- Directional split. Apply a directional split adjustment factor to those AADT values that represent both travel directions to estimate directional AADT values.
- Monthly adjustment. Apply monthly adjustment factors to each directional AADT value to estimate directional month-by-month average daily traffic volumes.
- Day-of-week adjustment. Apply day-of-week adjustment factors to directional monthly average daily traffic volumes to estimate directional average daily traffic values for each month and each day of the week.
- Hourly estimation. Apply hourly adjustment factors to estimate directional hourly traffic volume for each day in each month.

APPENDIX C
SURVEY OF CONGESTION MITIGATION STRATEGIES

SOURCE: HEARTLAND TPO (ORLANDO, FLORIDA) CMP/STRATEGIES REPORT (ADOPTED: 06/2017)



CMP STRATEGY SURVEY

The CMP uses a strategy toolbox with multiple tiers of strategies to support the congestion strategy or strategies for congested corridors. Following an approach used by other MPOs/TPOs and promoted by FHWA, the toolbox of congestion mitigation strategies is arranged so that the measures at the top take precedence over those at the bottom. The toolbox is presented below.

The "top-down" approach promotes the growing sentiment in today's transportation planning arena and follows FHWA's clear direction to consider all available solutions before recommending additional roadway capacity.

TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

These strategies are used to reduce the use of single occupant motor vehicles, as the overall objective of TDM is to reduce the miles traveled by automobile. The following TDM strategies, not in any particular order, are available for consideration in the toolbox to potentially reduce travel in the peak hours. Strategies include:

Congestion Pricing: Congestion pricing can be implemented statically or dynamically. Static congestion pricing requires that tolls are higher during traditional peak periods. Dynamic congestion pricing allows toll rates to vary depending upon actual traffic conditions. The more congested the road, the higher the cost to travel on the road. Dynamic congestion pricing works best when coupled with real-time information on the availability of other routes.

Alternative Work Hours: There are three main variations: staggered hours, flextime, and compressed work weeks. Staggered hours require employees in different work groups to start at different times to Spread out their arrival/departure times. Flextime allows employees to arrive and leave outside of the traditional commute period. Compressed work weeks involve reducing the number of days per week worked while increasing the number of hours worked per day.

Telecommuting: Telecommuting policies allow employees to work at home or a regional telecommute center instead of going into the office, all the time or only one or more days per week.

Guaranteed Ride Home Programs: These programs provide a safety net to those people who carpool or use transit to work so that they can get to their destination if unexpected work demands, or an emergency arises.

Alternative Mode Marketing and Education: Providing education on alternative modes of transportation can be an effective way of increasing demand for alternative modes. This strategy can include mapping Websites that compute directions and travel times for multiple modes of travel.

Safe Routes to Schools Program: This federally funded program provides 100 percent funding to communities to invest in pedestrian and bicycle infrastructure surrounding schools.

Preferential or Free Parking for HOVs: This program provides an incentive for employees to carpool with preferred of free-of-charge parking for HOVs.

LAND USE/GROWTH MANAGEMENT STRATEGIES

The strategies in this category include policies and regulations that would decrease the total number of auto trips and trip lengths while promoting transit and non-motorized transportation options. These strategies include the following:

Negotiated Demand Management Agreements: As a condition of development approval, local governments require the private sector to contribute to traffic mitigation agreements. The agreements typically set a traffic reduction goal (often expressed as a minimum level of ridesharing participation or a stipulated reduction in the number of automobile trips).

Trip Reduction Ordinance: These ordinances use a locality’s regulatory authority to limit trip generation from a development. They spread the burden of reducing trip generation among existing and future developments better than Negotiated Demand Management Agreements.

Infill Developments: This strategy takes advantage of infrastructure that already exists, rather than building new infrastructure on the fringes of the urban area.

Transit Oriented Developments: This strategy clusters housing units and/or businesses near transit stations in walkable communities. By providing convenient access to alternative modes, auto dependence can be reduced.

Design Guidelines for Pedestrian-Oriented Development: Maximum block lengths, building setback restrictions, and streetscape enhancements are examples of design guidelines that can be codified in zoning ordinances to encourage pedestrian activity.

Mixed-Use Development: This strategy allows many trips to be made without automobiles. People can walk to restaurants and services rather than use their vehicles.

PUBLIC TRANSIT STRATEGIES

Two types of strategies, capital improvements and operating improvements, are used to enhance the attractiveness of public transit services to shift auto trips to transit. Transit capital improvements generally modernize the transit systems and improve their efficiency; operating improvements make transit more accessible and attractive. The following strategies are included in the toolbox for consideration:

Transit Capacity Expansion: This strategy adds new vehicles to expand transit services.

Increasing Bus Route Coverage or Frequencies: This strategy provides better accessibility to transit to a greater share of the population. Increasing frequency makes transit more attractive to use. Implementing Regional Premium Transit: Premium transit such as Bus Rapid Transit (BRT) best serves dense urban centers where travelers can walk to their destinations. Premium regional transit from suburban areas can sometimes be enhanced by providing park-and-ride lots.

Providing Real-Time Information on Transit Routes: Providing real-time information on bus progress either at bus stops, terminals, and/or personal wireless devices makes bus travel more attractive.

Reducing Transit Fares: This relatively easy-to-implement strategy encourages additional transit use, to the extent that high fares are a real barrier to transit. However, due to the direct financial impact on the transit system operating budgets, reductions in selected fare categories may be a more feasible strategy to implement.

Provide Exclusive Bus Right-Of-Way: Exclusive right-of-way includes bus ways, bus-only lanes, and bus bypass ramps. This strategy is applied to freeways and major highways that have routes with high ridership.

NON-MOTORIZED TRANSPORTATION STRATEGIES

Non-motorized strategies include bicycle, pedestrian, and trail facility improvements that encourage non-motorized modes of transportation instead of single-occupant vehicle trips. The following strategies are included:

New Sidewalk Connections: Increasing sidewalk connectivity encourages pedestrian traffic for short trips.

Designated Bicycle Facilities on Local Streets: Enhancing the visibility of bicycle facilities increases the perception of safety. In many cases, bicycle lanes can be added to existing roadways through restriping.

Improved Bicycle Facilities at Transit Stations and Other Trip Destinations: Bicycle racks and bicycle lockers at transit stations and other trip destinations increase security. Additional amenities such as locker rooms with showers at workplaces provide further incentives for using bicycles.

Improved Safety of Existing Bicycle and Pedestrian Facilities: Maintaining lighting, signage, striping, traffic control devices, and pavement quality and installing curb cuts, curb extensions, median refuges, and raised crosswalks can increase bicycle and pedestrian safety.

Exclusive Non-Motorized ROW: Abandoned rail rights-of-way and existing parkland can be used for medium- to long-distance bicycle trails, improving safety and reducing travel times.

Complete Streets: Routinely designing and operating the entire right-of-way can enable safe access for all users including pedestrians, bicyclists, motorists, and transit. Elements that may be found on a complete street include sidewalks, bike facilities, special bus lanes, comfortable and accessible transit stops, frequent crossing opportunities, median islands, accessible pedestrian signals, curb extensions, support for changing mobility technologies, and more.

TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

The following TDM strategies are recommended to encourage HOV use:

Ridesharing (Carpools & Vanpools): In ridesharing programs, participants are matched with potential candidates for sharing rides. This typically is arranged/encouraged through employers or transportation management agencies that provide ride-matching services. These programs are more effective if combined with HOV lanes, parking management, guaranteed ride home policies, and employer-based incentive programs.

High Occupancy Vehicle Lanes: This increases corridor capacity while, at the same time, providing an incentive for single-occupant drivers to shift to ridesharing. These lanes are most effective as part of a comprehensive effort to encourage HOVs, including publicity, outreach, park-and-ride lots, rideshare matching services, and employer incentives.

Park-and-Ride Lots: These lots can be used in conjunction with HOV lanes and/or express bus services. They are particularly helpful when coupled with other commute alternatives such as carpool/vanpool programs, transit, and/or HOV lanes.

Employer-Landlord Parking Agreements: Employers can negotiate leases so that they pay for parking spaces used only by employees. In turn, employers can pass along parking savings by purchasing transit passes or reimbursing non-driving employees with the cash equivalent of a parking space.

Parking Management: This strategy reduces the instance of free parking to encourage other modes of transportation. Options include reducing the minimum number of parking spaces required per development, increasing the share of parking spaces for HOVs, introducing or raising parking fees, providing cash-out options for employees not using subsidized parking spaces, and expanding parking at transit stations or parkand-ride lots.

Managed Lanes: FHWA defines managed lanes as highway facilities or a set of lanes in which operational strategies are implemented and managed (in real time) in response to changing conditions. Examples of managed lanes may include High-Occupancy Toll (HOT) lanes with tolls that vary based on demand, exclusive bus-only lanes, HOV and clean air and/or energy-efficient vehicle lanes, and HOV lanes that could be changed into HOT lanes in response to changing levels of traffic and roadway conditions.

INTELLIGENT TRANSPORTATION SYSTEMS STRATEGIES

The strategies in Intelligent Transportation Systems (ITS) use new and emerging technologies to mitigate congestion while improving safety and environmental impacts. Typically, these systems are made up of many components, including sensors, electronic signs, cameras, controls, and communication technologies. ITS strategies are sets of components working together to provide information and allow greater control of the operation of the transportation system. The following strategies are included in the toolbox.

Dynamic Messaging: Dynamic messaging uses changeable message signs to warn motorists of downstream queues; it provides travel time estimates, alternate route information, and information on special events, weather, or accidents.

Advanced Traveler Information Systems (ATIS): ATIS provide an extensive amount of data to travelers, such as real-time speed estimates on the Web or over wireless devices and transit vehicle schedule progress. It also provides information on alternative route options.

Integrated Corridor Management (ICM): This strategy, built on an ITS platform, provides for the coordination of the individual network operations between parallel facilities creating an interconnected system. A coordinated effort between networks along a corridor can effectively manage the total capacity in a way that will result in reduced congestion.

Transit Signal Priority (TSP): This strategy uses technology located onboard transit vehicles or at signalized intersections to temporarily extend green time, allowing the transit vehicle to proceed without stopping at a red light.

TRANSPORTATION SYSTEMS MANAGEMENT STRATEGIES

Transportation Systems Management (TSM) strategies identify operational improvements to enhance the capacity of the existing system. These strategies typically are used together with ITS technologies to better manage and operate existing transportation facilities. The following strategies are included in the toolbox.

Traffic Signal Coordination: Signals can be pre-timed and isolated, pre-timed and synchronized, actuated by events (such as the arrival of a vehicle, pedestrian, bus or emergency vehicle), set to adopt one of several predefined phasing plans based on current traffic conditions, or set to calculate an optimal phasing plan based on current conditions.

Channelization: This strategy is used to optimize the flow of traffic for making left or right turns usually using concrete islands or pavement markings.

Intersection Improvements: Intersections can be widened, and lanes restriped to increase intersection capacity and safety. This may include auxiliary turn lanes (right or left) and widened shoulders.

Bottleneck Removal: This strategy removes or corrects short, isolated, and temporary lane reductions, substandard design elements, and other physical limitations that form a capacity constraint that results in a traffic bottleneck.

Vehicle Use Limitations and Restrictions: This strategy includes all-day or selected time-of-day restrictions of vehicles, typically trucks, to increase roadway capacity.

Improved Signage: Improving or removing signage to clearly communicate location and direction information can improve traffic flow.

Geometric Improvements for Transit: This strategy includes providing for transit stop locations that do not affect the flow of traffic, improve sight lines, and improve merging and diverging of buses and cars.

Intermodal Enhancements: Coordinating modes makes movement from one mode to the other easier. These enhancements typically include schedule modification to reduce layover time or increase the opportunity for transfers, creation of multimodal facilities, informational kiosks, and improved amenities at transfer locations.

Goods Movement Management: This strategy restricts delivery or pickup of goods in certain areas to reduce congestion.

INCIDENT MANAGEMENT STRATEGIES

Freeway Incident Detection and Management Systems: This strategy addresses primarily non-recurring congestion, typically includes video monitoring and dispatch systems, and may also include roving service patrol vehicles.

ACCESS MANAGEMENT STRATEGIES

Access Management Policies: This strategy includes adoption of policies to regulate driveways and limit curb cuts and/or policies that require continuity of pedestrian, bicycle, and trail facilities.

CORRIDOR PRESERVATION/MANAGEMENT STRATEGIES

Corridor Preservation: This strategy includes implementing, where applicable, land acquisition techniques such as full title purchases of future rights-of-way and purchase of easements to plan proactively in anticipation of future roadway capacity demands.

Corridor Management: This strategy is applicable primarily in moderate- to high-density areas and includes strategies to manage corridor rights-of-way. The strategies range from land-use regulations to landowner agreements such as subdivision reservations, which are mandatory dedications of portions of subdivided lots that lie in the future right-of-way.

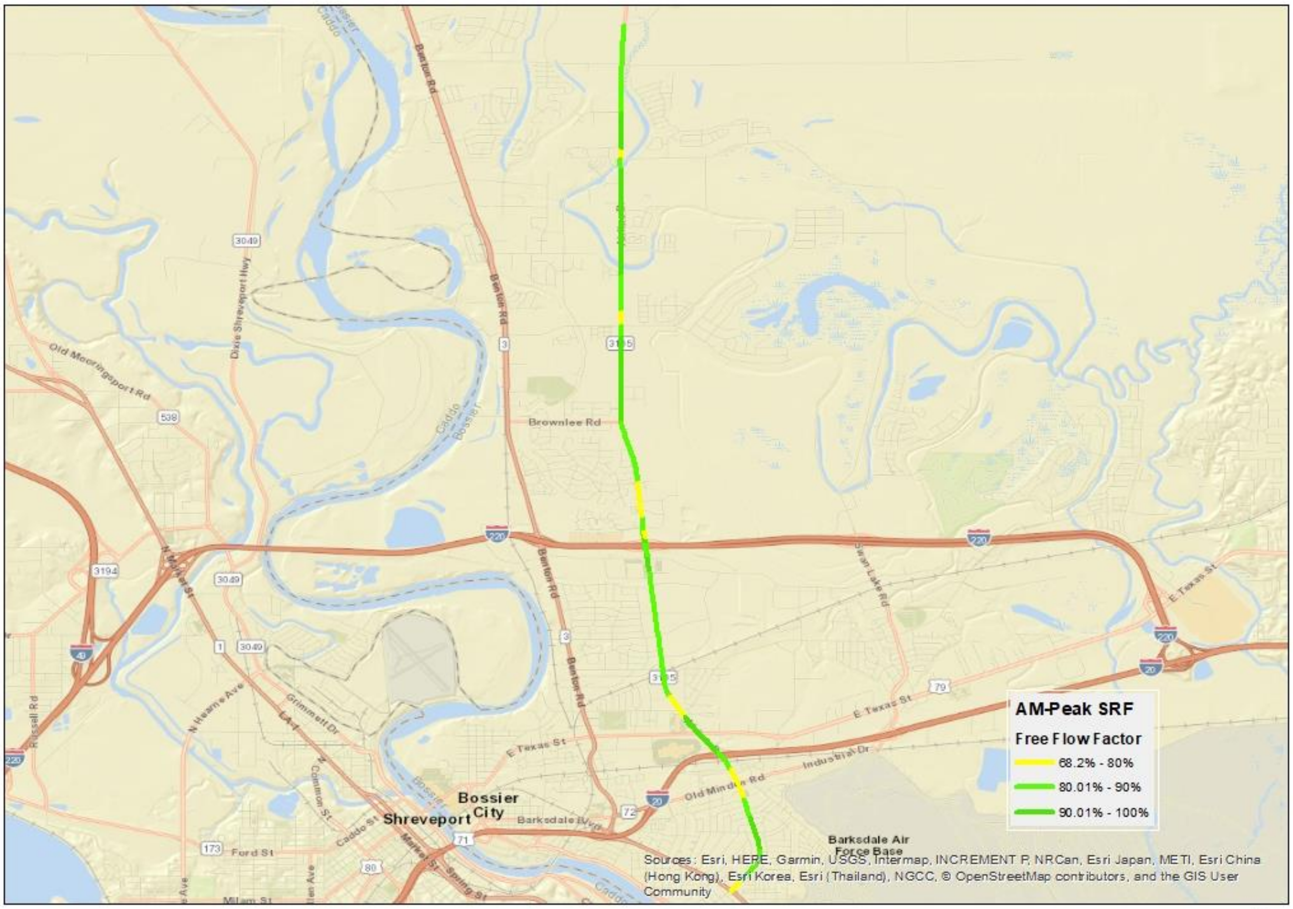
ADDING ROADWAY CAPACITY

Strategies to add capacity are costly and the least desirable strategies and should be considered last resort methods for reducing congestion. Capacity-adding strategies should be applied after determining the demand and operational management strategies identified earlier are not feasible solutions. The key strategy is to increase the capacity of congested roadways through additional general purpose travel lanes (or passing lanes on rural two-lane facilities).

Increase the capacity of congested roadways through additional general purpose travel lanes (or passing lanes on rural two-lane facilities).

APPENDIX D
INDIVIDUAL CMP STUDY CORRIDORS
SRF DETERMINATION MAPS BY
WEEKDAY (M-F) PEAK-PERIOD AND
[04.01.2021 – 04.30.201 ANALYSIS PERIOD]

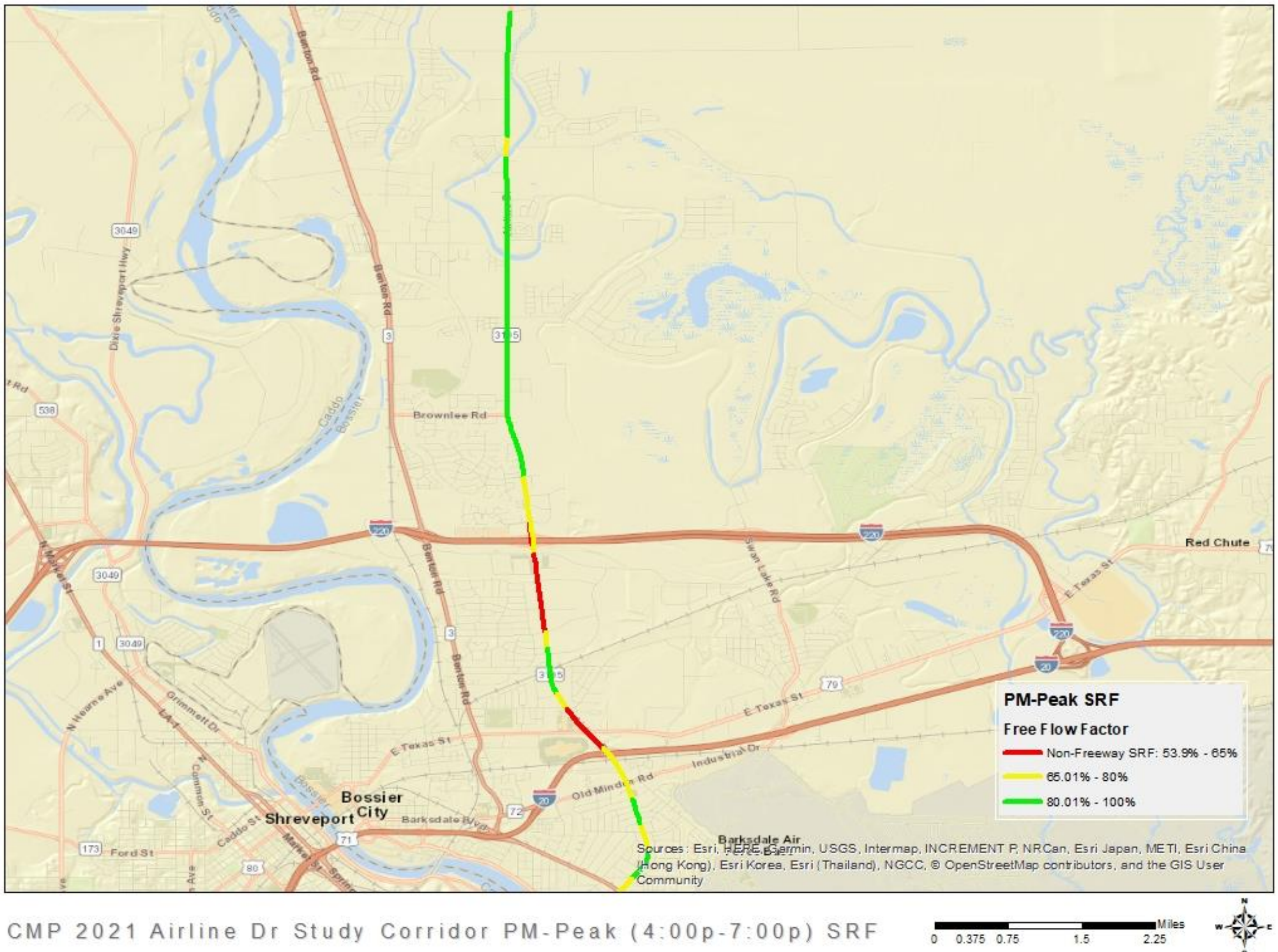
AIRLINE DR (LA 3105) STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 Airline Dr Study Corridor AM-Peak (6:00a-9:00a) SRF

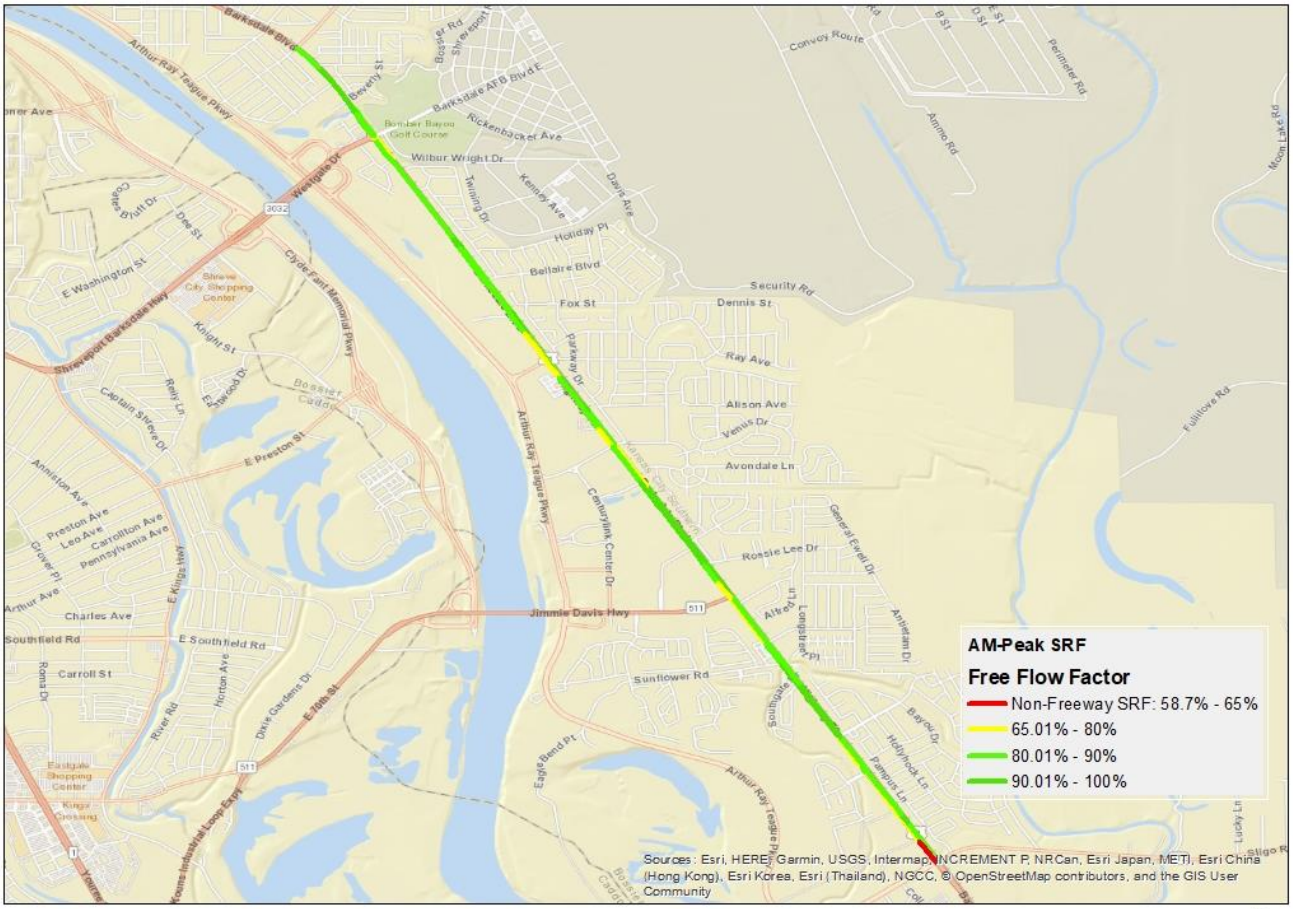
Miles 0 0.375 0.75 1.5 2.25

AIRLINE DR (LA 3105) STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 Airline Dr Study Corridor PM-Peak (4:00p-7:00p) SRF

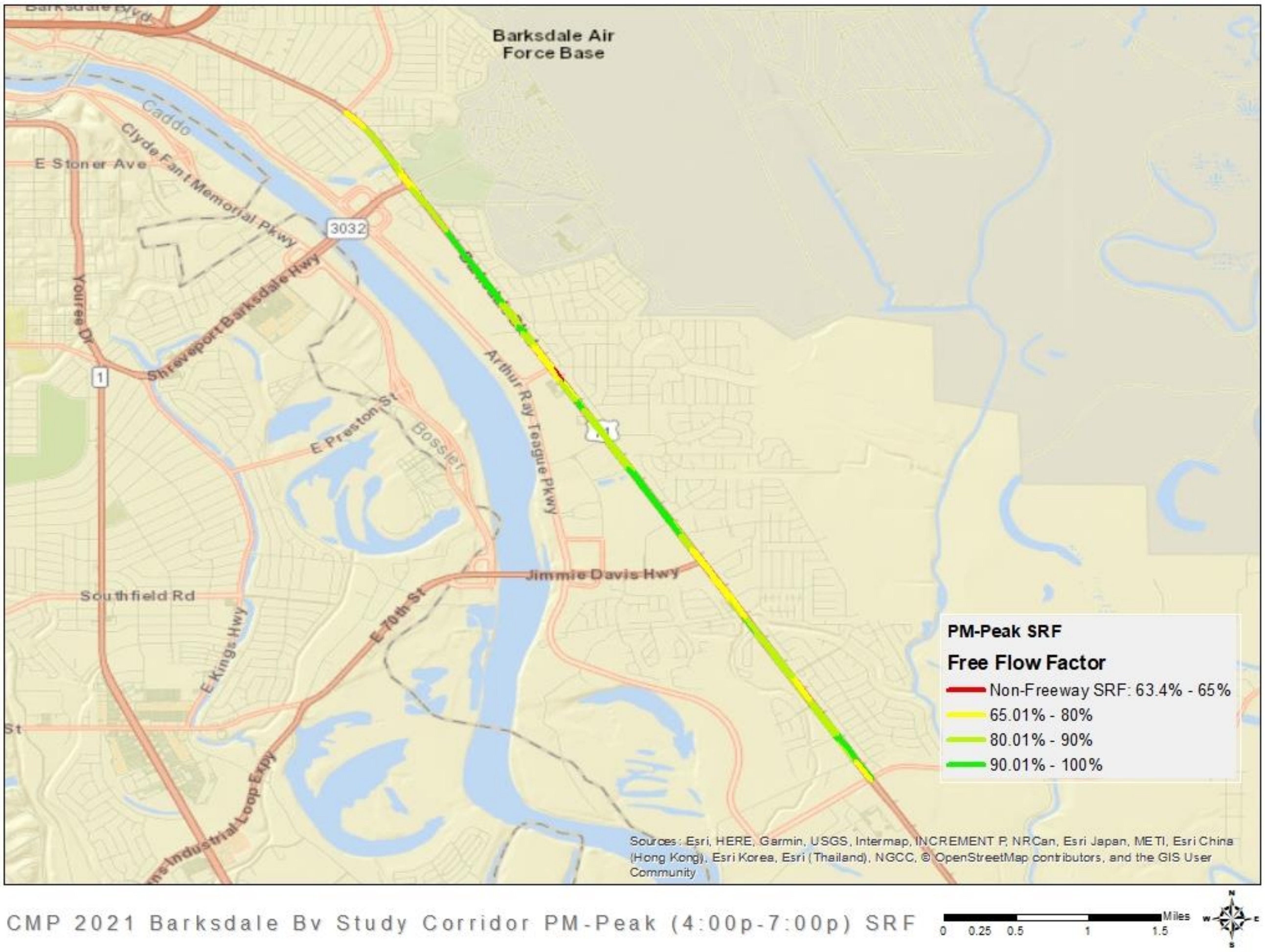
BARKSDALE BV (US 71) STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 Barksdale Bv Study Corridor AM-Peak (6:00a-9:00a) SRF

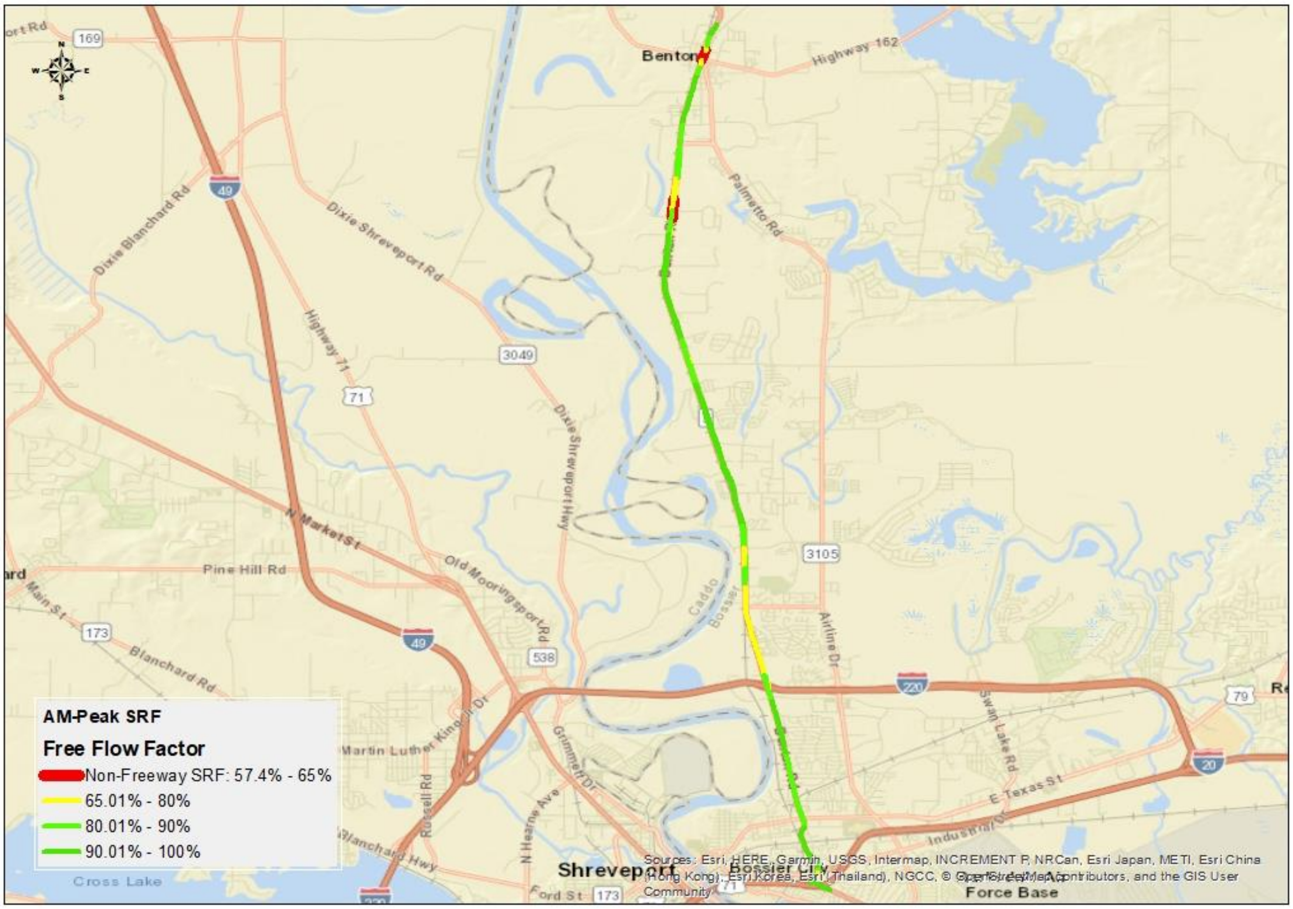
Miles 0 0.2 0.4 0.8 1.2

BARKSDALE BV (US 71) STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



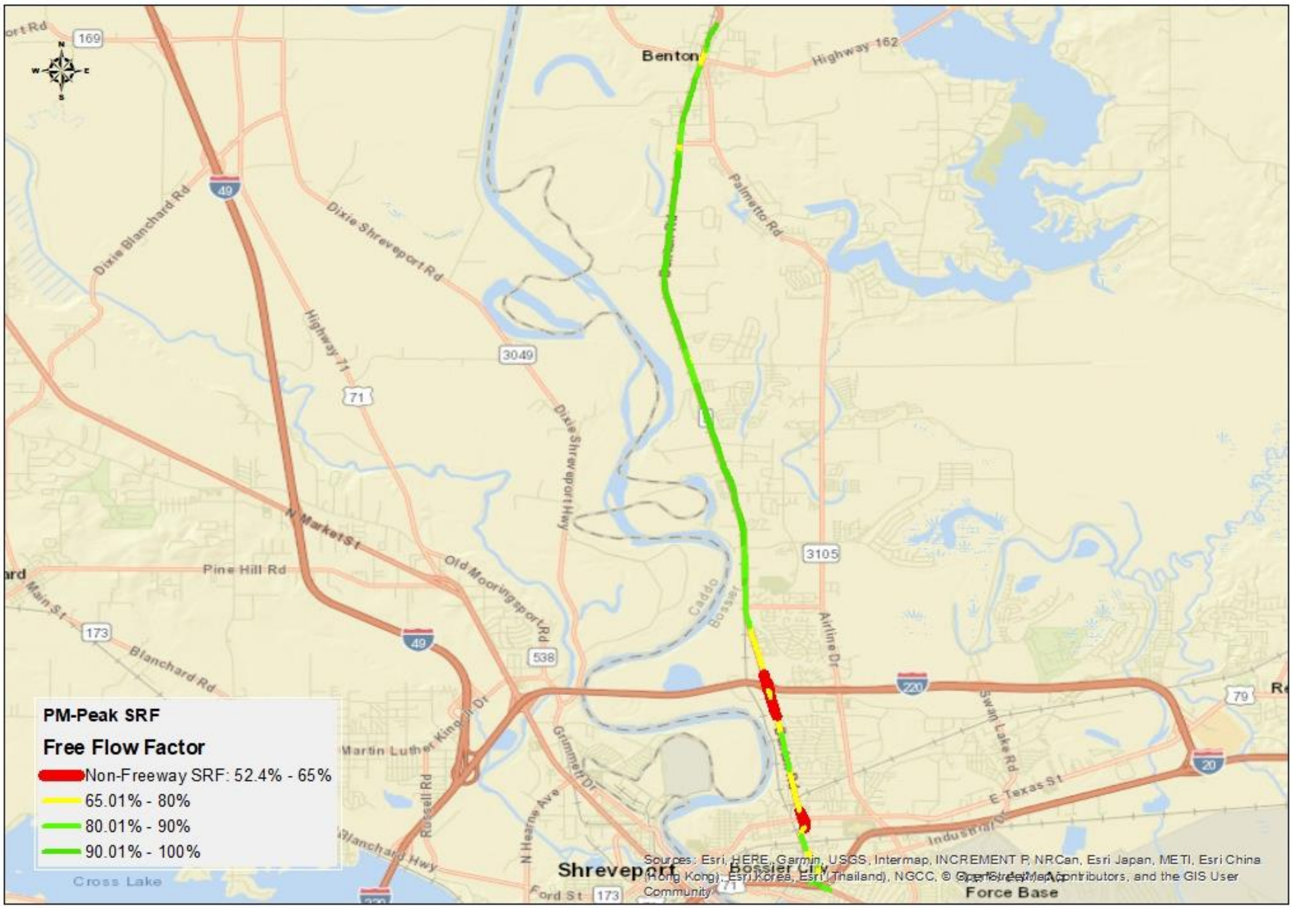
CMP 2021 Barksdale Bv Study Corridor PM-Peak (4:00p-7:00p) SRF

BENTON RD (LA 3) STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



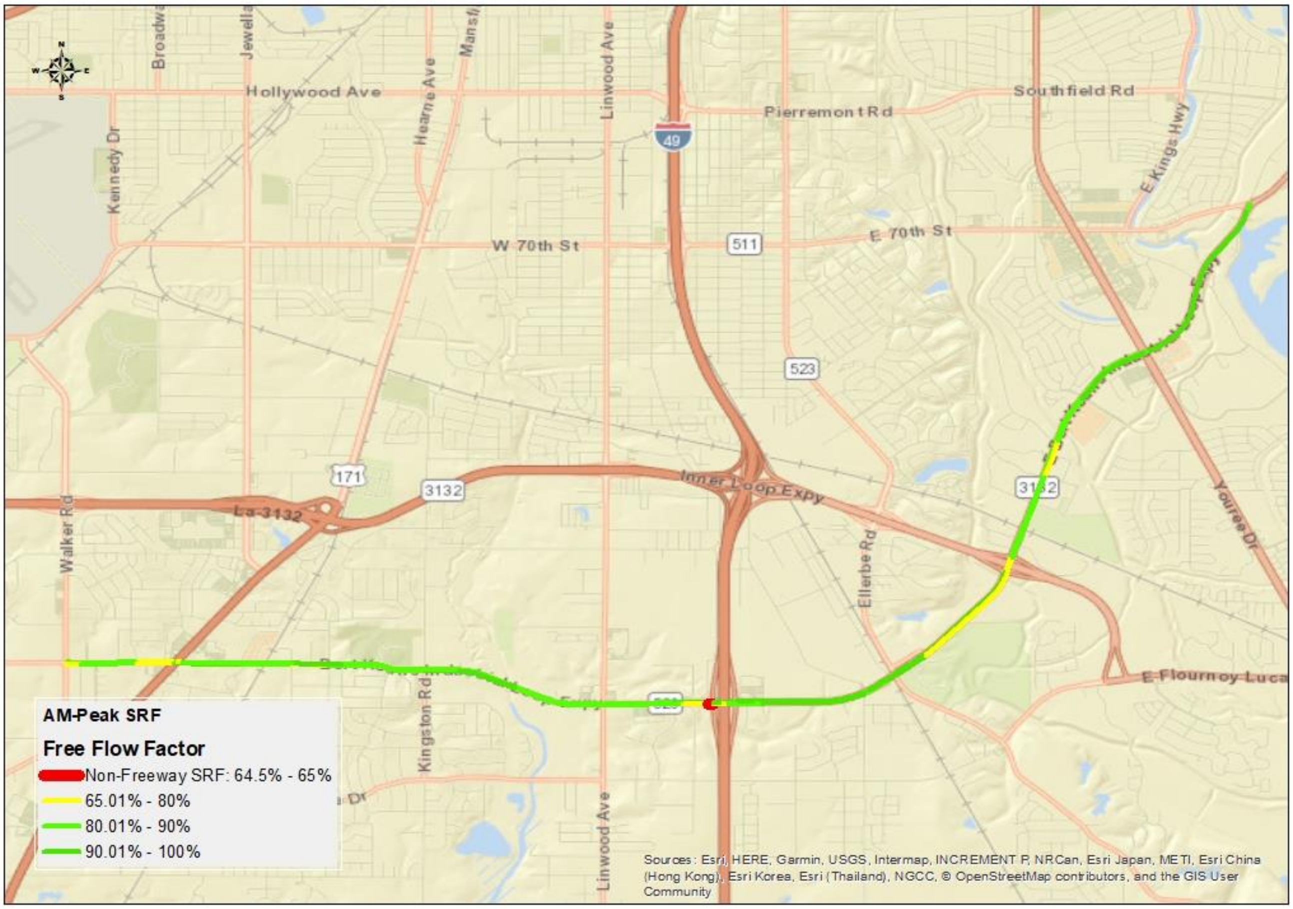
CMP 2021 Benton Rd/LA 3 Study Corridor AM-Peak (6:00a-9:00a) SRF

BENTON RD (LA 3) STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



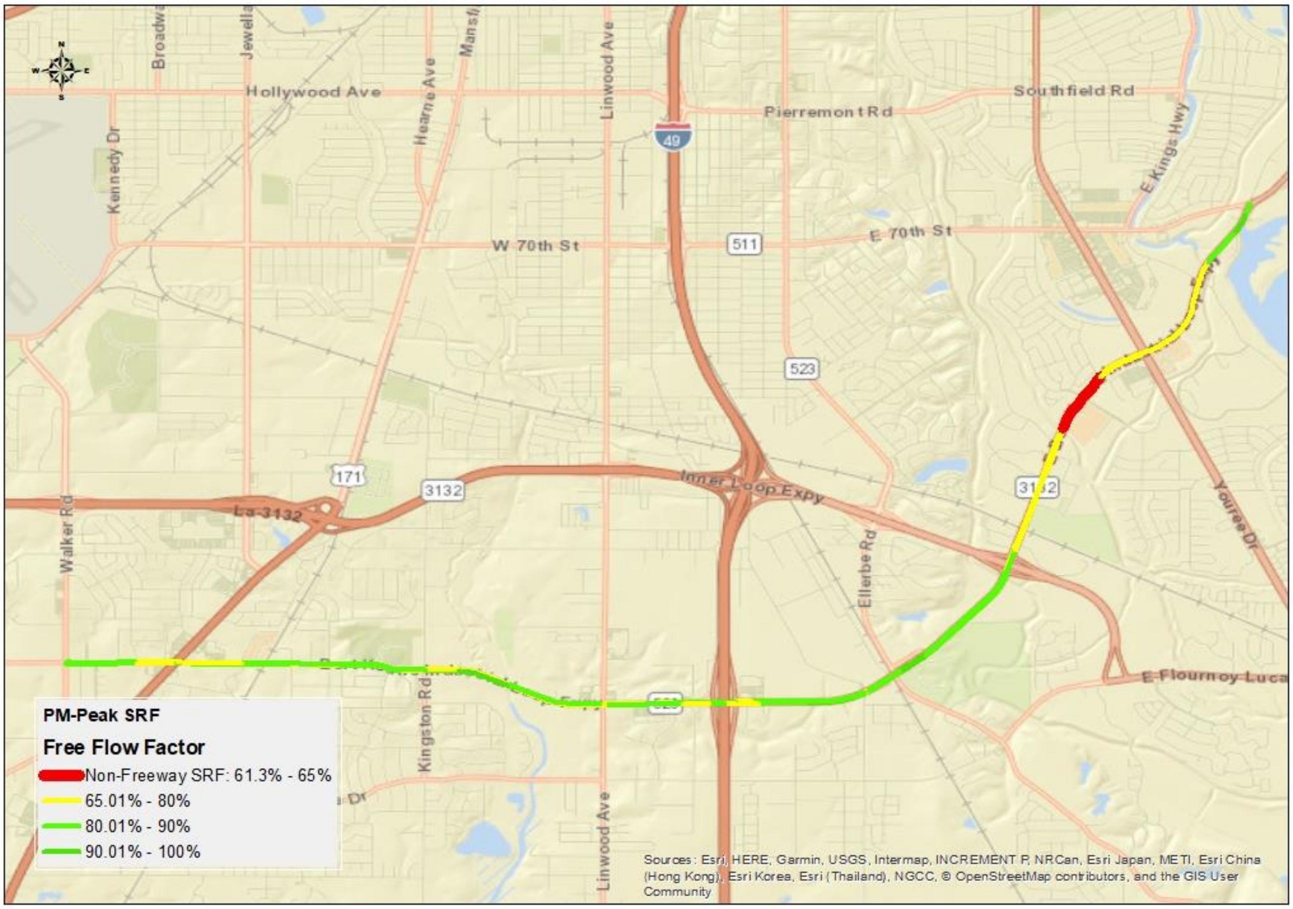
CMP 2021 Benton Rd/LA 3 Study Corridor PM-Peak (4:00p-7:00p) SRF

BERT KOUNS IND. LOOP (LA 526) STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



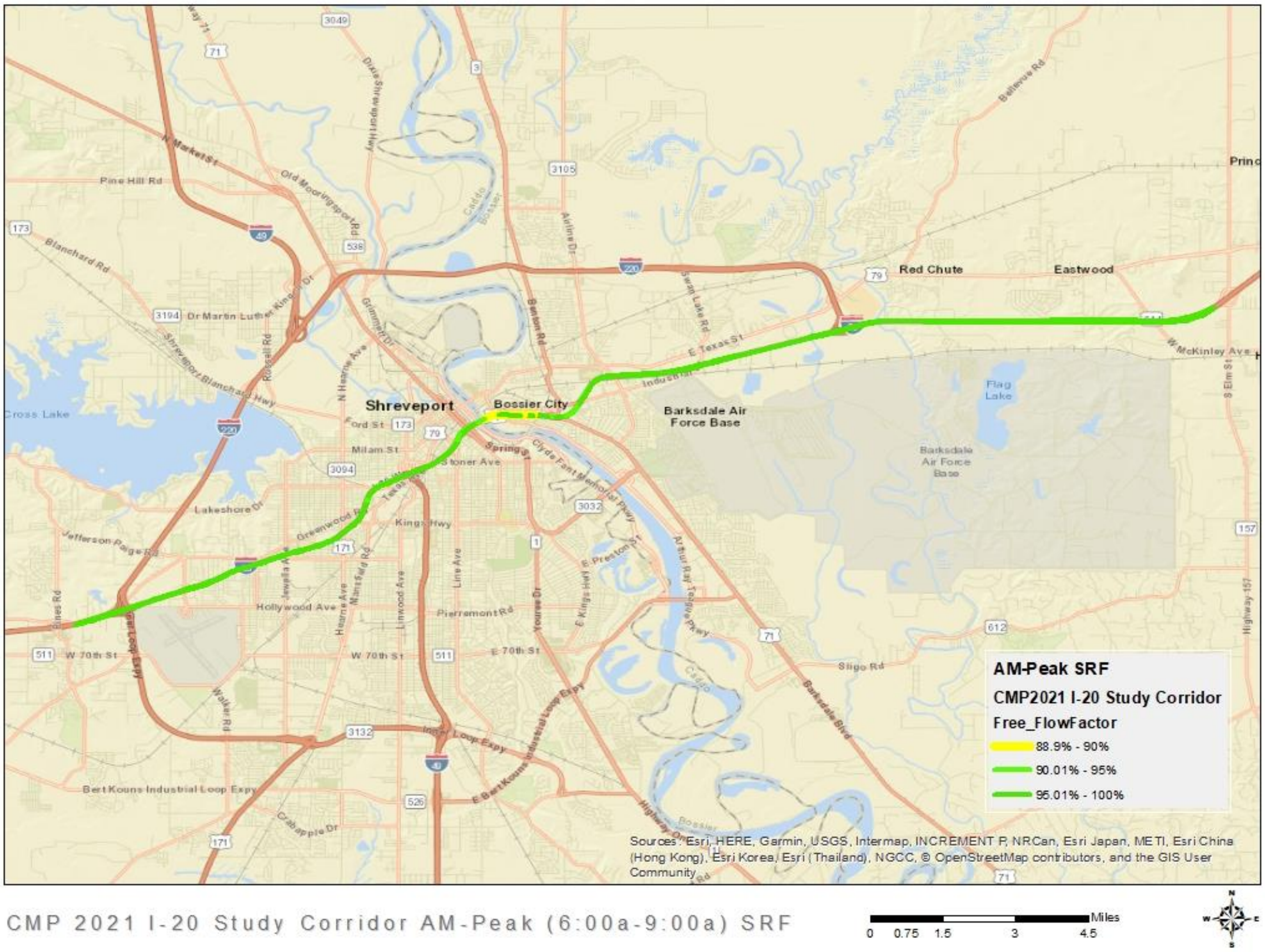
CMP 2021 Bert Kouns Ind Loop Study Corridor AM-Peak (6:00a-9:00a) SRF

BERT KOUNS IND. LOOP (LA 526) STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



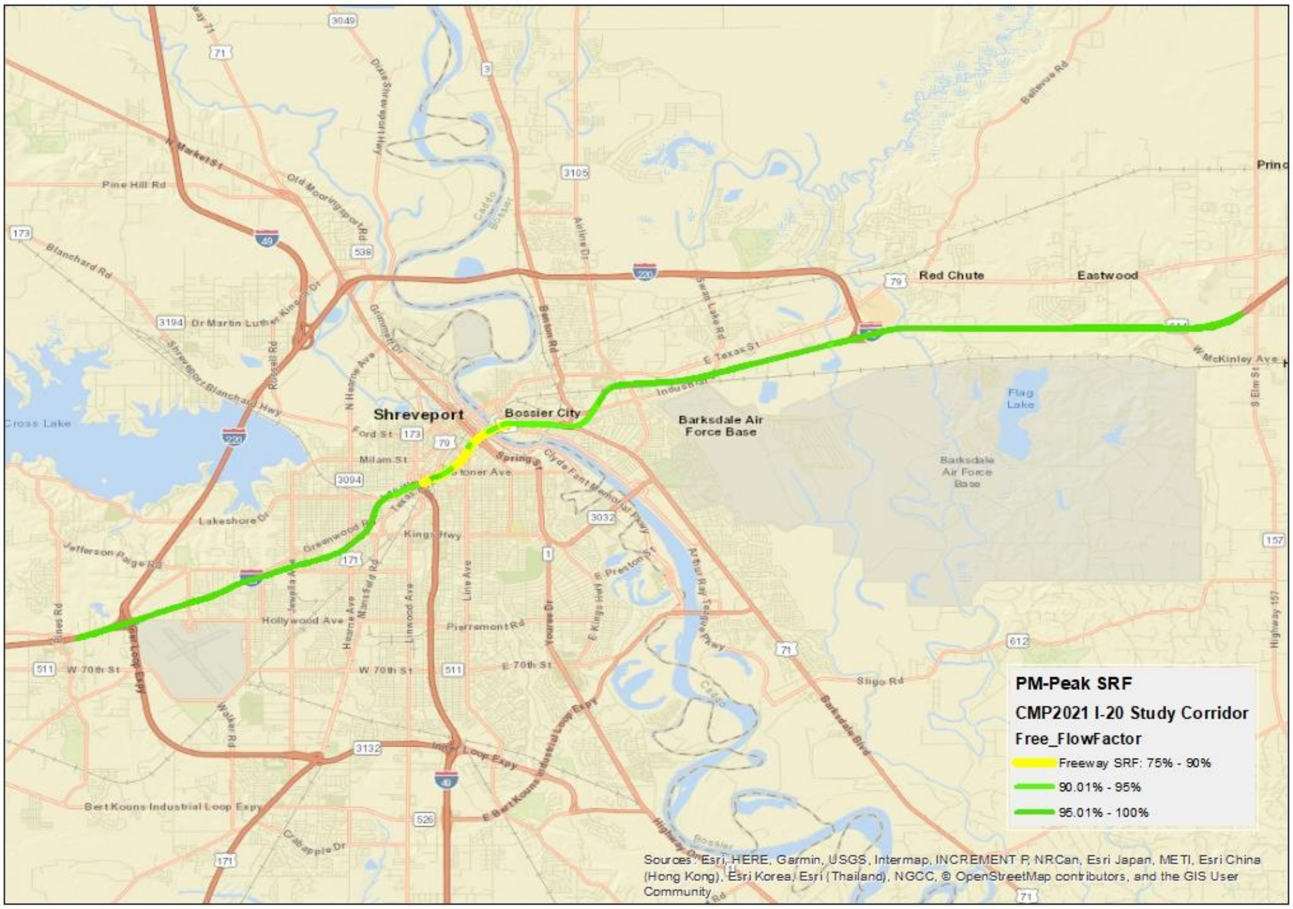
CMP 2021 Bert Kouns Ind Loop Study Corridor PM-Peak (4:00p-7:00p) SRF

I-20 STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 I-20 Study Corridor AM-Peak (6:00a-9:00a) SRF

I-20 STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



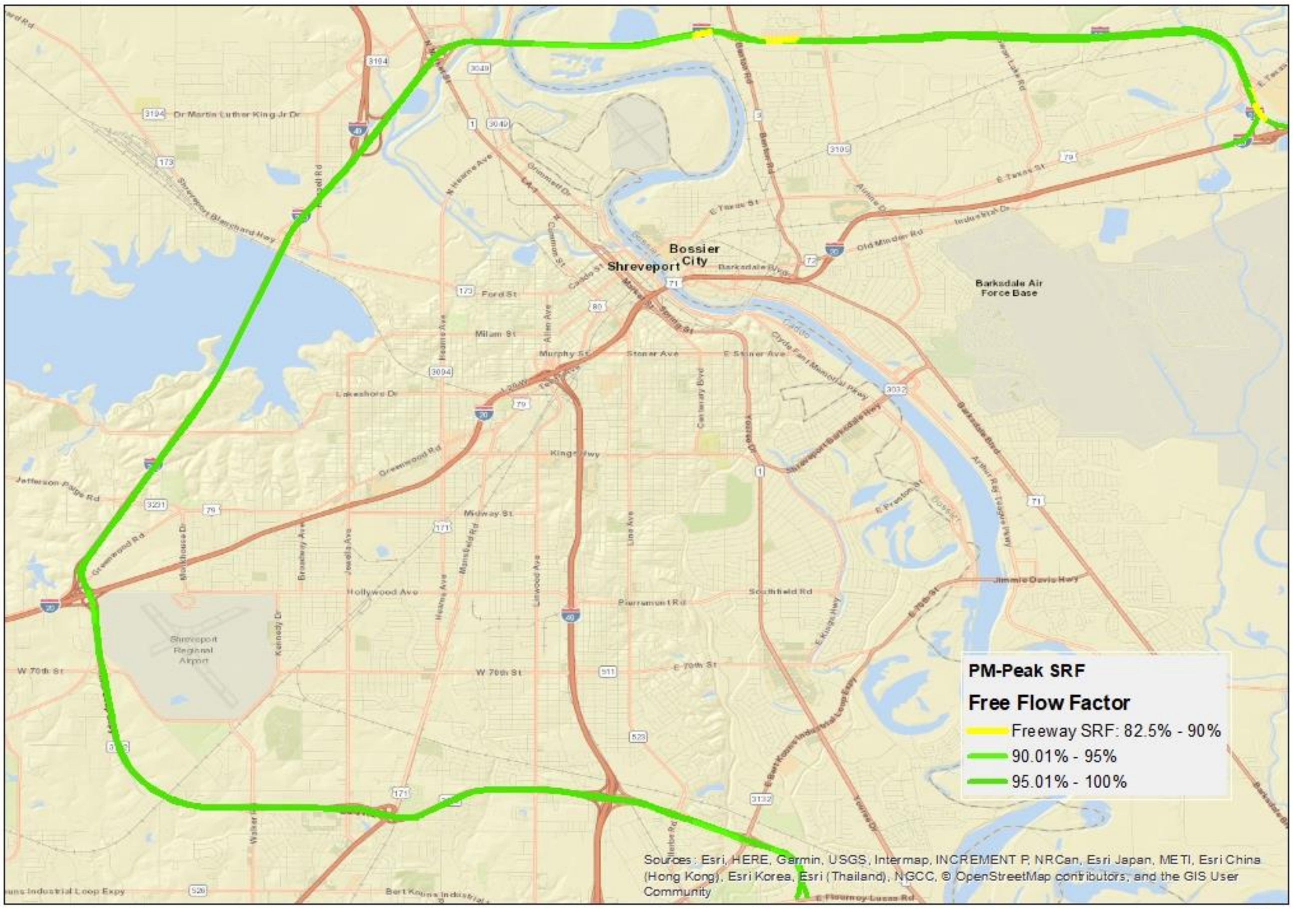
CMP 2021 I-20 Study Corridor PM-Peak (4:00p-7:00p) SRF

Miles 0 0.75 1.5 3 4.5

I-220 / LA 3132 STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD

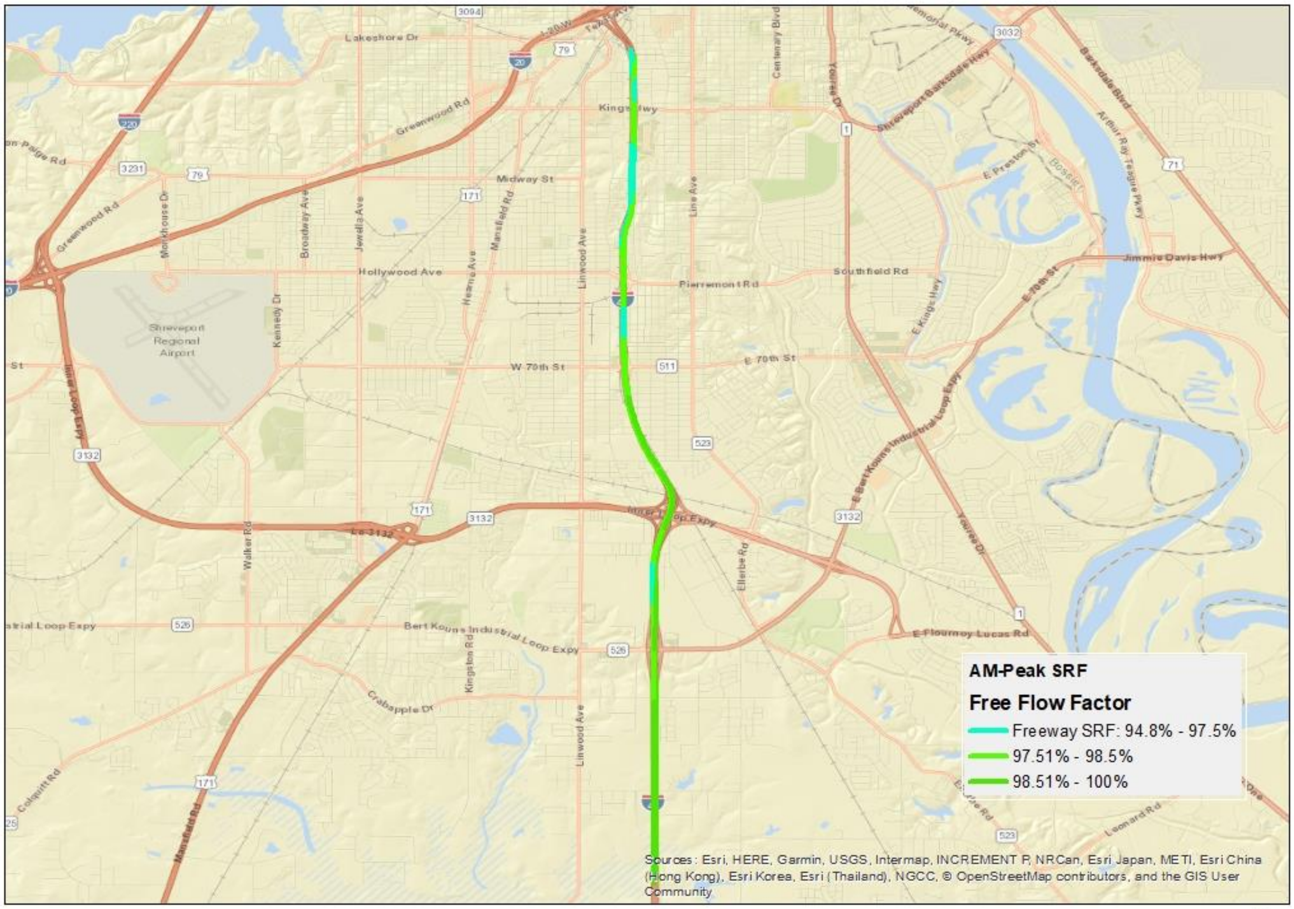
CMP 2021 I-220/LA 3132 Study Corridor AM-Peak (6:00a-9:00a) SRF

I-220 / LA 3132 STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



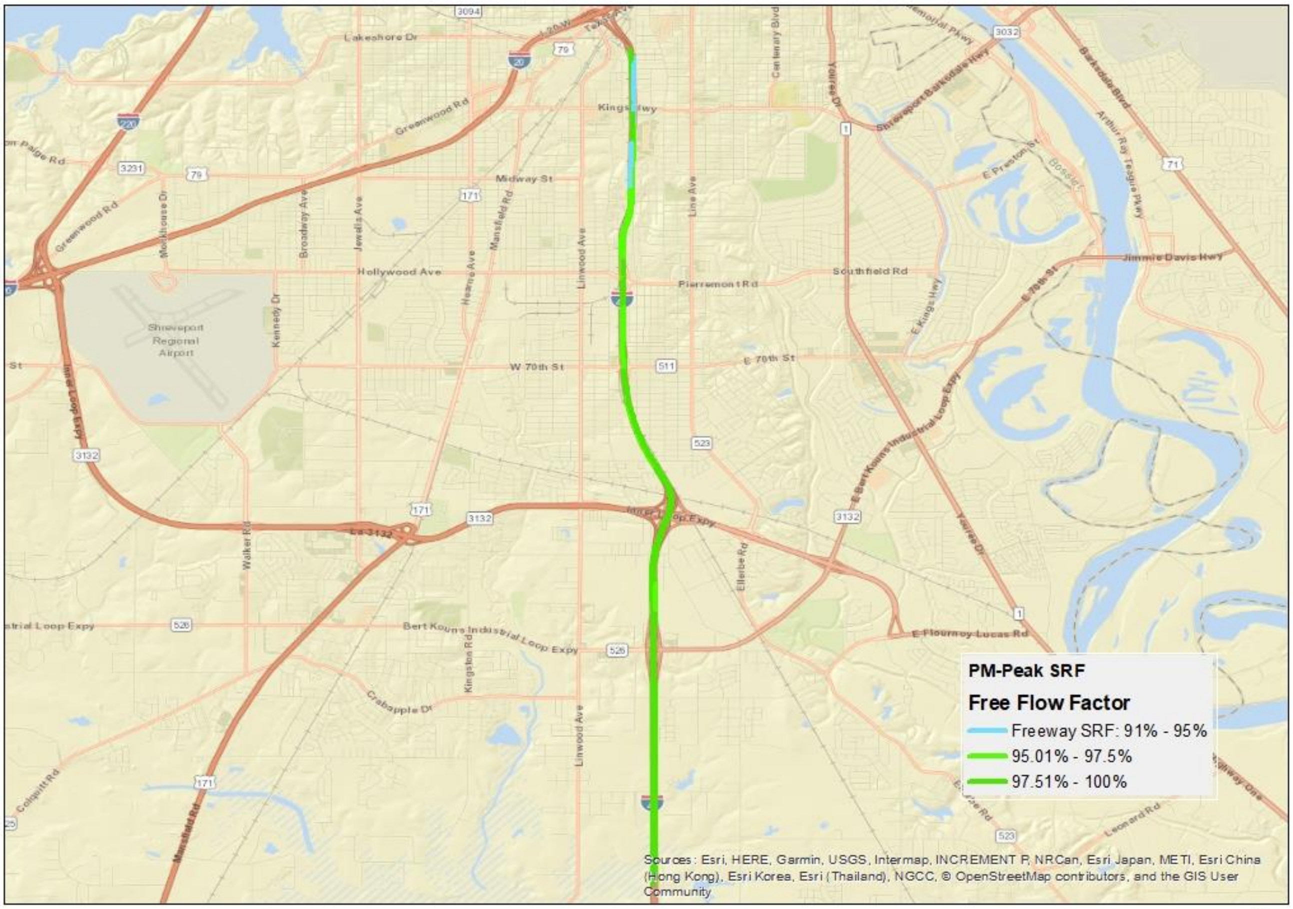
CMP 2021 I-220/LA 3132 Study Corridor PM-Peak (4:00p-7:00p) SRF

I-49 STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 I-49 Urban Study Corridor AM-Peak (6:00a-9:00a) SRF

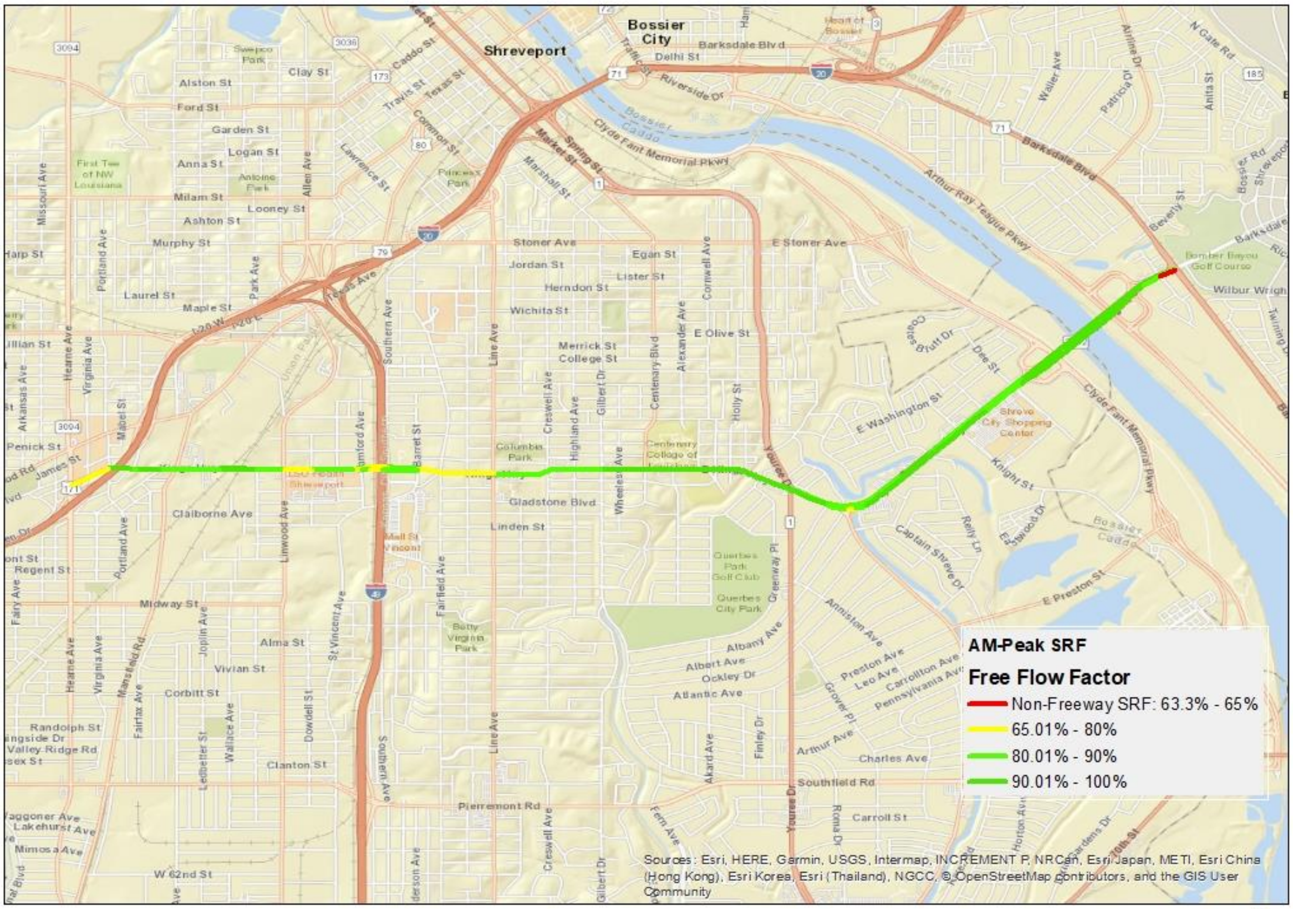
I-49 STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 I-49 Urban Study Corridor PM-Peak (4:00p-7:00p) SRF

Miles 0 0.4 0.8 1.6 2.4

KINGS HWY / WESTGATE STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



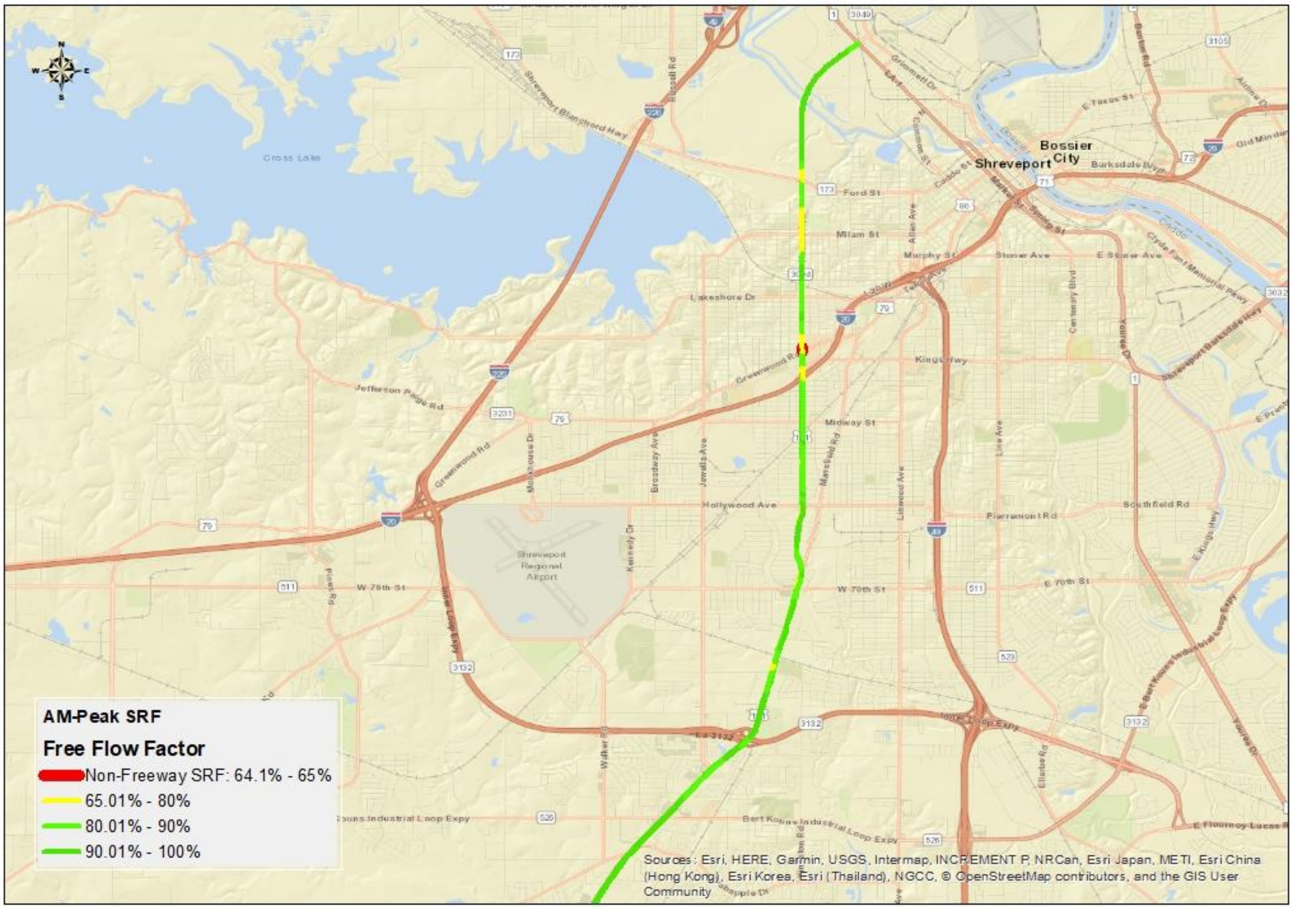
CMP 2021 Kings Hwy Study Corridor AM-Peak (6:00a-9:00a) SRF

0 0.2 0.4 0.8 1.2 Miles

KINGS HWY / WESTGATE STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD

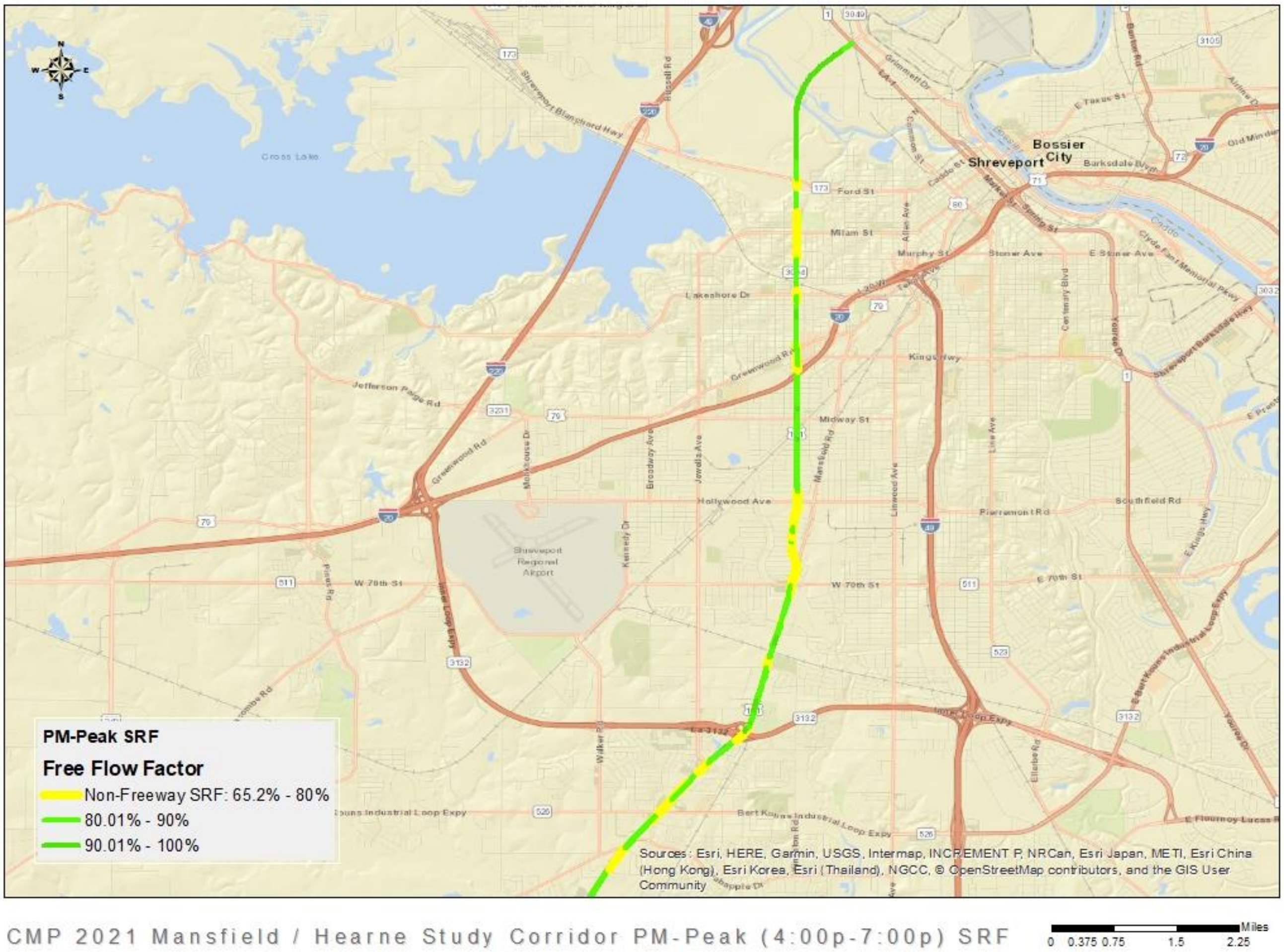
CMP 2021 Kings Hwy Study Corridor PM-Peak (4:00p-7:00p) SRF

MANSFIELD RD (US 171) / HEARNE AVE STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



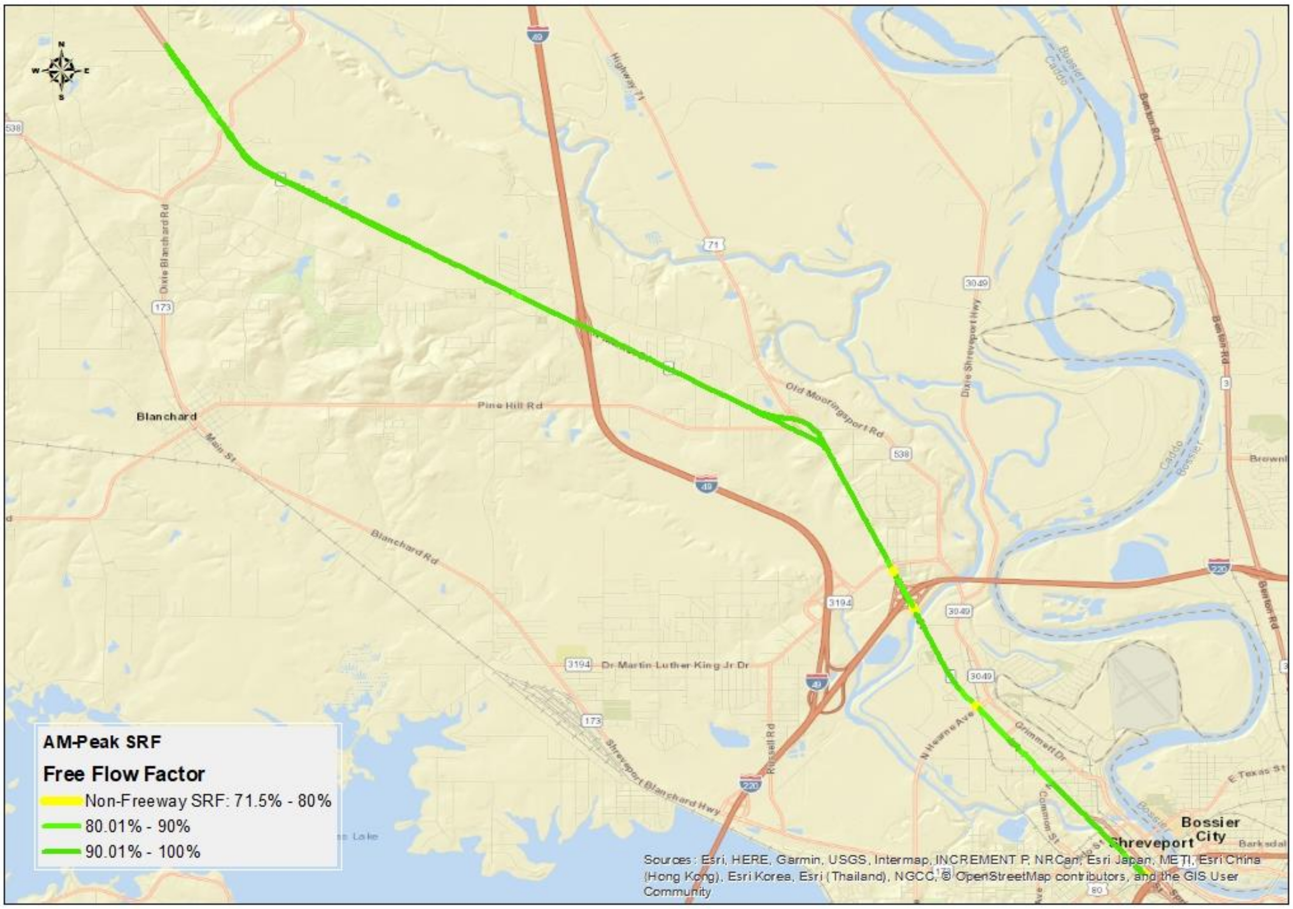
CMP 2021 Mansfield / Hearne Study Corridor AM-Peak (6:00a-9:00a) SRF

MANSFIELD RD (US 171) / HEARNE AVE STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 Mansfield / Hearne Study Corridor PM-Peak (4:00p-7:00p) SRF

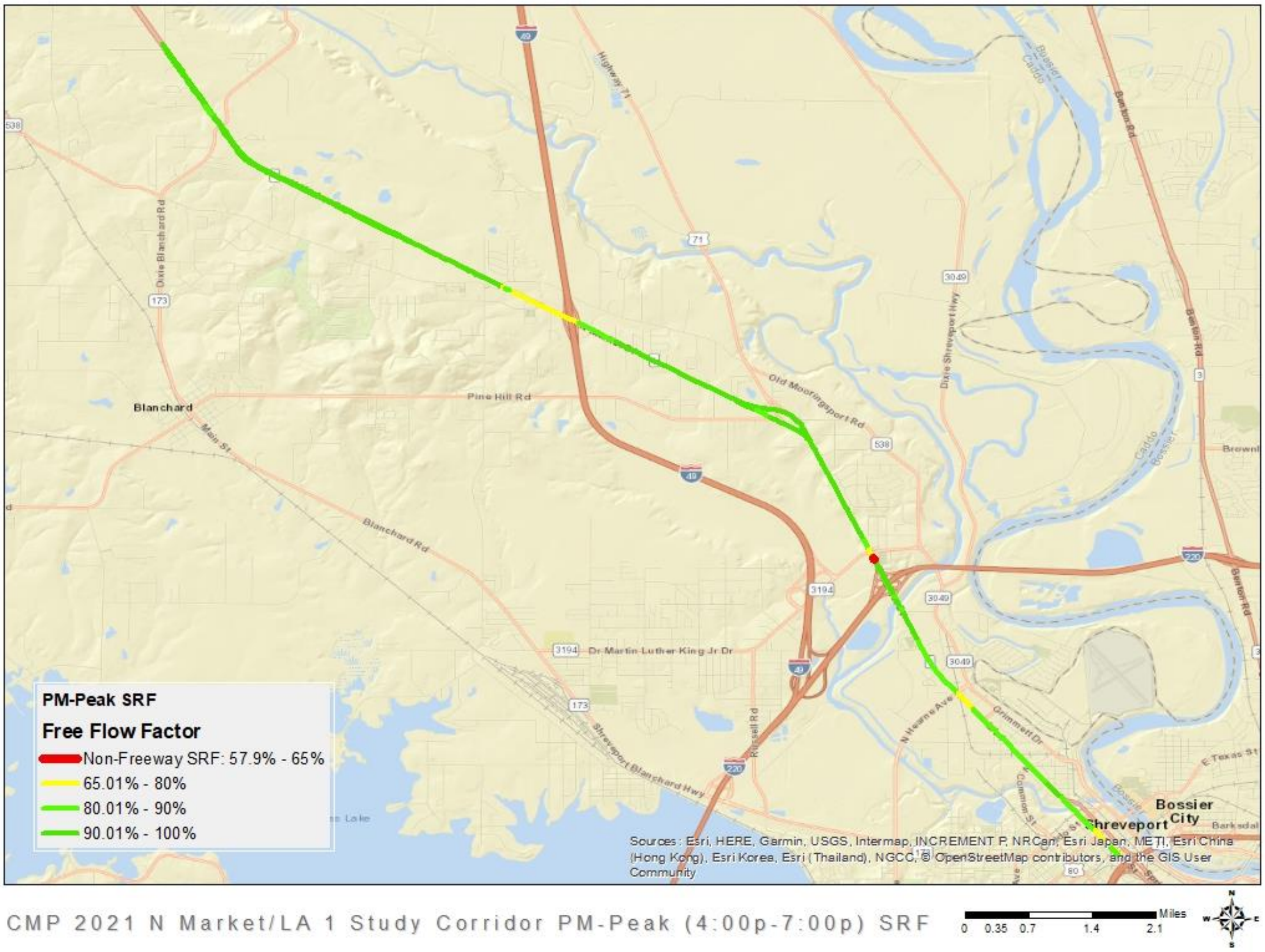
N. MARKET ST (LA 1-US 71) STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 N Market/LA 1 Study Corridor AM-Peak (6:00a-9:00a) SRF

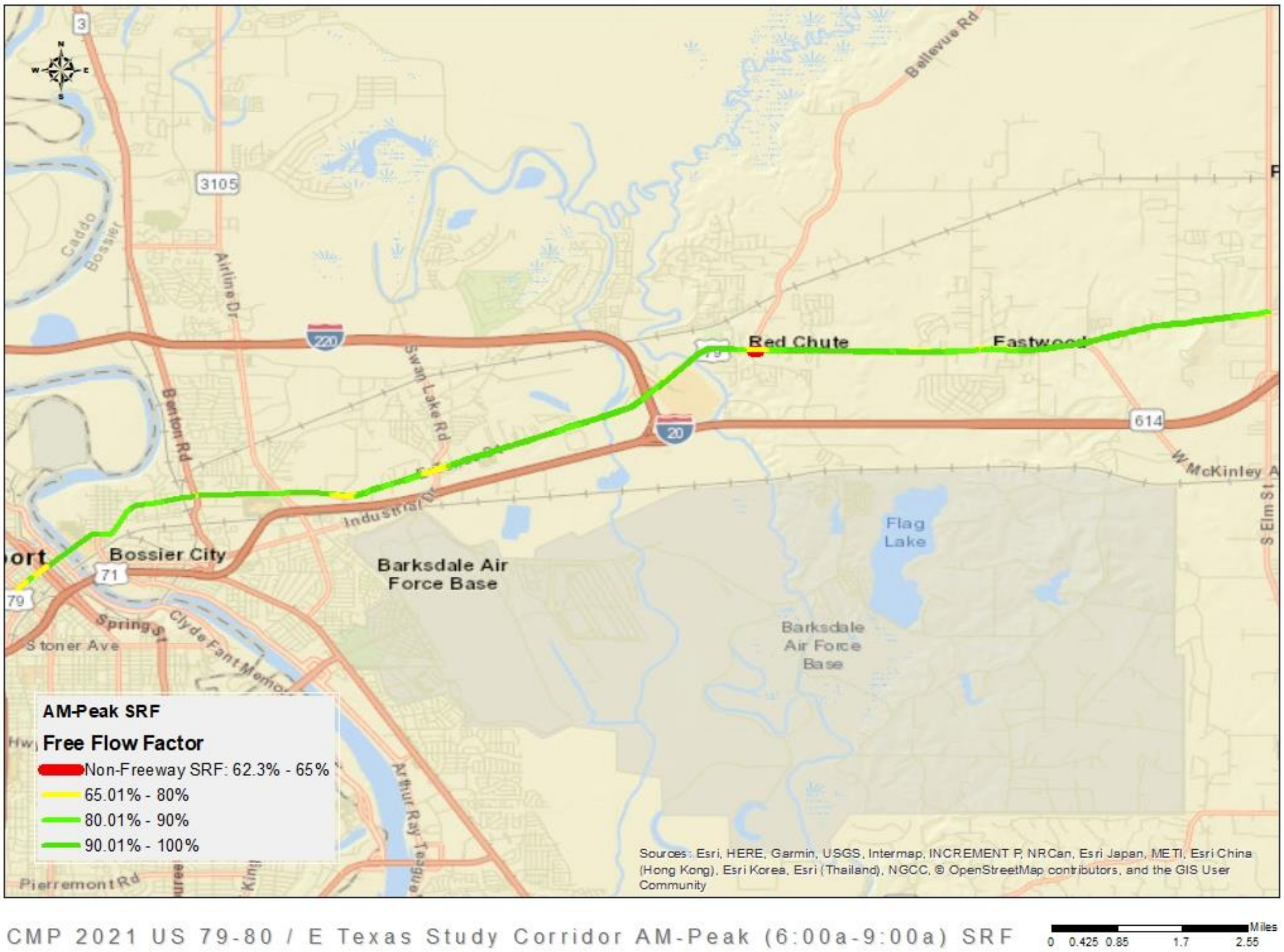
0 0.35 0.7 1.4 2.1 Miles

N. MARKET ST (LA 1-US 71) STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



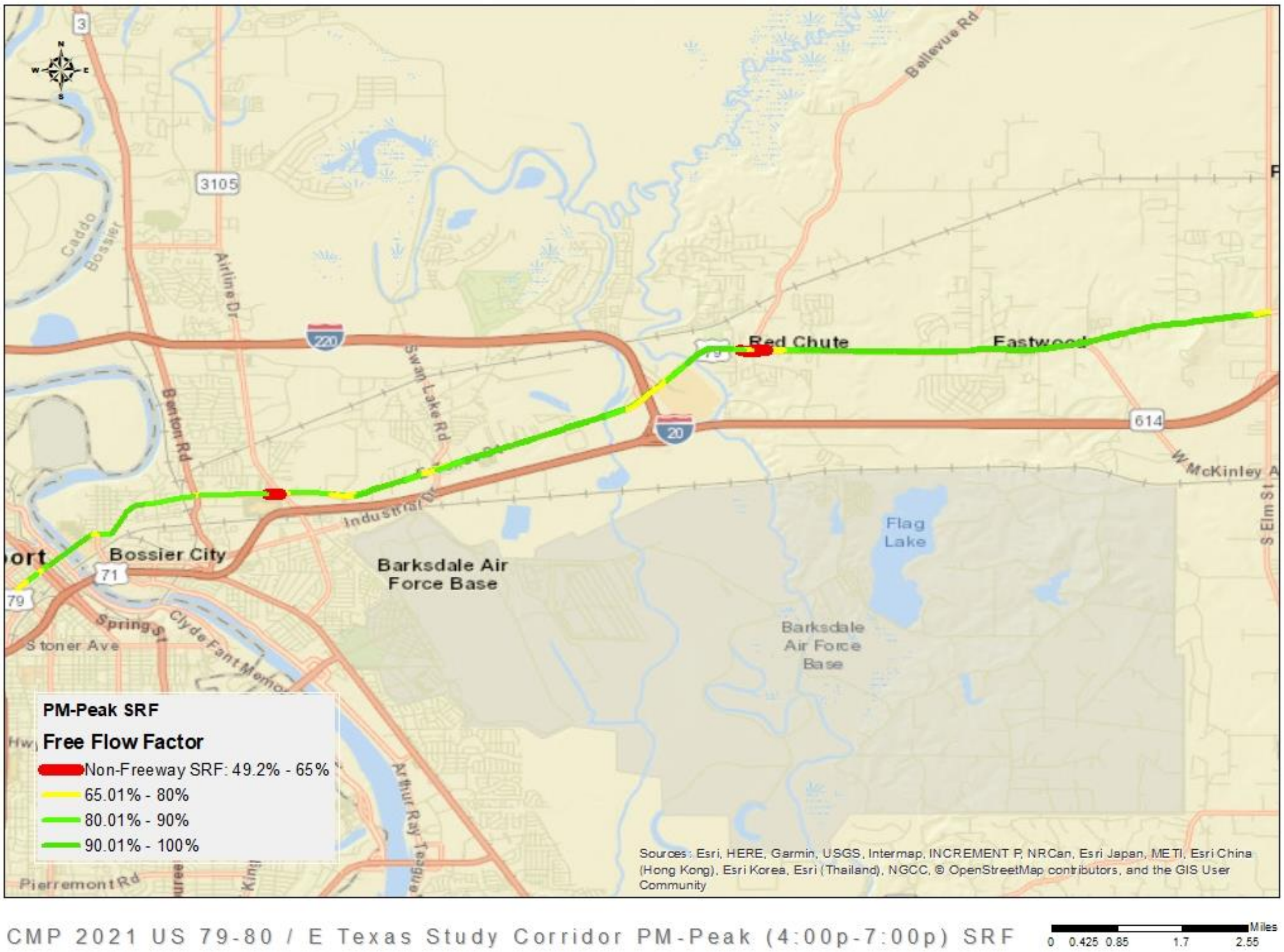
CMP 2021 N Market/LA 1 Study Corridor PM-Peak (4:00p-7:00p) SRF

US 79-80 / E. TEXAS ST STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



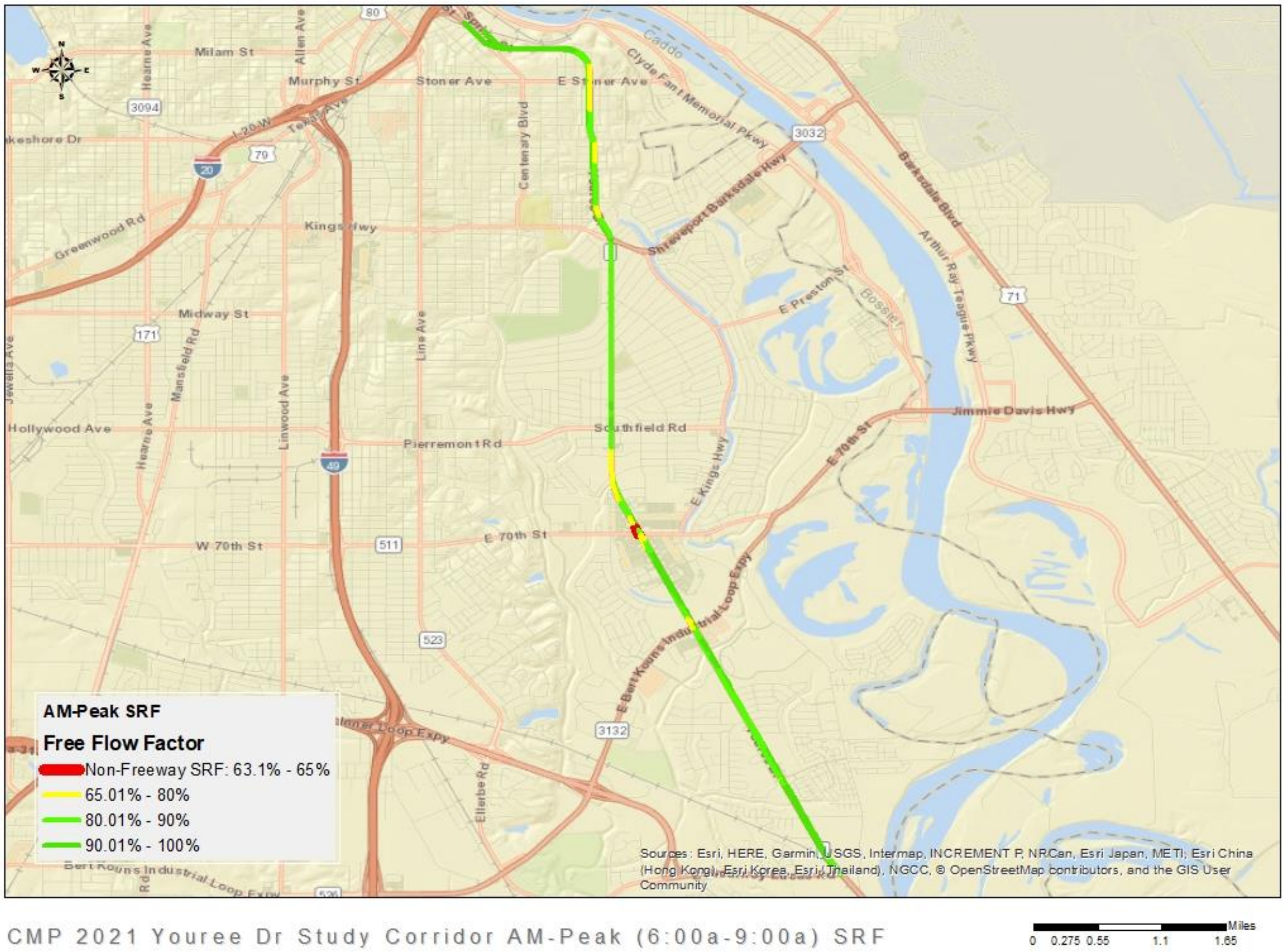
CMP 2021 US 79-80 / E Texas Study Corridor AM-Peak (6:00a-9:00a) SRF

US 79-80 / E. TEXAS ST STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



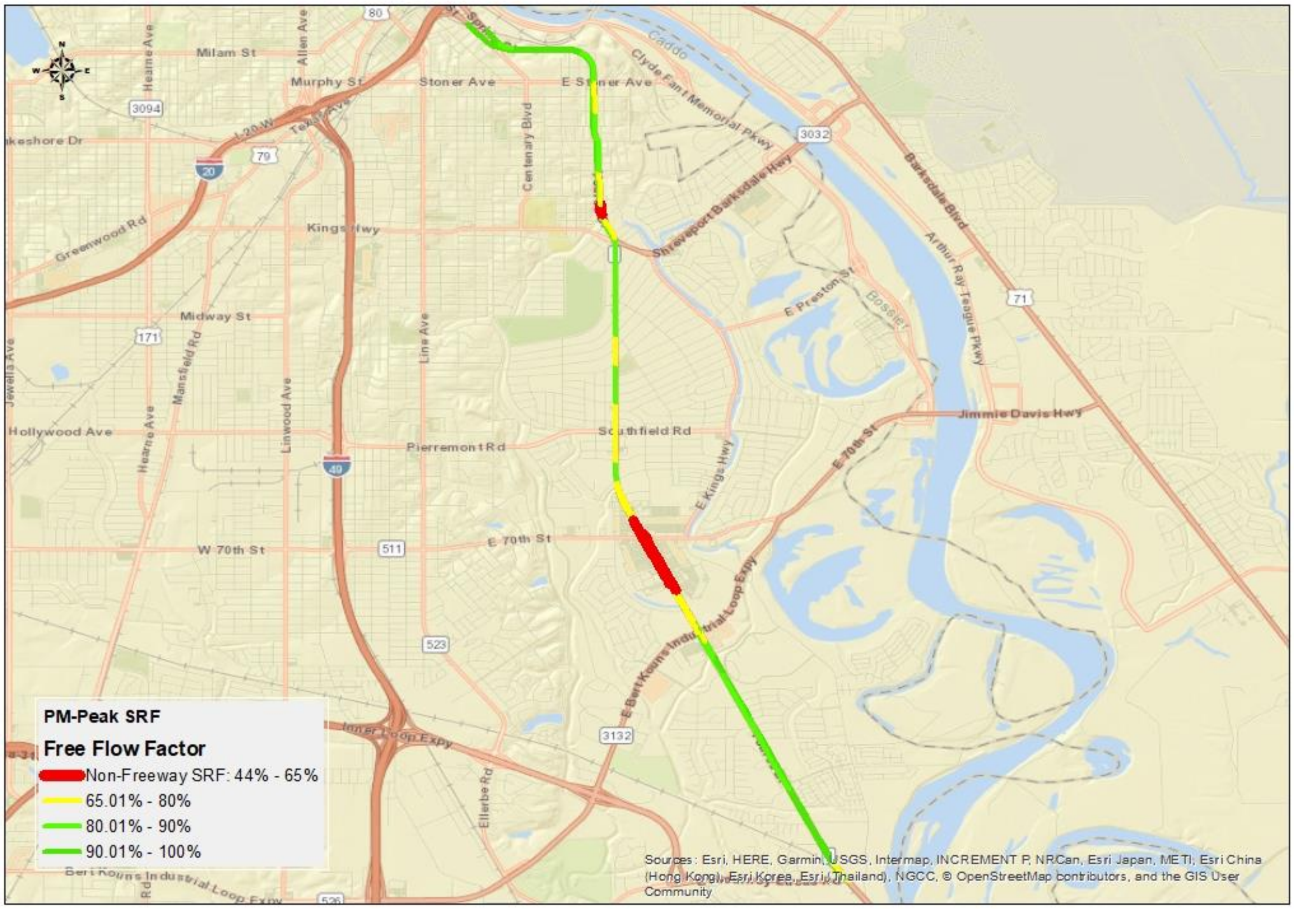
CMP 2021 US 79-80 / E Texas Study Corridor PM-Peak (4:00p-7:00p) SRF

YOUREE DR (LA 1) STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



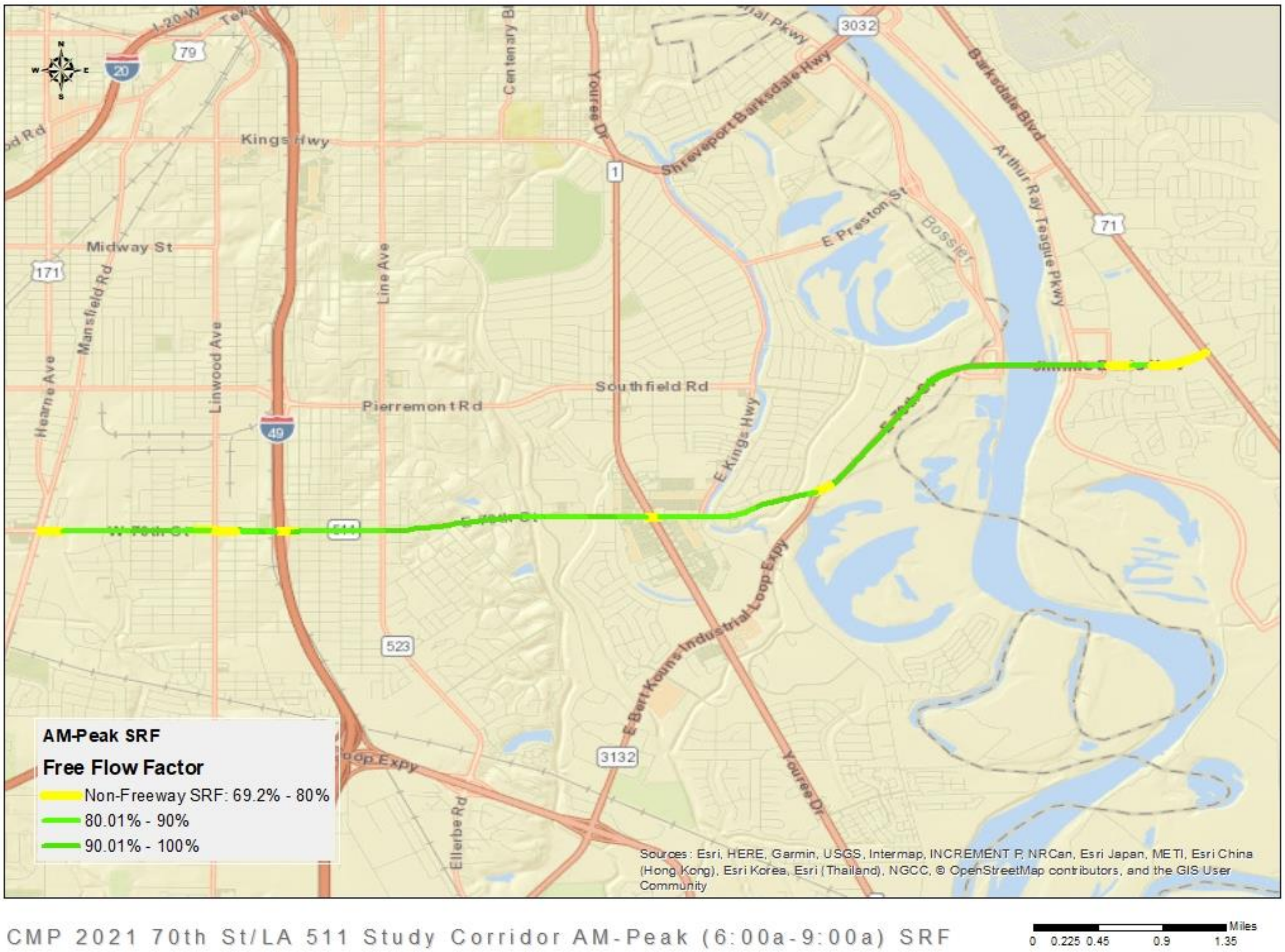
CMP 2021 Youree Dr Study Corridor AM-Peak (6:00a-9:00a) SRF

YOUREE DR (LA 1) STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



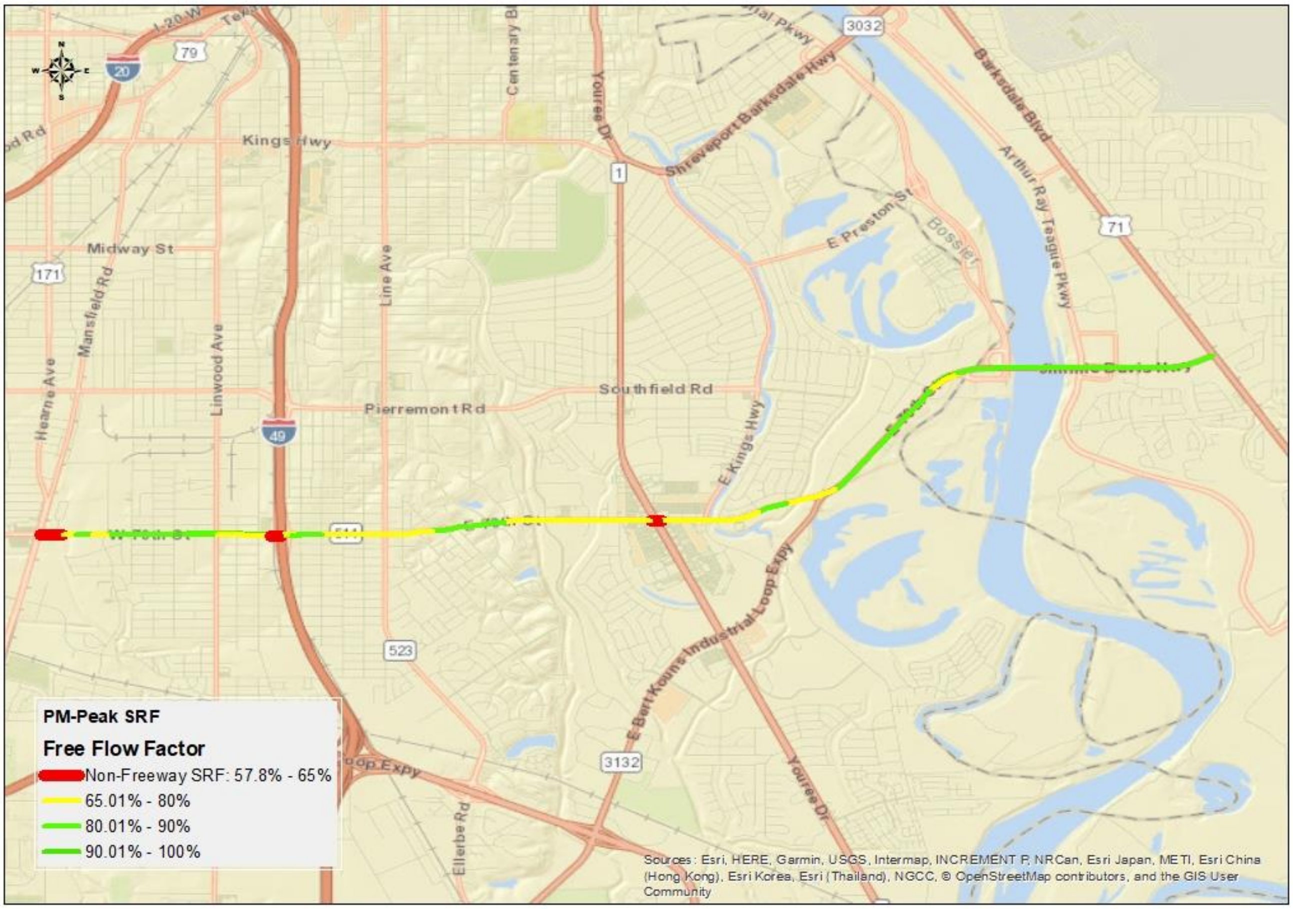
CMP 2021 Youree Dr Study Corridor PM-Peak (4:00p-7:00p) SRF

70TH ST. (LA 511) STUDY CORRIDOR / AM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 70th St/LA 511 Study Corridor AM-Peak (6:00a-9:00a) SRF

70TH ST. (LA 511) STUDY CORRIDOR / PM PEAK / 04.2021 ANALYSIS PERIOD



CMP 2021 70th St/LA 511 Study Corridor PM-Peak (4:00p-7:00p) SRF