



## NORTHWEST LOUISIANA - METROPOLITAN PLANNING AREA

# CMP 2009

## CONGESTION MANAGEMENT PROCESS



Prepared by, Northwest Louisiana Council of Governments (NLCOG)  
in cooperation with the Federal Highway Administration, the Federal Transit  
Administration and the Louisiana Department of Transportation and Development

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**NORTHWEST LOUISIANA  
CONGESTION MANAGEMENT PROCESS (CMP)**

**2009 UPDATE**

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## Justification for the CMP

### CMP Regulatory Requirements

Regions with more than 200,000 people, known as Transportation Management Areas (TMAs), must maintain a congestion management plan (CMP) and use it to inform transportation planning and decision-making. These requirements were introduced by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and were continued under the successor law, the



Transportation Equity Act for the 21st Century (TEA-21). Whereas previous laws referred to this set of activities as a congestion management system (CMS), SAFETEA-LU, refers to a “congestion management process”, which is intended to be an integral component of metropolitan transportation planning process. The Northwest Louisiana Congestion Management Plan has been developed to address this federal requirement for the Northwest Louisiana Council Of Governments (NLCOG). NLCOG is the designated Metropolitan Planning Organization (MPO) for the Shreveport / Bossier City Louisiana Urbanized Area (UZA).

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 Transportation 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.

### CMP's Purpose in the MPO's Transportation Planning Process

Aside from the CMP being a federal requirement for a MPO with a population of over 200,000, CMP's help qualify and/or identify potential projects for inclusion into their regional transportation program. They identify potential improvements based on quantifiable data and they consider congestion in developing transportation improvements. CMP's establish a baseline condition for

future comparison of conditions and allow for project prioritization based on potential congestion mitigation. CMP's can provide solutions beyond merely adding road capacity as mitigation development includes other solutions that may be more effective and cost-efficient. CMP's encourage economic competitiveness and increase the reliability of planning for all modes and all journey purposes. Environmental programs that involve air quality and natural hazard mitigation also benefit from the CMP process.

### **Integration of the CMP Into NLCOG's (TMA) Transportation Planning Processes**

The CMP is intended to be an integral part of the metropolitan transportation planning process, rather than a stand-alone program or system. SAFETEA-LU outlines the requirements for addressing congestion in Transportation Management Areas (TMAs), mandating the incorporation of CMP within the metropolitan transportation planning process. Integration of the CMP into the planning process will provide decision makers better tools for project prioritization.

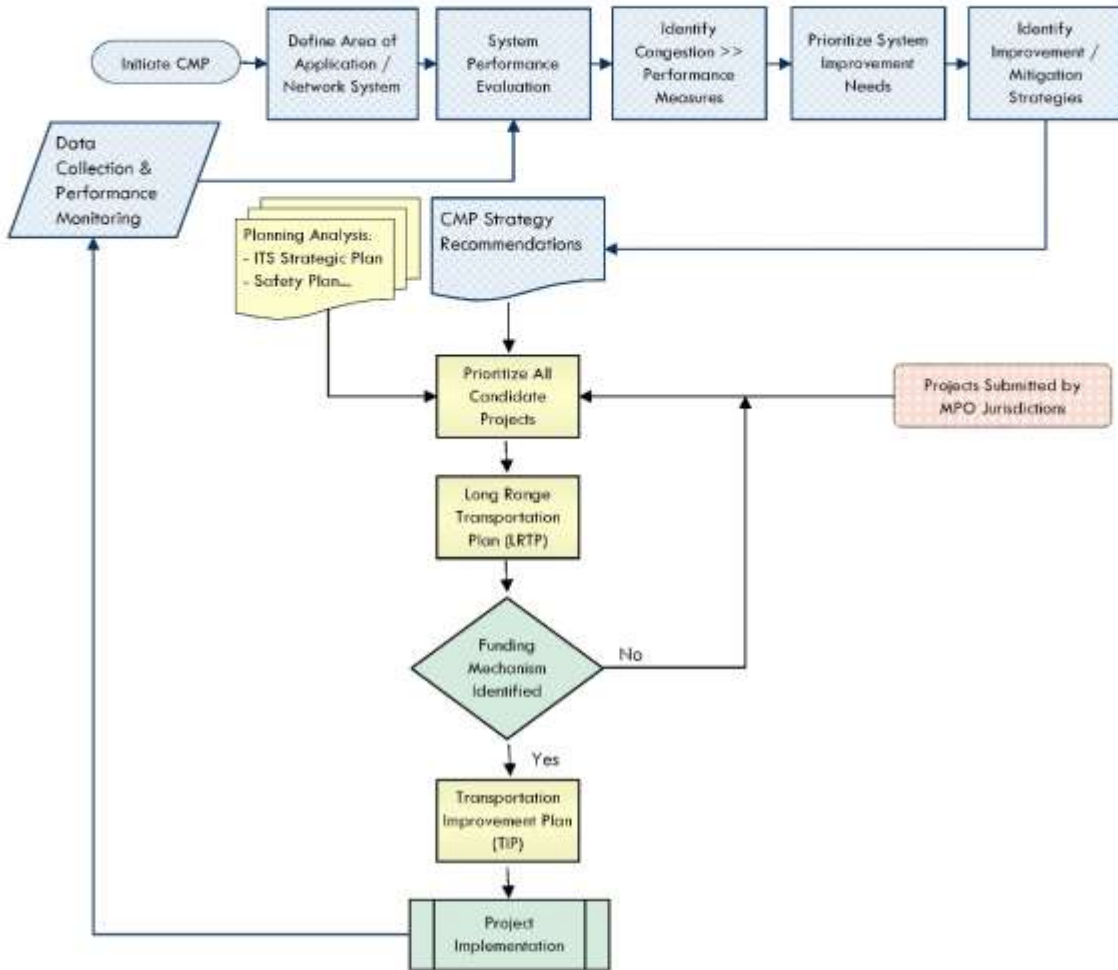
The planning process and its relationship to the CMP components are presented in Figure 1.1 (please refer to the following page). Outlined below, NLCOG's CMP contains six distinct process components.

Primary CMP components:

- 1) Area of Application and System Definition
- 2) System performance evaluation
- 3) Identification of congestion (through performance measures)
- 4) Methodology to prioritize corridor/section improvement needs
- 5) Mitigation/Improvement strategy identification
- 6) On-going data collection and performance monitoring

Figure 1.1, illustrates how the aforementioned CMP process elements are integrated into the overarching MPO transportation planning process. A critical process element, within the overall MPO planning process, occurs during the prioritization of **all** candidate projects is undertaken. It is at this juncture, that CMP improvement strategies are recommended, as well as, the recommended improvements from other MPO planning analysis efforts, and the improvement projects/strategies submitted by the MPO's member jurisdictions.

**Figure 1.1**  
**CMP Linkage To The MPO Planning Process**



### CMP Participation

NLCOG’s Congestion Management Process was developed through a cooperative effort with members of the MPO’s Technical Advisory Committee (TAC). The Technical Advisory Committee (TAC) 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 TAC’s primary function is to interpret technical data and policy mandates. Further, the TAC is used by the MPO’s Transportation Policy Committee to formulate the Long Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP). In an effort to integrate the CMP into the planning process the

development of the CMP was discussed during the TAC meetings. The member agencies and groups represented on the TAC include:

- LADOTD - Planning/Programming
- LADOTD – District 04 Traffic Engineer
- Shreveport MPC
- Bossier City Chamber of Commerce
- Shreveport-Bossier Port Commission
- SporTran
- Coordinating and Development Corporation (CDC)
- Federal Highway Administration – LA Div.
- Caddo Parish Commission
- Bossier City Traffic Engineering
- Federal Transit Administration – Reg. VI
- Caddo Parish Commission
- Shreveport Chamber of Commerce
- Shreveport Traffic Engineering

## Northwest Louisiana's CMP Development

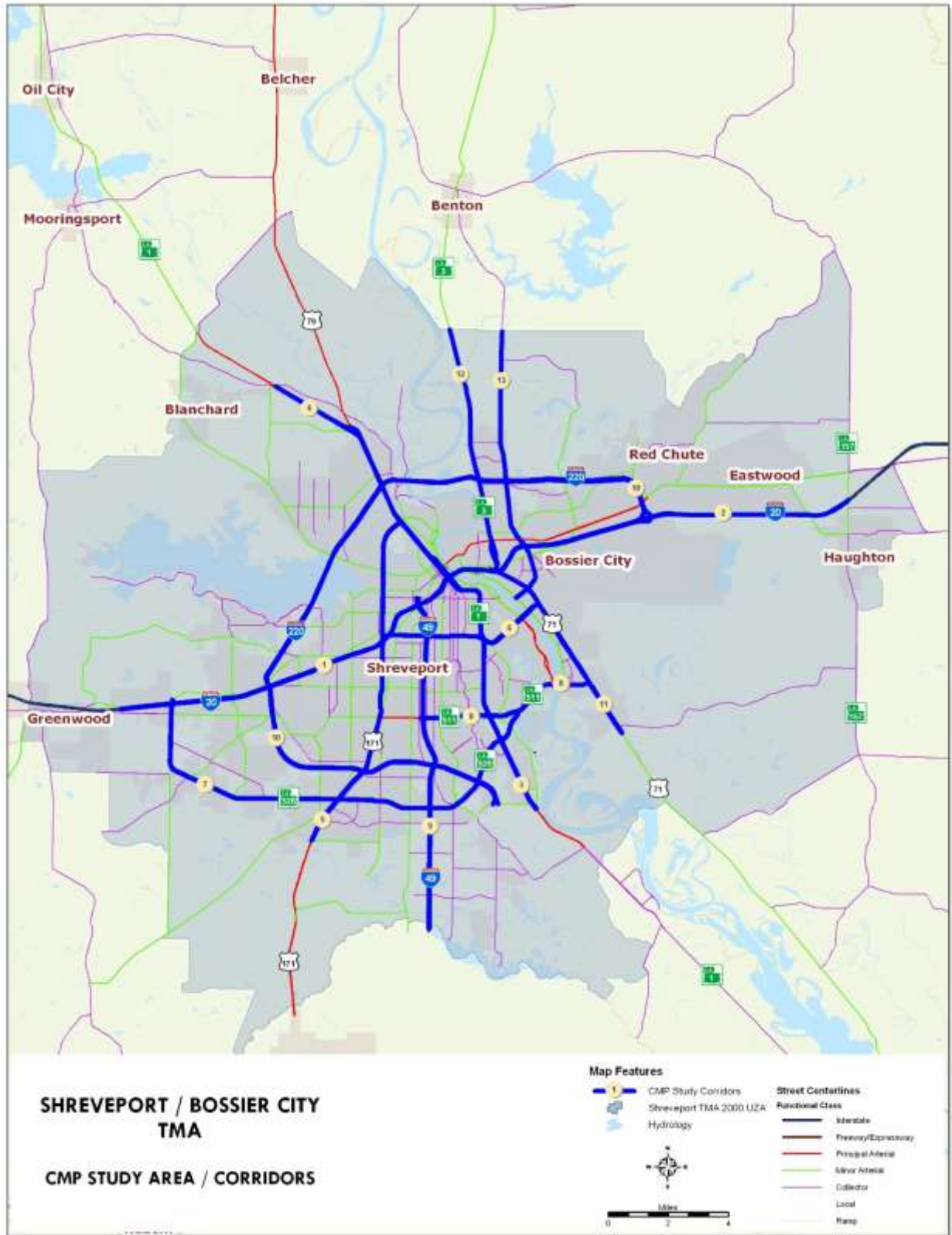
### **CMP Area of Application (Study Area) / System Network (Corridors)**

CMP study area boundaries mirror the ones that were established for the US Census designated twenty-year urban growth area... otherwise known as the 2000 Shreveport Urbanized Area (UZA) boundary. 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.

NLCOG (Shreveport MPO/TMA) utilized their in-house regional travel demand forecasting model (TRANSCAD) to identify the most congested transportation facilities. A 0.70 v/c ratio is used as the initial performance threshold level. All model links (segments) operating above the threshold are flagged as candidates in the development of the CMP study corridors. Combined with ADT count and growth trend information, the flagged segments are joined together to form corridors. Figure 2.1, illustrates the physical extent of the thirteen lowest performing, by v/c ratio, corridors. The thirteen corridors are presented to the Technical Advisory Committee (TAC - which comprises most of the region's transportation stakeholders) for consideration and approval.



Figure 2.1: 2009 CMP Study Corridors (13)



The map's individual CMP study corridor extents are keyed ("Map ID") to Table 2.1 (following page).

Within the CMP study area, thirteen corridors were developed equaling a total one-way length of approximately 149 corridor miles. Four of the corridors, I-20 West, I-20 East, I-220/LA 3132, and I-49 are classified as interstate (limited access) facilities while the remaining nine are functionally classified as principal arterials. Table 2.1, describes the physical extent of each individual corridor.

Table 2.1: 2009 CMP Study Network

| Map ID | Corridor Name                          | Length (miles) | Extents                                |
|--------|--|----------------|--|
| 1      | I-20 (West)                            | 11.3           | LA 526 (Bert Kouns Ind.) – Traffic St. |
| 2      | I-20 (East)                            | 14.1           | LA 157 – Spring St.                    |
| 3      | Youree Dr (LA 1)                       | 9.6            | LA 523 – N. Market St.                 |
| 4      | N. Market St. (LA 1/US 71)             | 8.2            | LA 538 – Spring St. Split (viaduct)    |
| 5      | Mansfield Rd. / Hearne                 | 11.6           | N. Market St. – Williamson Way         |
| 6      | Kings Hwy.                             | 5.7            | US 71 – Hearne Ave.                    |
| 7      | LA 526 (Bert Kouns Ind.)*              | 15.8           | I-20 – LA 511                          |
| 8      | LA 511 (J.Davis-70 <sup>th</sup> St.)* | 6.0            | US 71 – I-49                           |
| 9      | I-49**                                 | 11.3           | Southern Loop – I-20                   |
| 10     | I-220 / LA 3132**                      | 27.8           | LA 523 – I-20 (Bossier City)           |
| 11     | US 71 (Barksdale Blvd.)                | 6.8            | LA 612 (Sligo Rd) – I-20               |
| 12     | Benton Rd. (LA 3)                      | 8.3            | Kingston Rd. – I-20                    |
| 13     | Airline Dr. (LA 3105)                  | 9.5            | Kingston Rd. – AR Teague Pkwy.         |

\* Reconfigured study corridor from 2001 CMS

\*\* New study corridors for 2009

The corridor is but one component of the performance analysis. A more detailed examination takes place at the corridor’s section and intersection levels.

### CMP System Evaluation - Performance Measures

The data requirements of a CMP are significant. In cooperation with Louisiana's Dept. Of Transportation and Development (LaDOTD), base performance measures were established statewide, through LADOTD's CMS Committee (1997), in order to evaluate levels of congestion in a quantifiable and consistent manner. The three base measures are:

- Average Travel Speed
- Level-Of-Service (LOS)
- v/c Ratio

These measures are primarily used to evaluate the following physical categories 1) Travel Speed/Rates (corridor-segment level analysis; calculate a “Speed Deficit” measure); 2) LOS (all levels - primarily intersection operations); and 3) v/c ratio (segment level analysis - if needed). Additionally, secondary measures will be utilized such as: vehicle classification, occurrence of incidents and transit performance indices. These performance indicators will provide the basis for CMP evaluation and monitoring activities.

### **Traffic Flow Data Collection (Travel Time Runs)**

The precise collection of travel speed data is critical to accurately determining facility performance levels. For this reason, GPS technology is utilized to collect raw position and temporal data along the ten CMP corridors (Please refer to Appendix A for a detailed description of this data collection methodology). Raw GPS position files are transformed into useable average travel speed (rate) data and assigned to individual corridor segments for further analysis (i.e. MPH calculations).

The Congestion Management System (CMP) process identifies congestion based upon field collected travel flow data. For analysis purposes, identified CMP corridors (i.e. critical transportation facilities) are subdivided into smaller units called sections (approximately 0.2 mile in length). A sub-set of corridors was created to facilitate a more accurate identification of congested segment locations. Sections represent portions of the corridor bounded by critical signalized intersections (principal arterials) or interchanges (interstates/freeways). Locally, there are a total of 200 identified sections within the CMP network.

The location and level of facility congestion is determined through a Speed Deficit calculation.

*Speed Deficit is the calculated difference between average off-peak travel speed and average peak period travel speed.*

A Speed Deficit calculation produces an easily understood measure of facility congestion. A large discrepancy between **the average off-peak travel speed** and **average peak period travel speed** indicates the presence of congestion. What is considered a “large” difference between off-peak and peak travel speeds? Locally, congestion “significantly” impedes travel when there is a difference of approximately 15 mph along primary surface streets or as little as a 7-mph reduction on limited access facilities.

## Identify Network Congestion

From the traffic flow data collection that was performed during 2001, Table 2.2 summarizes the ten study sections (~0.2 mile corridor section) which exhibited the highest speed deficits.

Table 2.2: 2001 Ten Highest - Speed Deficit Sections (2001 study)

| Rank | Section | Peak Period | Facility    | Dir. | Section: From/To                   | Speed Deficit (mph) |
|------|---------|-------------|-------------|------|------------------------------------|---------------------|
| 1    | 41      | AM          | Benton Rd.  | SB   | I-220 WB Ent Ramp to Viking        | 32                  |
| 2    | 117     | PM          | Kings Hwy.  | WB   | Dee to Knight                      | 26                  |
| 3    | 117     | NOON        | Kings Hwy.  | WB   | Dee to Knight                      | 24                  |
| 4    | 102     | AM          | LA 526-BKI. | EB   | Walker to Mansfield                | 24                  |
| 5    | 13      | AM          | Airline Dr. | SB   | I-220 WB Ent Ramp to Viking        | 23                  |
| 6    | 139     | AM          | Hearne Ave. | SB   | Kings Hwy to I-20 EB Exit Ramp     | 23                  |
| 7    | 139     | PM          | Hearne Ave. | SB   | Kings Hwy to I-20 EB Exit Ramp     | 23                  |
| 8    | 149     | AM          | US 171      | SB   | Inner Loop EB Exit Ramp to Jewella | 23                  |
| 9    | 91      | AM          | LA 526-BKI. | WB   | E Kings Hwy to Youree              | 22                  |
| 10   | 81      | AM          | LA 511      | WB   | Barksdale to East Foot J Davis Br  | 22                  |

High speed deficits indicate the presence of vehicular delay and conflict within the flow of traffic. The higher the deficit the more likely congestion is present within the study section.

## Ongoing CMP Performance Monitoring

In addition to providing an analysis of existing conditions, the CMP also outlines a suggested program for updating the document once every five years. The recommended program includes guidelines for collecting new data to ensure all future data collection efforts are consistent with existing parameters. The result will be a continuous record of travel conditions on key corridors allowing for time series analysis and the identification of locations with increasing or decreasing congestion levels.

Figures 2.2 and 2.3 show the congested and potentially congested corridors for the AM and PM peak periods, respectively.

Figure 2.2: 2001 AM PEAK PERIOD LOS DETERMINATIONS



Figure 2.3: 2001 PM PEAK PERIOD LOS DETERMINATIONS



## CMP Section Prioritization Methodology

Speed Deficit provides an acceptable measure of congestion, but it does not address a section's **need** for improvement. In order to prioritize congested sections for improvement, current TIP projects, ADT, and transit measures are considered.

Sections that are slated for improvement, under the TIP, will have a lower priority. High volume sections have added importance within the transportation network. Further, sections that directly impact transit operations are prioritized higher.

**Identify Congested Segments**    → Speed Deficit    → **Prioritize Section Needs**

- 1) Existing TIP Project
- 2) ADT
- 3) Transit Impact Measure

### Existing TIP Projects

Congested sections that are currently scheduled for improvements, through the TIP, are prioritized lower than sections that are left unimproved. The scope of the improvement will be taken into account during the formulation of recommended alleviation strategies. Further, including programmed improvement projects in the needs prioritization process strengthens the linkage between the CMP and the MPO's overall transportation processes.

### Average Daily Traffic (ADT)

Sections are prioritized by the volume levels they handle on a daily basis. Higher ADT sections are given priority over the less traveled network sections.

*By utilizing ADT as a prioritization criterion, the sections with the highest travel demand are recommended for improvement before less traveled sections.*

ADT data is obtained through LaDOTD's Data Collection and Analysis Section. However, most network sections do not contain LaDOTD ADT data. In these cases, locally collected, unadjusted 24-hour volume counts provide a reasonable estimate of daily traffic.

## Transit Impact Rating

Congestion significantly degrades transit's ability to provide efficient and economical service to its patrons. Heavily congested sections reduce fuel efficiency, and increase both vehicle emissions and patron delay. The function 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. The rating consists of the calculations denoted below:

$$\begin{array}{c} \text{[Route Usage Component]} \\ \frac{\text{number of passengers/route/month}}{\text{total SPorTran passengers/month}} \end{array} + \begin{array}{c} \text{[Physical-Network Component]} \\ \frac{\text{route mileage on the CMP corridor}}{\text{total CMP network mileage}} \end{array}$$

Theoretically, the highest impact rating any section can receive is 200% (2.0). A route usage of 100% (1.0) means that all of SPorTran's monthly passengers ride only one route (not very likely). Route usage compares the significance of one route to another using ridership data. If the entire transit route traverses the CMS network, then the physical-network component calculates to 100% (1.0). Percentages are additive if more than one transit route occupies a section. Sections that do not have transit service traversing over them have a 0% (0.0) impact rating. Locally, nearly all the sections have a Transit Impact Rating of between 0% and 20%. A high section impact rating (15% - 20%) indicates the presence of a significant influence upon transit service. Improvements made to these sections will invariably affect transit operations.



## Identify High Priority CMP Sections

Local prioritization of identified congested sections adds another level of complexity to the CMP. By integrating the three ranking criteria (TIP projects, ADT, Transit Impact Rating) into a local prioritization scheme, a well-balanced and equitable approach is achieved.

Table 2.3: Prioritization Recommendations for the Highest Speed Deficit Sections

| Priority* | Corridor        | Dir. | Peak | Section: From/To                           | Justify/Recommendation   |
|-----------|-----------------|------|------|--|--|
| 1 ▼       | Benton Rd.      | SB   | AM   | I-220 WB Ent Ramp to Viking                | TIP project 4 will significantly reduce delay through this section; <b>Lower this section's priority</b>   |
| 2 ▼       | Kings Hwy.      | WB   | PM   | Dee to Knight                              | Local signal timing improvements have reduced section delay - next travel time study will prove this out; <b>Lower this section's priority</b>       |
| 3 ▼       | Industrial Loop | EB   | AM   | Walker to Mansfield                        | AM delay - school crosswalk; <b>Lower this section's priority</b>  |
| 4 ▼       | Kings Hwy.      | WB   | Noon | Dee to Knight                              | Same section as priority #2  |
| 5 ▼       | Mansfield Rd.   | SB   | AM   | Inner Loop EB Exit Ramp to Jewella         | Justified signal timings for direction/period; <b>Lower this section's priority</b>  |
| 6 ▲       | Mansfield Rd.   | SB   | AM   | Kings Hwy to I-20 EB Exit Ramp             | No scheduled improvements; <b>Legitimate high priority section in need of improvement</b>  |
| 7 ▲       | Mansfield Rd.   | SB   | PM   | Kings Hwy to I-20 EB Exit Ramp             | Same section as priority #6  |
| 8 ▲       | Airline Dr.     | SB   | AM   | I-220 WB Ent Ramp to Viking                | TIP project 4 will <b>not</b> resolve all the factors contributing to its congestion; <b>Legitimate high priority section in need of improvement</b> |
| 9 ▲       | Industrial Loop | WB   | AM   | E Kings Hwy to Youree                      | <b>Legitimate high priority section in need of improvement</b>   |
| 10 ▲      | Mansfield Rd.   | SB   | PM   | Greenwood to Kings Hwy                     | <b>Legitimate high priority section in need of improvement</b>   |
| 11 ▲      | Industrial Loop | WB   | AM   | Barksdale to East Foot Jimmie Davis Bridge | TIP project 2 will <b>not</b> resolve all the factors contributing to its congestion; <b>Legitimate high priority section in need of improvement</b> |
| 12 ▲      | Industrial Loop | EB   | PM   | Millicent Way to Youree                    | <b>Legitimate high priority section in need of improvement</b>   |

| Priority* | Corridor        | Dir. | Peak | Section: From/To                           | Justify/Recommendation   |
|-----------|-----------------|------|------|--|--|
| 13 ▲      | Airline Dr.     | SB   | AM   | Douglas to Shed                            | TIP project 4 will <b>not</b> resolve all the factors contributing to its congestion; <b>Legitimate high priority section in need of improvement</b> |
| 14 ▲      | Industrial Loop | WB   | PM   | Barksdale to East Foot Jimmie Davis Bridge | Same Section as priority #11   |
| 15 ▲      | Industrial Loop | EB   | AM   | Business Park to Millicent Way             | <b>Legitimate high priority section in need of improvement</b>   |
| 16 ▼      | Industrial Loop | EB   | AM   | Kingston to Linwood                        | Local signal timing improvements have reduced section delay - next travel time study will prove this out; <b>Lower this section's priority</b>       |
| 17 ▼      | Kings Hwy.      | EB   | Noon | Youree to E Kings Hwy                      | TIP project 6 will significantly reduce delay through this section; <b>Lower this section's priority</b>   |
| 18 ▲      | Mansfield Rd.   | SB   | AM   | Greenwood to Kings Hwy                     | Same Section as priority #10   |
| 19 ▲      | N. Market St.   | SB   | AM   | MLK Jr to I-220 WB Ramp                    | <b>Legitimate high priority section in need of improvement</b>   |
| 20 ▼      | Industrial Loop | WB   | AM   | Mansfield to Walker                        | AM delay - school crosswalk; <b>Lower this section's priority</b>  |
| 21 ▲      | Industrial Loop | EB   | PM   | Walker to Mansfield                        | <b>Legitimate high priority section in need of improvement</b>   |

▼ \* Priority has decreased due to section prioritization evaluation

▲ \* Priority has been elevated

Prioritizing congested sections is cost effective because proposed improvement projects are not only targeted at poorly performing sections, but at sections that will provide the greatest benefit to the traveling public through its improvement.

The outcomes of the section prioritization process are summarized in Table 2.4. In essence, the list identifies sections that urgently need improvement.

Table 2.4: 2001 CMP Highest Priority Sections (10) in Need of Improvement

| Priority | Facility        | Direction  | Peak Period | Section: From/To                       |
|----------|-----------------|------------|-------------|--|
| 1        | Hearne Ave.     | Southbound | AM          | Kings Hwy to I-20 EB Exit Ramp         |
| 2        | Airline Dr.     | Southbound | AM          | I-220 WB Entrance Ramp to Viking       |
| 3        | Industrial Loop | Westbound  | AM          | E Kings Hwy to Youree                  |
| 4        | Hearne Ave.     | Southbound | PM          | Greenwood to Kings Hwy                 |
| 5        | J. Davis Hwy.   | Westbound  | AM          | Barksdale to East Foot J. Davis Bridge |
| 6        | Industrial Loop | Eastbound  | PM          | Millicent Way to Youree                |
| 7        | Airline Dr.     | Southbound | AM          | Douglas to Shed                        |
| 8        | Industrial Loop | Eastbound  | AM          | Business Park to Millicent Way         |
| 9        | N. Market St.   | Southbound | AM          | MLK Jr Dr to I-220 WB Entrance Ramp    |
| 10       | Industrial Loop | Eastbound  | PM          | Walker to Mansfield                    |

## **Determination of Improvement Needs Or,**

### **How do we best reduce congestion along the identified high priority sections?**

Through the CMP, alleviation strategies are formulated 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.

During the initial development of the CMS in 1998, TAC members, as well as, NLCOG staff identified low cost, congestion mitigation strategies that are consistent with federal guidelines and can be applied to the identified congested corridors and intersections. The value based proposed mitigation strategies are categorized within one of the four major levels of mitigation strategies summarized below respectively:

#### **1) Temporal shift of home based work travel behavior (Regional TDM strategies)**

- MPO support of large employer (+500) compressed/staggered/flexible work hours
- Large employer (+500) staggered shift release times (e.g. Barksdale A.F.B.)

#### **2) Shifting trips from automobiles to other modes**

- Public transit capital improvements (e.g. Downtown Trolley Service – 4/16/09)
- Public transit operational improvements (e.g. Extended Service Hours - JARC)
- Encourage the use of non-motorized modes (MPO Bike/Ped. Committee, sidewalks and bicycle facilities)

#### **3) Enhancing operations on existing roadway facilities (TSM Improvements)**

- Traffic operations improvements (intersection widening, signal coordination, traffic surveillance and control systems)
- Incident Management (e.g. Interim ITS TMC at LADOTD 04 HQ and Shreveport Traffic Eng., detection and clearing of incidents, Deployed Alternate Route Plan (ARP))
- Access management (medians, signal and driveway spacing, frontage roads, inter-parcel connections – foster local jurisdiction participation)

#### **4) Increasing roadway capacity (widening and new roads)**

There are many system management initiatives undertaken by jurisdictions with the common goal of managing congestion and improving the mobility of people and goods in and across the region. However in some cases more roadway capacity is needed to accommodate population growth.

As a part of the CMP, each congested corridor is subjected to a screening process that examines the unique characteristics of the roadway and determines the most appropriate level of mitigation treatment and corresponding improvement strategy. When considering improvement strategies along an individual high priority section, TAC members and NLCOG staff confer over the merits of proposed improvements and subsequently recommend a course of action. Examples of specific improvement strategy negotiations are documented within the following section.

#### **Congestion Mitigation Strategy Recommendations Process**

##### **Hearne Ave. – Kings Hwy. To I-20 EB Exit Ramp**

Source(s) of Congestion:

Physical Deficiencies – Inadequate signalized intersection spacing; low speed turning path onto I-20 WB entrance ramp; narrow lane widths; inadequate turning bay lengths at some signalized intersections; skewed intersection at Kings Hwy.

Demand – High right turn volumes onto I-20 WB entrance ramp; LA. State Fairgrounds is a special generator adjacent to this section

Land Use Factors – Above average amount of private property access located along section

Recommended Improvement(s):

Construction of an additional southbound travel lane, from Greenwood Rd. 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 the Louisiana State Fairgrounds.

### **Airline Dr. – I-220 WB Entrance Ramp to Viking Dr.**

Source(s) of Congestion:

Physical Deficiencies – Inadequate signalized intersection spacing and LT bay length; “Spillback” problems

Demand – This is one of the fastest developing areas in the region – substantial increases in ADT’s per year (over 3%) are anticipated;

Land Use Factors – Large commercial and institutional attractors are located to the North and South of this section; private property access (i.e. curb cuts) onto Airline Dr is increasing with each new development; intense residential development, to the North, utilizes Airline Dr. as its primary link to Bossier City’s major activity centers

Recommended Improvement(s):

Even with the implementation of a coordinated signal system (TIP project 4 – Append. 4), this section will experience ever increasing delay due to the above mentioned land use and demand factors. It is recommended that additional improvements be made to maintain current performance levels.

“Spillback” into the through travel lanes is a major source of delay during the peak periods. Turning movements are expected to increase as I-220 and Viking Dr. are fully utilized by motorists. A needed physical improvement is to increase turning bay lengths before the noted negative impacts are realized. This improvement in conjunction with the coordinated signal system project will preserve current performance levels.

### **Industrial Loop – E. Kings Hwy. To Youree Dr.**

Source(s) of Congestion:

Physical Deficiencies – None; It is a 5 lane, modern design facility with current traffic control equipment

Demand – This is one of the highest volume throughput intersections in the region (6/95 24 hour count – 63504)

Land Use Factors – Existing commercial attractors are located adjacent (North) to the section; A substantial institutional development is being constructed along the section's South side; Because of these large developments, private property access (i.e. curb cuts), as well as, traffic signals have proliferated along Industrial Loop

Recommended Improvement(s):

In this case, physical improvements alone will have a minimal impact upon congestion. Over the long run, significant reductions in congestion are achieved if physical improvements are tied to land use policy and demand management approaches. For example, 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.

Congested sections along Industrial Loop will benefit the most from demand management approaches since its physical deficiencies are nearly nonexistent. The continued development of the Industrial Loop corridor will bring with it added pressure to provide direct access onto this corridor. An established policy of limiting private access points will go along way to minimize these negative traffic flow impacts.

**Hearne Ave. – Greenwood to Kings Hwy.**

Source(s) of Congestion:

Physical Deficiencies – Narrow lane widths along the entire length of the section; Hearne at Kings Hwy. Intersection is skewed

Demand – Observed peak period volumes have an unusually short duration (4:30 – 5:00 PM); LA. State Fairgrounds is a special generator adjacent to this section

Land Use Factors – Much of the commercial development has little setback from Hearne Ave.'s travel lanes; A substantial institutional land use is located along the section's East side; Excessive private property access (i.e. curb cuts – driveways the length of the property's frontage onto Hearne)

Recommended Improvement(s):

Here again, a coordinated improvement project which entails the addition of a Southbound travel lane, from Greenwood Rd. to the I-20 Westbound entrance ramp, will reduce turning movement

delay. Additionally, it will facilitate higher entrance ramp speeds downstream and reduce spillback onto through travel lanes, this improvement will allow for the expansion of lane widths/turning bays and a possible realignment of the Kings Hwy. intersection. The improvement will ease non-recurring (i.e. special generator) congestion caused by activities originating from the Louisiana State Fairgrounds

#### **J. Davis Hwy. (LA 511) – Barksdale Blvd. (US 71) To East Foot of J. Davis Bridge**

##### Source(s) of Congestion:

Physical Deficiencies – After TIP project #2 is completed, the physical deficiencies along this section are negligible; however, with a lane drop at the foot of the bridge, a source of recurrent congestion (“bottleneck”) is created on both sides of the river

Demand – This section provides links to both Clyde Fant and A.R. Teague Parkways for residents of South Bossier City. This is the southern most river crossing in the MPO area. Therefore, it is a crucial transportation corridor for residents and businesses located in the southern half of the MPO. Also, continued expansion of Teague Parkway will bring additional volumes to Woodmont Blvd.

Land Use Factors – With the addition of a 2WLTl throughout the section, private property access has a negligible negative impact upon travel flow.

##### Recommended Improvement(s):

In the long run, an additional bridge is needed to eliminate the “bottlenecks” that exist along the current approach configuration. However, this type of improvement requires a substantial capital outlay.



## CMP Improvement Recommendations

Table 2.5 specifies improvements that will alleviate most of the sources of congestion. Please note the improvements listed below are recommendations only. As of this time, they are not “official” transportation improvement projects.

Utilizing the findings of the prioritization process, congestion alleviation strategies are formulated to best mitigate the source(s) of congestion for the least amount of cost. NLCOG’s objective is to develop “value” based improvement strategies/projects through the recommendations component of the CMP process.

Table 2.5: 2001 CMP Highest Priority Sections and Recommended Improvements

| Priority | Facility        | Dir | Section: From/To                    | Improvements                   |
|----------|-----------------|-----|-------------------------------------|--------------------------------|
| 1        | Hearne Ave.     | SB  | Kings Hwy to I-20 EB Exit Ramp      | Add dedicated lane/ramp        |
| 2        | Airline Dr.     | SB  | I-220 WB Ent. Ramp to Viking        | Increase turn. bay length      |
| 3        | Industrial Loop | WB  | E Kings Hwy to Youree               | Maintain private access policy |
| 4        | Hearne Ave.     | SB  | Greenwood to Kings Hwy              | add dedicated lane/ramp        |
| 5        | J. Davis Hwy.   | WB  | Barksdale to East Foot J. Davis Br. | Ramp access to North/So Pkwys  |
| 6        | Industrial Loop | EB  | Millicent Way to Youree             | Maintain private access policy |
| 7        | Airline Dr.     | SB  | Douglas to Shed                     | Add. lane downstream           |
| 8        | Industrial Loop | EB  | Business Park to Millicent Way      | Maintain private access policy |
| 9        | N. Market St.   | SB  | MLK Jr Dr to I-220 WB Ent. Ramp     | Synchronize w/I-220 sig        |
| 10       | Industrial Loop | EB  | Walker to Mansfield                 | Add second LT bay              |

## **Implementing the Congestion Management Process (CMP)**

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 *Mapping The Way 2035 – NW Louisiana’s Long Range Transportation Plan* and corresponding TIP. Programming of CMP strategies into the TIP will be coordinated through the aforementioned TAC in cooperation with the implementing agency and will be funded through federal, state, or local funds.

### Potential Funding Sources

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 are identified in the 2008 Northwest Louisiana Metropolitan Planning Area TIP (2008-2011). 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 TAC, 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
- Follow data collection methodology for updating travel times on study corridors
- Continue dialogue with the TAC concerning mitigation strategy recommendations
- Include CMP monitoring/maintenance activities in the UPWP

## APPENDIX A

### Travel Time/Delay Study Conditions Utilizing GPS Data Collection Technology

#### General Conditions:

- A travel time “Run” consists of a test vehicle, outfitted with GPS collection equipment, traversing an identified CMS corridor in one direction (e.g. Eastbound) during one time period (e.g. AM peak period).
- Runs are performed on normal, non-holiday weekdays (Tuesday - Thursday). It is acceptable to collect data on a Monday, if the collection schedule becomes constrained.
- Travel time runs are performed during the peak period of travel, by direction, for that particular corridor. Off-peak runs are conducted to determine average travel speed under free flow conditions. Locally, peak period travel times occur during the following time periods: AM = 7:30 - 8:30 and PM = 4:45 - 5:45. Off-peak runs are performed during any weekday night (Monday - Thursday) after 10:00 PM. Note concerning Off-peak runs: If the recorded speeds are higher than the posted speeds, the posted speed is utilized for average travel speed calculations.
- Runs will not be conducted under adverse weather conditions (heavy rain, sleet, etc.)



Fig. 2a-1; Trimble's Pro/XL GPS Receiver

### **Test Vehicle and Driving:**

The test vehicle is driven over the study corridor following the “Floating-car” technique as described in Chapter 4 of ITE’s Manual Of Transportation Engineering Studies; 1976.

### **Data Collection:**

- A checkpoint is defined as the point where the test vehicle is perpendicular to either the far curb of an intersection or the apex of an exit ramp gore (limited access facilities). The rover is activated (i.e. log its x, y, and z position), by the driver, each time the study vehicle passes over a checkpoint. These checkpoints define the section boundaries.

- Within the normal flow of traffic, each study begins when the test vehicle passes over the designated start point. This is considered a running start to the study.

- To determine the appropriate number of study runs, a minimum of two test runs will be performed on each corridor. This is done to insure the statistical significance of the data collected. Following the equations in Chapter 4 of ITE’s Manual Of Transportation Engineering Studies, the number of test runs, by corridor, are calculated (Please refer to “Travel Time - Study Requirements and Equations” - Sample-Size Requirements for additional data collection information).

### **Equipment Setup:**

- Configure Base Station and Rover unit for this type of application. In order to perform post-processing differential correction correctly, the base station unit must also track every satellite that the rover uses to compute its position. To meet this requirement, it is recommended that the base station Elevation Mask and SNR Mask have lower settings than the rover unit. If any of the tracked satellites fall below the rover’s preset Elevation Mask or SNR, it is likely that signal interference and/or corruption will occur. Therefore, the rover will stop tracking these satellites before the base station does. This ensures that the data collected out in the field is valid.

From GPS Setup Software:

1. Satellite Availability - make sure there will be at least 4 satellites available during the entire study run.
2. Acceptable PDOP (Position Dilution of Precision - measure of satellite geometry) - A low PDOP indicates a viable satellite geometry. When the satellites are widely distributed across the sky there is a low PDOP measure (i.e. sat.’s give most accurate data). If they are grouped close together a high PDOP is indicated. The PDOP must be below 7 in order to obtain valid satellite data.
3. SNR Mask (Signal to Noise Ratio) - SNR is a measure of the satellite’s emitted signal strength. An acceptable minimum threshold is an SNR of 6 (base station = 4).
4. Elevation Mask - The inclination angle is set to between 10 -15 degrees (base station - 10 deg.). The elevation mask is the angle, in degrees, above the horizon that the satellite cannot fall below during the study. If it does fall below this preset, the receiving unit doesn’t accept the satellite’s signal (maintains signal integrity).

5. Logging Interval - To obtain the most accurate data, the logging interval for synchronized measurement data at the base station should be the same as that of the rover unit's logging interval (i.e. both set for 1 sec. logging intervals). If the intervals are different, the accuracy degrades ( $> 1$  meter from truth) because during differential correction interpolation is required to determine base station and rover positions.

Rover Unit Configuration:

1. Before each run, download the corridor's data dictionary into the TDC1 datalogger (i.e. corridor major intersections = checkpoint)
2. Preset the rover to automatically log its position once every second.
3. Affix the antenna to the top of the test vehicle using the magnetic mount.



*Fig. 2a-2; Attaching the Dome Antenna to the Test Vehicle*

**Post-processing:**

With these defined test conditions, the data that is collected out in the field is consistent across all study runs. Therefore, the data collected from one study is comparable to the results of other runs that utilize these test parameters. Post-processing takes the “raw” data files and converts them into usable information for corridor analysis.

**Completed Travel Time Runs**

The following table summarizes the travel time runs that have been performed in order to meet the data requirements outlined in the CMS's Performance Monitoring Plan. Please note, the “GPS ASCII File” field contains the names of corrected position files (ASCII format). “Required Runs/Facility” refers to the number of runs, as required by ITE, to maintain statistical integrity.

## APPENDIX B

### CMP RECORD OF PUBLIC COMMENT AND ADOPTION

| DESCRIPTION   | DATE               | RESOLUTION |
|---|--------------------|------------|
|   |                    |            |
| Introduce CMP Draft Document: MPO Policy Comm.      | 4/9/2009           |            |
| Public Comment of Draft CMP document                | 4/2009 – 7/15/2009 |            |
| Final CMP document adoption by MPO Policy Committee | 7/31/2009          |            |
|   |                    |            |