FINAL REPORT

Comprehensive Transportation Study For City of Deming / Luna County

CITY OF DEMING NEW MEXICO

Kingdom Of The Sun

October 2009

WHPacific

In Association with

WILSON & COMPANY ENGINEERS & ARCHITECTS

DEMING / LUNA COUNTY REGIONAL COMPREHENSIVE TRANSPORTATION STUDY

FINAL REPORT

Prepared for:

City of Deming, New Mexico

&

Luna County

Prepared by:

WHPacific, Incorporated

In association with

Wilson & Company

PTV, America Inc.

October 2009

This report has been prepared based on certain key assumptions made by WHPacific, Inc. and its sub-consultants which substantially affect the conclusions and recommendations of this report. These assumptions, although thought to be reasonable and appropriate, may not prove true in the future. WHPacific's conclusions and recommendations are conditioned upon these assumptions.

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EXECUTIVE SUMMARY

INTRODUCTION

Investment in transportation infrastructure involves major expenditures on the part of governmental entities at the federal, state, and local levels. The availability of adequate funds to address all the transportation needs of the community is constrained by a number of factors including revenue sources, competition for transportation funding, and legal requirements. Current transportation funding legislation encourages comprehensive transportation planning activities on the parts of local and regional agencies in developing priorities for transportation projects. The process is intended to facilitate the development of transportation-related projects in a rational manner for efficient use of transportation funding.

This report summarizes the activities associated with the development of the Deming-Luna County Regional Comprehensive Transportation Study (RCTS). The study was commissioned by the City of Deming in conjunction with Luna County and with the support of the New Mexico Department of Transportation (NMDOT). The purpose of the study is to address an array of transportation-related issues, including roadway capacity, safety, maintenance of existing facilities, and designation of future corridors. This study will serve as a framework for ongoing transportation planning activities in the development of the transportation infrastructure and programs, providing analytical tools for use in assessing the efficiency of the existing transportation system and evaluating recommended improvements.

The consulting team of *WHPacific, Inc.*, in association with *Wilson &* Company and *PTV America, Inc.* was contracted by the City to conduct the study. The project team was assisted by a Technical Advisory Committee (TAC), which included City and County staff along with other members of the community familiar with local transportation issues. The TAC provided valuable input and direction for the study through a series of regular meetings and reviews of interim work products and report materials.

BACKGROUND

Situated within the Mimbres Valley of southwestern New Mexico, the City of Deming lies some 30 miles north of the international border with Mexico and serves as the seat for Luna County. Deming has an extensive history as a western town with influences including the Mimbres Indians, Southern Pacific & ATSF Railroads, outlaws, soldiers, ranchers and farmers. Deming's population is approximately 15,000. Growth in recent years has contributed to issues of concern such as congestion, safety, commercial traffic, and the continuity of the transportation network.

A *Comprehensive Plan* was developed for the City of Deming in 2003, in which recommendations were developed concerning transportation facilities and policies. A number of developments have occurred in the ensuing years since the Comprehensive Plan was adopted, including additional population growth, establishment of new school sites, proposal for a new industrial park, and ongoing expansion of federal governmental agencies such as the Customs and Border Patrol (CBP). The Comprehensive Plan further recommended a transportation study be conducted to evaluate existing conditions and develop recommendations for a project implementation program, resulting in the development of this RCTS.

SCOPE OF STUDY

The scope of the study was developed under the direction of City staff members with input from the TAC. Four major components of the study were defined as described in Section 1 of this report and include the following items. In addition to facilitating the development of the study, these products will aid in the City's ongoing planning activities.

Analysis of Existing Conditions. Sections 2 and 3 of this report present details of the engineering analyses and demographic data development. Traffic capacity analyses and accident summaries provide analytical assessments of deficiencies in the roadway network. These analyses provide criteria from which sound decisions can be made in developing solutions to address the deficiencies. In addition, the traffic data and inventories provide a useful database of information for incorporation into the City & County Geographic Information System (GIS) for future planning purposes. Similarly, updated demographic data were developed from taking Census information and combining that with other available data. The population forecast developed for this project enabled the project team to more accurately assess future conditions.

A computerized ***Transportation Planning Model*** was developed for system-wide analysis of the roadway network. This invaluable tool provided a realistic assessment of future conditions and testing of "what if' scenarios for alleviating traffic congestion. This model will provide an ongoing analytical tool for the City & County to assess changing conditions throughout the development of the plan. Future improvements were identified by incorporating the data collection and analysis activities into the traffic model and evaluating the results. Several criteria were considered in the evaluation process as detailed in Chapter 6 of this report.

Recommendations were formulated from the results of the evaluations, from which a ***Transportation Improvement Program (TIP)*** was developed. The TIP provides a useful tool for the planning and development of transportation improvements in the Deming area. The recommended improvements presented in the TIP are proposed to improve the efficiency of the existing roadway network, as well as to accommodate forecast growth. Because the needs are great and funding is limited, it is important that the TIP and associated planning efforts be continually and cooperatively implemented by all local entities in order to meet the mobility needs for the Deming area. It is recommended that this be treated as a living document being periodically revisited and updated as significant changes occur in the community; a recurring period of approximately 3-5 years would be preferred in order to monitor progress and assess changing conditions

PUBLIC INVOLVEMENT

Public involvement activities were incorporated into the study process. In addition to receiving input from the community through the TAC, a public open house was held to inform the public of the project and to solicit input. Formal presentations before the Deming City Council and Luna County Commission were also made during the course of the project, providing further opportunities for community input to the study.

PRINCIPAL FINDINGS

A number of deficiencies were identified in the roadway network with regard to traffic capacity, safety, or system continuity, i.e., the extents of transportation facilities throughout the study area. The deficiencies were most prominent along the major facilities such as NM 11, US 180, and Country Club Road. The transportation planning model and recommendations focused on the development of potential projects to address the deficiencies.

The results of the analyses reveal that developing a designated truck route would provide moderate relief of traffic congestion along NM 11 in downtown Deming while reducing safety concerns associated with heavy commercial traffic in the downtown area. However, further improvements, such as the addition of turning lanes, would be required at several intersections to improve traffic operations. Other proposed improvements would serve areas of expected growth, underserved areas (i.e., vacant areas with little or no transportation facilities), and safety concerns. The recommended projects are described in further detail in Sections 6 of this report.

DEVELOPMENT OF THE TRANSPORTATION IMPROVEMENT PROGRAM

The proposed projects that were identified to address deficiencies are presented according to logical stages of implementation, based on transportation demand and development priorities. These were tabulated in the Transportation Improvement Program (TIP) for short- and long-range planning as contained in Section 7 of this report. A graphic presentation of the proposed projects is depicted in the *Long Range Street Plan*.

The TIP is intended to be a dynamic tool with enough flexibility to accommodate changing demands. Nevertheless, it provides a good guideline in the transportation planning and programming process, and should therefore be approved by the City Council. This action will confirm the importance of the plan as part of the City's policies.

CONCLUSIONS

Comprehensive transportation planning activities are vital in addressing deficiencies with diminishing funds. It is therefore imperative that this study and the resulting TIP provide a rational framework for the development of an efficient transportation system that will address deficiencies and accommodate growth.

Because of the magnitude of proposed projects, and the fact that the required funds are above present revenue levels, the TIP should be treated as a dynamic document and updated as needed to address changing conditions, such as significant population or employment changes, funding status program updates, etc. The information contained in the study and TIP will assist the City in developing projects and obtaining funding while providing the community with a vision of how mobility needs will be met. A well-developed plan thus provides an important element of maintaining the community's quality of life with regard to transportation.

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

1.1 Background and Purpose

Situated within the Mimbres Valley of southwestern New Mexico, the City of Deming lies some 30 miles north of the international border with Mexico and serves as the seat for Luna County. Deming has an extensive history as a western town with influences including the Mimbres Indians, Southern Pacific & ATSF Railroads, outlaws, soldiers, ranchers and farmers. Deming's population is approximately 15,000. Growth in recent years has contributed to issues of concern such as congestion, safety, commercial traffic, and continuity of the transportation network.

The City of Deming, in conjunction with Luna County, has commissioned this Regional Comprehensive Transportation Study (RCTS) to serve as a framework for ongoing transportation planning activities in the development of the transportation infrastructure and programs. This RCTS provides analytical tools for use in assessing the efficiency of the existing transportation system and evaluating recommended improvements.

1.2 Study Area

The study area is comprised of the City of Deming and the extra-territorial zone approximately three miles around the city limits (see Figure 1 below). The transportation network includes regional federal and state routes, as well as county and local (City) routes.

Deming and Luna County participate in planning activities within the Southwest New Mexico Regional Planning Organization (SWRPO). While the community also participates in the Regional Transit District, this RCTS is independent of the Corre Caminos RTD program.

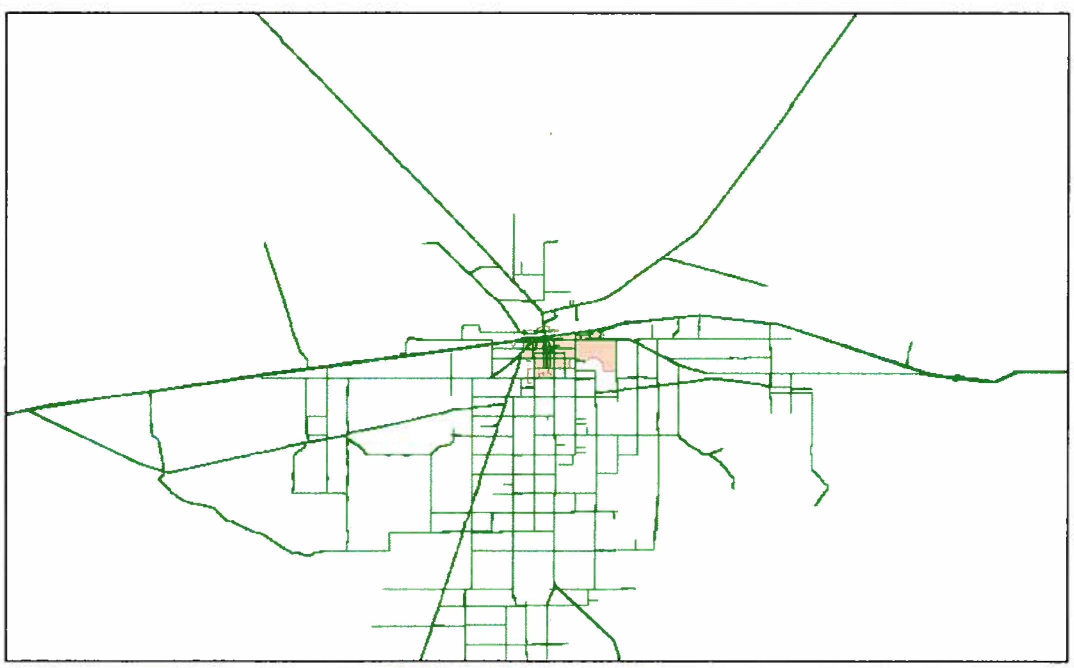


Figure 1 – Study Area

1.3 Study Process

This RCTS has been developed through an open, collaborative process under the guidance of a Technical Advisory Committee (TAC), consisting of a cross-section of community leaders from participating agencies and other stakeholders (see Section 1.4). The study process was comprised of a four-step program as follows:

Step 1 – Establish Project Goals. This step commenced with the project initiation, identification of study team, formulation of the TAC, development of the study limits, and refinement of the study scope. A kickoff meeting was held with stakeholders in which project goals and transportation issues were identified and public involvement activities defined.

Step 2 – Define Project Issues. Preliminary project issues were identified with the TAC. A Data collection program commenced which consisted of: literature research – identification of prior studies and plans; background information – including zoning, demographic data, economic development plans, etc.; network inventory – validation of existing roads (number of lanes, speeds, etc.) and traffic control (stop signs, traffic signals, etc.). Traffic volume counts were collected along a number of streets and intersections for analysis and validation of the traffic forecast model, and accident data were collected for identification of potential safety concerns. Input was also sought from stakeholders and the community regarding potential project issues and constraints.

Step 3 – Evaluation of Alternatives. A traffic forecast model was developed to evaluate future conditions based on anticipated growth. The model was used as a tool to evaluate alternative project concepts, e.g. improved or new roadways, intersection improvements, etc. Results were evaluated with respect to their feasibility and satisfying the goals of reduced congestion, enhanced safety, and transportation service.

Step 4 – Recommendations. A Transportation Improvement Program (TIP) was developed as the culmination of the study process to identify roadway and bicycle/pedestrian projects. Sufficient information was developed for use in ongoing planning activities and funding requests through the SWRPO and other funding entities.

1.4 Study Participants

The following stakeholders participated in the study.

- City of Deming
- Luna County
- New Mexico Department of Transportation
- Southwest New Mexico Council of Governments
- Deming Public School District
- Deming-Luna County Chamber of Commerce

CHAPTER 2

EXISTING TRANSPORTATION SYSTEM

2.0 EXISTING TRANSPORTATION SYSTEM

The existing transportation system for the study area was evaluated and studied to determine the operational functionality of the roadway network. During this process several considerations were taken into account in order to fully understand the dynamic of the roadway network and constraints such as the geometric configurations of the roadways and intersections and the operational and user characteristics. Data from various agencies such as the City of Deming, Luna County, New Mexico Department of Transportation (NMDOT), traffic counts, and field inventories were collected to develop the model and alternate solutions for additional analysis and recommendations. The following sections summarize our findings.

2.1 Study Area Network

Within the Deming City limits, major transportation routes can be found in all four directions of the city. To the north of Deming lies NM 26, a shortcut off of I-25 to I-10 that provides access to Hatch, New Mexico, and US 180, also known as the Silver City Highway. To the South is NM 11 which provides access to Columbus New Mexico and to the border of the United States and Mexico. To the east and west, Interstate 10 provides access to Las Cruces, New Mexico, El Paso, Texas and points east and Lordsburg, New Mexico and Arizona and California to the west.

As the local traffic converges with traffic on these major routes within the City of Deming such as Gold and Pine Streets, congestion and delay is experienced at several points along these major corridors.

2.2 Existing Street Functional Classification

The classification of the existing street network can be categorized in four distinct categories; local roads, collectors, arterials, and state highways. Each of these categories takes into consideration the distinct characteristics of each of the corridors and establishes the functionality of these roadways within the transportation network.

Local Streets: The primary function of this type of roadway is to permit direct access to abutting lands and provide access to higher classified streets. Traffic along these types of roadways usually carries the lowest amount of volume in the traffic network and discourages large amounts of traffic. Local streets are not included in the transportation evaluation.

Collector Streets: The collector street classification provides access to not only low volume areas such as neighborhoods, but also provides access and traffic circulation to commercial and industrial areas as well. The collector street conveys traffic from the local street system to areas of interest as well as to the arterial street system. Since Deming has a lot of housing and industrial areas within its City limits, collector streets make up the majority of the roadway network. Many people rely on these types of roads for mobility throughout the city.

Arterial Streets: The main function of this type of roadway is to service a larger amount of traffic at a higher rate of speed than the previously mentioned classifications. Arterials typically provide a high rate of mobility and, at times, provide access to adjacent properties. This is present along some of the major streets, including Gold Street with a high number of commercial buildings as well as other facilities that attract a higher volume of traffic.

State Highway: This type of roadway serves as a primary route for longer trips into and out of the study area. Interstate 10, which is located in the center of the city allows for high amount of traffic at a greater speed than any of the above mentioned classifications. Other high volume facilities include US 180, NM 26, and NM 11.

The functional classification map developed for the City of Deming Comprehensive Plan (10-17-02) served as the basis for this study, and was refined based on input from the Technical Advisory Committee (TAC) and local community, traffic volumes and analysis of physical conditions. The revised functional classification map is presented in Figure 2.

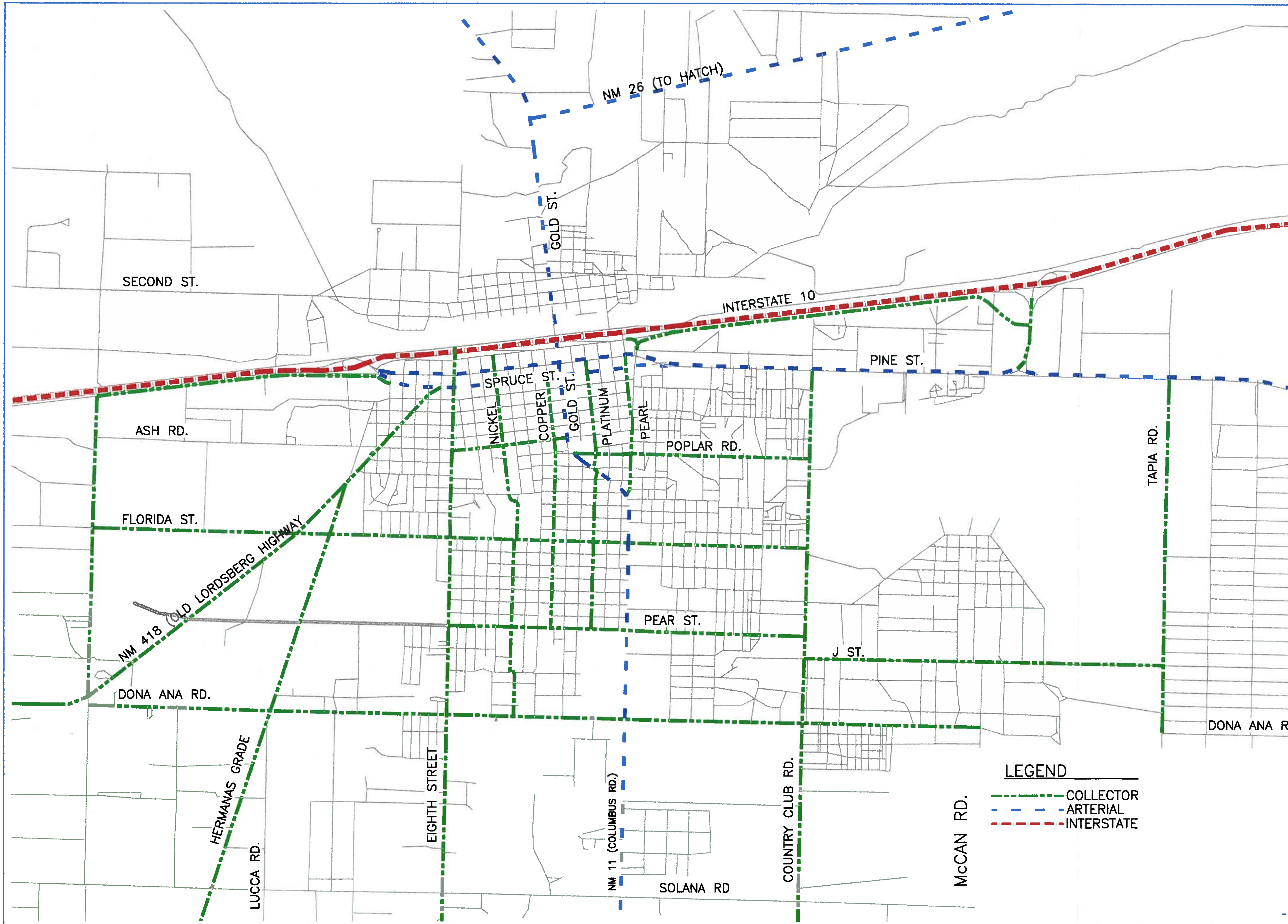
The classification of the existing roadways is used to establish a basis of what the current traffic conditions are and what the existing roadway network is currently operating under. As shown in Figure 2, there is a variety of each of the above mentioned classifications within the Deming City limits. This information is placed into the traffic simulation model which will allow for evaluation of the sufficiency of the roadway network. This Classification Map was developed specifically for purposes of defining the travel demand model and independently from other recently-developed planning maps, such as in the City's Comprehensive plan. Thus this map defines the network in terms of functionality for land use accessibility and mobility throughout the network. Other planning tools, such as the local route designation on the NMDOT system, should be consolidated with the map for consistency in future planning activities.

2.3 Roadway Travel Lanes

During our data gathering phase of the project, a field inventory was conducted of the existing lane configurations for each of the corridors within the project limits. The number of lanes within the network determines the capacity of each of the roadways and was imputed into the model. The typical roadway of the existing network ranges from a four lane divided roadway to a two lane undivided with unimproved shoulders. Also taken into account is the configuration of the signalized and un-signalized intersections that were identified and used in the traffic model.

2.4 Traffic Control

Traffic control devices such as traffic signals, pavement markings and speed zones were also inventoried during the data gathering phase. These devices assist in the regulation of traffic operations within the network. Figure 3 presents the areas where traffic signals and stop conditions exist. Also observed was the intersection configuration, namely the number and type of lanes (e.g. through and turning lanes). At many of these locations, traffic turning movement counts were conducted for use in the analysis and in the traffic model.



WHPacific
6501 Americas Pkwy NE, Suite 400
Albuquerque, NM 87110
505-247-0294 Fax 505-242-4845
www.whpacific.com

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DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

FUNTIONAL CLASSIFICATION MAP

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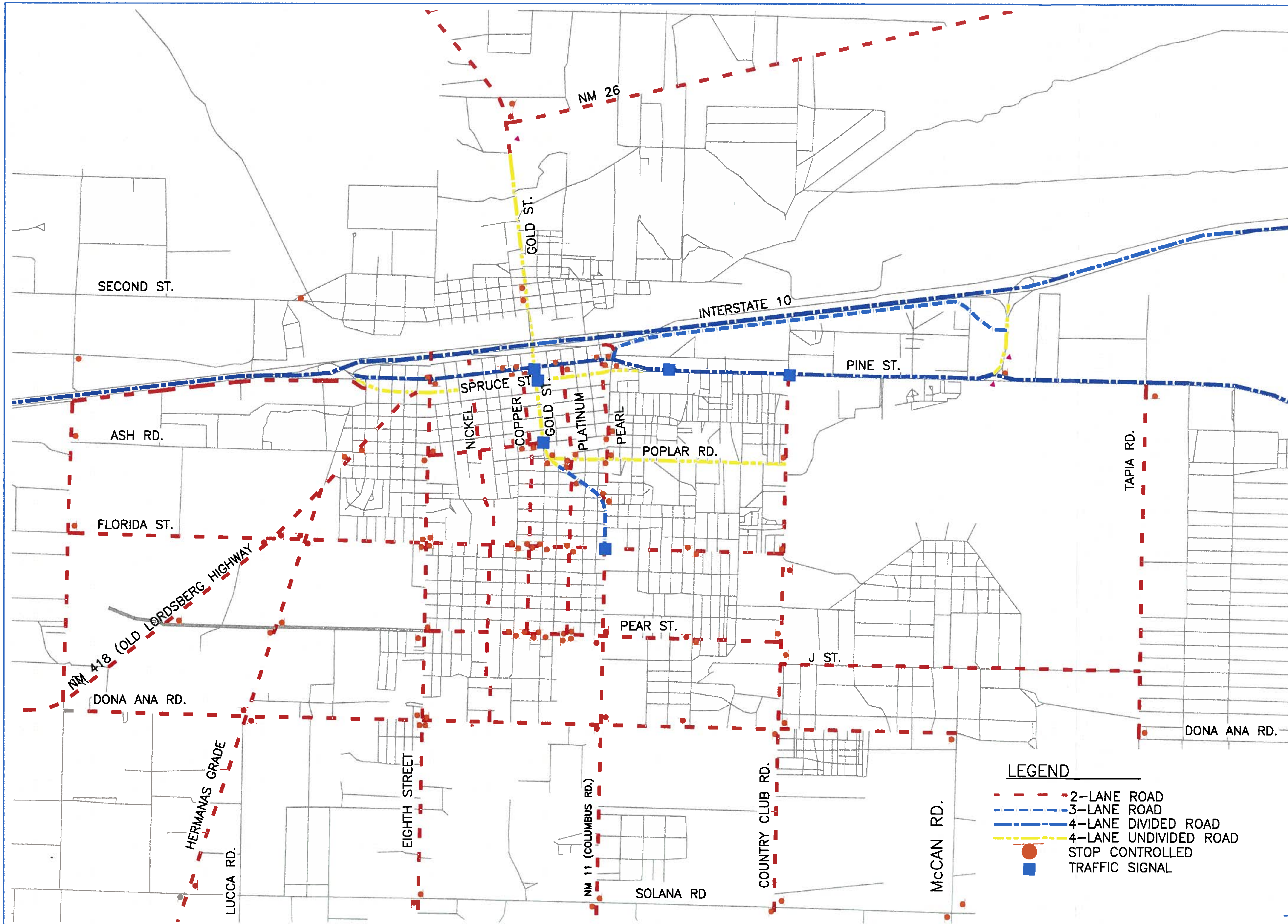
FIGURE 2



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DEMING / LUNA COUNTY
TRANSPORTATION MASTER PLAN
LANE USE & TRAFFIC CONTROL MAP

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FIGURE 3

2.5 Existing Traffic Volumes and Speeds

As seen in Figure 4, traffic volume counts were collected throughout the study area. A total of 28 nine-hour turning movement counts were conducted at various intersections and a total of 39 roadway volume counts were performed using pneumatic tube counters that record the speed and classification of each vehicle.

Traffic counts conducted by the New Mexico Department of Transportation (NMDOT) were used as a comparison document and supplemental information.

The collection of traffic count data allows for identification of certain traffic characteristics and identification of daily and peak hour volumes. Peak hour volumes are usually designated as the peak one-hour volume within a 24 hour period. Typically an A.M. and a P.M. Peak volume is identified.

Turn movement volume was collected to identify the existing capacity of various intersections and was used as a validation tool for the traffic model.

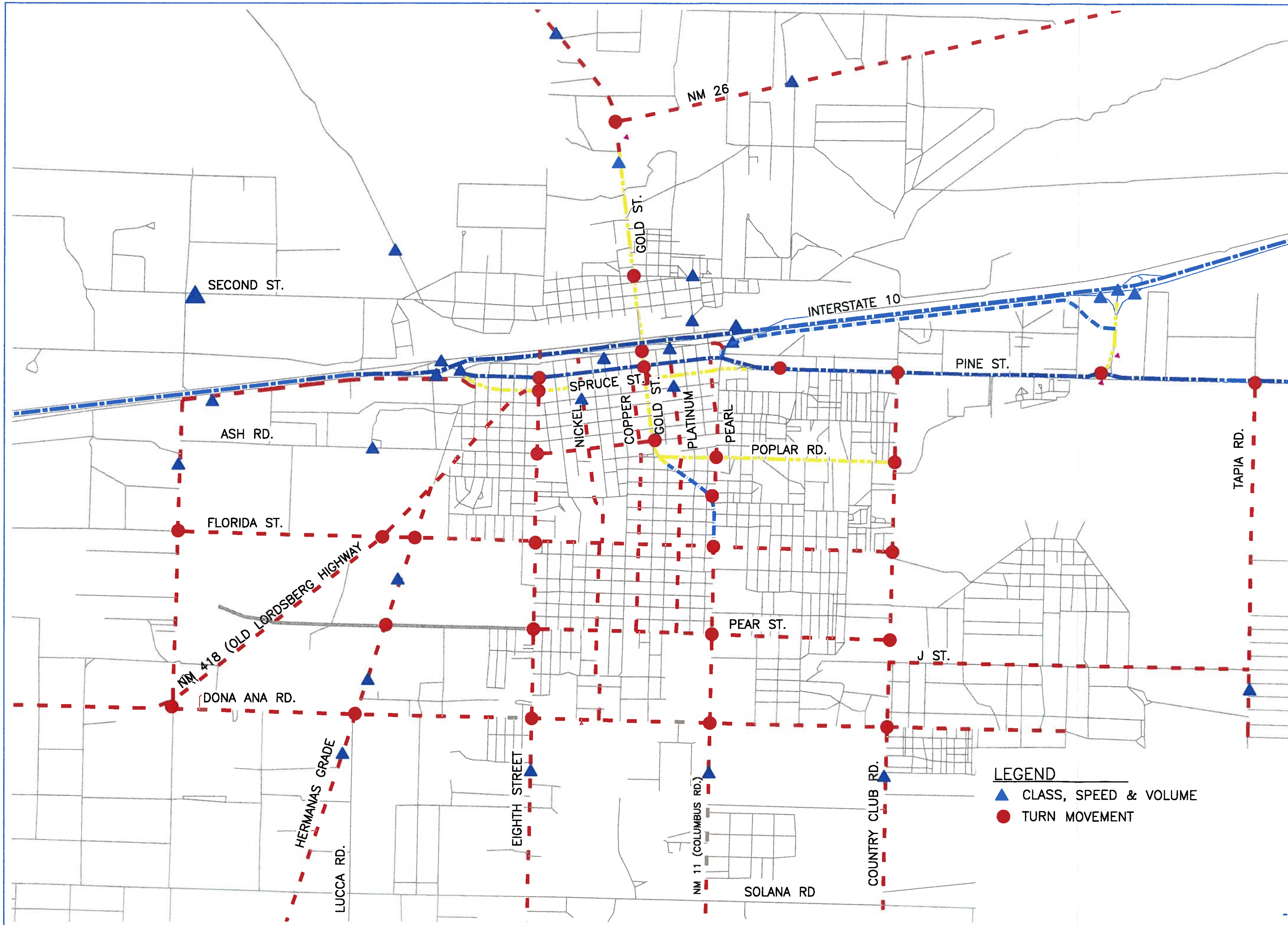
For the signalized and unsignalized intersections within the study area, the measure of effectiveness (MOEs) was reported by the simulation model. The MOEs are equated to a Level of Service (LOS). LOS is a lettered scale used to compare and evaluate intersection performance.

Each intersection control is measured in terms of average vehicle delay, in seconds, for each approaching vehicle. Control delay is the sum of the deceleration, queue, stop, and acceleration delays computed for each approach movement. See Table 1 for LOS criteria.

The signalized intersections within the study area were simulated using Synchro 6.0 optimized timing and evaluated using methods of the Highway Capacity Manual (HCM). Control delay was reported from the model and equated to LOS criteria in Table 1.

LEVEL OF SERVICE	DELAY PER VEHICLE	DEFINITION
A	Less than 10.0 Sec.	Very Low Delay – Free Flow
B	10.1 to 20.0 Sec.	Minimal Delay – Good Progression
C	20.1 to 35.0 Sec.	Moderate Delay
D	35.1 to 55 Sec.	Significant Delay
E	55.1 to 80 Sec	High Delay
F	Greater than 80.0 Sec	Excessive Delay

Table 1 – Delay and Level of Service Criteria



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6501 Americas Pkwy NE, Suite 400
Albuquerque, NM 87110
505-247-0294 Fax 505-242-4845
www.whpacific.com

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DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

TRAFFIC COUNT LOCATION MAP

SCALE 1" = 800'

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FIGURE 4

Urban areas typically assign an overall LOS D or higher as the desirable base condition for intersection approaches. However, LOS E may be acceptable for certain low volume approaches or minor movements, especially where higher level of service may significantly degrade a major movements or where the default is LOS E based upon the intersection length or low approach volumes.

The following is a summary of the existing signalized and unsignalized intersections with the associated LOS and delay.

Signalized Intersections				
Street North/South	**Street East/West**	**Level of Service**	**Highest Approach**	**Delay (seconds/vehicle)**
NM 11	Florida	C	C	26.4
Gold	Ash	A	A	7.2
Gold	Pine	C	C	31.5
Country Club	Pine	B	C	21.1
Wal-Mart	Pine	A	A	8.2

Table 2 – Signalized Intersections LOS and Delay

Unsignalized Intersections				
Street North/South	**Street East/West**	**Level of Service**	**Highest Approach**	**Delay (seconds/vehicle)**
Skyview	NM 418	A	A	3.5
Hermanas Grade	Doña Ana	A	A	9.3
Hermanas Grade	Pear	A	A	0
NM 418	Florida	A	B	10.2
Hermanas Grade	Florida	A	B	11.1
8th Street	Doña Ana	A	A	7.6

Table 3 – Unsignalized Intersections LOS and Delay

Unsignalized Intersections (Continued)				
Street North/South	Street East/West	Level of Service	Highest Approach	Delay (seconds/vehicle)
8th Street	Pear	A	C	18.5
8th Street	Florida	A	A	7.6
8th Street	Ash	A	C	18.8
8th Street	Spruce	A	C	15.6
NM 11	Doña Ana	A	C	15.0
NM 11	Pear	A	D	27.9
Gold	Spruce	A	C	22.4
Gold	Cedar	A	D	28.9
Gold	NM 26	A	B	13.3
Country Club	Doña Ana	A	B	11.6
Country Club	Pear	A	B	12.1
Country Club	Florida	A	B	14.1
Country Club	Poplar	A	B	12.4
Tapia	Pine	A	A	10
Tapia	Doña Ana	A	A	8.4
Skyview	Florida	A	A	8.4

Table 3 (Continued) – Unsignalized Intersections LOS and Delay

The existing signalized and unsignalized intersections currently show acceptable LOS. These intersections were evaluated for the peak hour. Some concerns from the general public and the TAC included the congestion present during the morning and evening peak hours near downtown Deming. Additionally, congestion is present near the off peak hours at and near the existing schools zones.

2.6 Safety Constraints

Accident Data was collected from the City of Deming and the NMDOT Consolidated highway Database from the period of 2004 to 2006. The intersections that the information was requested for are the locations where the greatest numbers of conflicts typically occur. Also, the technical advisory group suggested problem intersections for analysis due to perceived high accident experience occurring at these areas.

The data studied included information on the number and severity of accidents at a given intersection. This information was analyzed and taken into consideration, identifying any intersections that need improvement or need some remediation. A summary of the accident data collected can be found in the following table.

Intersection		Total for Year			3 -Yr. Total	# of Accidents by Type		
Street	Street	2004	2005	2006		Angle	R.E.	Other
2nd Street	N. Copper	6	1	0	7	3	3	1
Ash	Nickel	0	0	3	3	1	2	0
Ash	NM 418	0	0	2	2	2	0	0
Ash	8th Street	0	0	2	2	1	1	0
Ash	Gold	2	2	0	4	3	0	1
Buckeye	Silver	1	0	1	2	1	0	1
Buckeye	Granite	2	0	0	2	1	0	1
Buckeye	Copper	2	0	1	3	3	0	0
Cedar	Gold	1	2	1	4	3	1	0
Cedar	I-10	1	1	2	4	2	2	0
Cedar	Pearl	0	3	0	3	3	0	0
Copper	Holly	1	0	1	2	1	0	1
Copper	Spruce	1	2	0	3	2	0	1
Country Club	Popular	0	3	0	3	0	2	1
Country Club	Raymond Reed	2	2	0	4	3	1	0

Table 4 – Accident Data

Intersection		Total for Year			3 -Yr. Total	# of Accidents by Type		
Street	**Street**	**2004**	**2005**	**2006**		**Angle**	**R.E.**	**Other**
Country Club	Birch	1	1	0	2	0	2	0
Country Club	Doña Ana	1	1	1	3	3	0	0
Country Club	Florida	2	1	0	3	1	2	0
Country Club	Pine	0	3	3	6	4	2	0
Country Club	Pear	1	0	2	3	3	0	0
Doña Ana	Hermanas Grade	1	1	0	2	2	0	0
I-10	Gold	1	1	0	2	0	0	2
I-10	Pine	0	3	0	3	0	0	3
I-10	Exit 81	2	1	2	5	0	0	5
I-10	Exit 83	1	1	0	2	1	0	1
Totals		**29**	**29**	**21**	**79**	**43**	**18**	**18**

Figure 4 (Continued) – Accident Data

As seen in Figure 5, the amount of accidents varies from an average of 2-3 accidents for the three year period at a given intersection to 6+ accidents. The intersections that show a high number of accidents typically occur on high volume roadways and along major corridors. From the information above, the most common type of accident that typically occurs is an *Angle* type; *Rear End* (R.E.) and *Other* make up the rest of the classifications. It should be noted that in some cases, an intersection was not specified in the accident report, only a street name. Hence the reason for individual roadways have a accident type designation within the exhibit.

As mentioned above, the accident data collected for this project was limited to information gathered from NMDOT historical data and some City of Deming data. A limited amount of data was available for major intersections and some minor but not all of the intersections studied in this report had accident data available. Attempts to gather additional information from other sources was not successful. This information was used in the model analysis to examine further and identify additional problem areas.

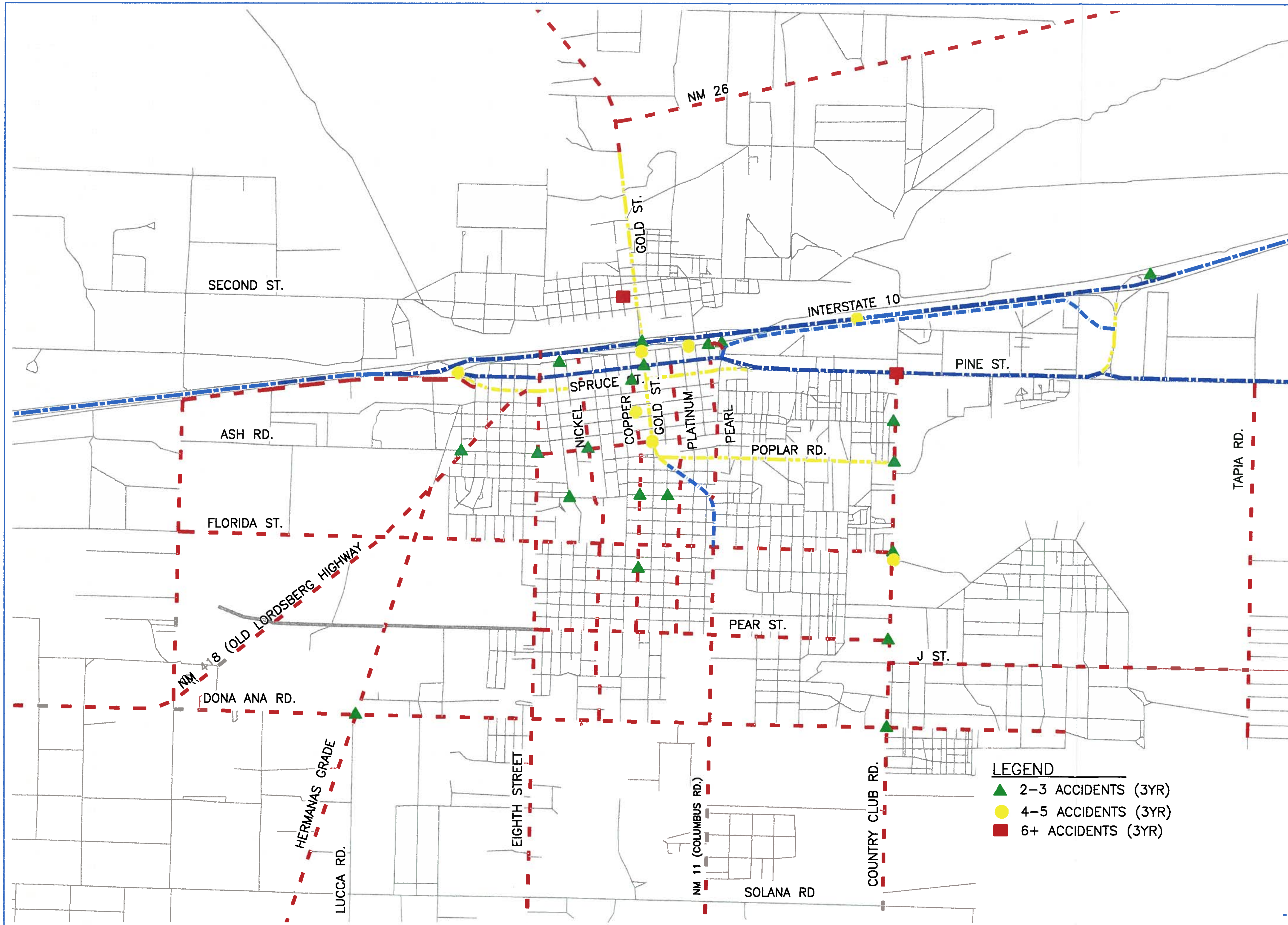
2.7 Major Land Use and Development Constraints

A number of issues have been identified that will have major impacts to the transportation network. A more comprehensive discussion on land use and its affects can be found in Section 3 of this report.

2.8 Parking and Pedestrian Issues

As mentioned above, Gold Street has on-street parking available. Being that this area not only experiences high traffic volume, it also is an area where there is a high concentration of commercial buildings located which causes strain on the transportation system. In discussions with residents at the public involvement functions, concerns with the angled parking along Gold Street poses a problem with merchants and patrons when backing out of these spaces. Although along this corridor the number of accidents are moderate (3-4) for the 3 year study period, attention to this issue will be taken into consideration.

The City staff and the TAC have received informal request on the inclusion of pedestrian facilities near the new schools that are now in operation as well as provide access to the new pedestrian walking ring located near Country Club and Pine Street. Any new projects outlined in the Transportation Improvement Plan (TIP) will evaluate the needs and design criteria for the Americans with Disabilities Act (ADA).



WHPacific
6501 Americas Pkwy NE, Suite 400
Albuquerque, NM 87110
505-247-0294 Fax 505-242-4845
www.whpacific.com

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DEMING / LUNA COUNTY
TRANSPORTATION MASTER PLAN
ACCIDENT DATA

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FIGURE 5

CHAPTER 3

LAND USE AND DEMOGRAPHIC DATA

3.0 LAND USE AND DEMOGRAPHIC DATA

3.1 Forecasts of Future Demographic Data

3.1.1 Introduction

The Deming Transportation Planning traffic-forecasting model was built using future demographic data to develop a range of future projections. Population, housing, and employment projections for the project study area were prepared by WHPacific based on data from the Bureau of Business and Economic Research (BBER) at the University of New Mexico and county-level demographic analysis for Luna County, New Mexico. Using the cohort-component method to project the Deming population forecasts, a ratio-based technique of 56 percent was applied across all age cohorts from the Luna County population projections. The 56 percent ratio is based on historical ratios from past census counts for Deming and Luna County.

BBER completed a Community Economic Assessment for Deming Main Street in March 2008. In this report they estimated the population of Deming in 2006 as 14,529. Between 2000 and 2006, the report states that the population in Deming has reflected a slower growth rate; approximately a half a percentage point per year. However, because the revised projections by the BBER were not completed at the time of this study, this report relied on 2000 Census data and previously-published BBER data sets.

3.1.2 Geography

Deming is located approximately 90 miles from the Arizona state line, 30 miles from the International Port of Entry at Columbus, NM, and approximately 100 miles from El Paso, Texas. Deming is the County Seat of Luna County and one of two incorporated municipalities located within the County. 56 percent of Luna County's population lives in the City of Deming.

3.1.3 Population Growth Patterns

Over the past 90 years, the City of Deming has experienced a consistent growth rate of approximately 20 percent or more through each of the 10-year US Census reporting periods, as summarized in the City of Deming Comprehensive Plan (2003). The 2000 US Census showed that Deming experienced a growth rate of 21% between the years of 1990 to 2000 with a total population of 14,116.

Luna County has experienced similar growth rate patterns to the City of Deming. The Deming Comprehensive Plan states that growth in both the City and County can be attributed to many factors, such as the natural increase that has occurred over time, and the rise in employment opportunities related to agriculture and Interstate construction. The completion of Interstate 10 through the City of Deming provided new access to the City and increased the number of motorists and tourists travelling through the area. Another factor is the in-migration of retirees and seasonal residents that have taken residence in the Deming area. The influx of people from Mexico continues to be one of the most significant factors contributing to the population growth to the City of Deming. Mexican workers arrive in the area seeking seasonal employment in the agriculture industry as well as other job opportunities. The City of Deming's historical population growth trends show an average of 20 percent population growth rate in recent US Census reporting periods of 10 years.

3.1.4 Age and Gender

Age-cohort demographics for the City of Deming show the population for persons aged 19 and under to be 33 percent and the population of persons aged 65 years and over to be 19 percent. Deming's median age is 34.9 years. According to the 2000 U.S. Census, males account for 47.4% of the population and females account for 52.7 percent, with a gender breakdown of 7,441 females and 6,675 males.

3.2 Population Projections

The Deming Population Projections for the years 2005 to 2030 are listed in Figure: 1 below. The projections are based upon BBER Luna County population projections with an applied ratio of 56 percent to forecast the City of Deming populations. The projections show growth rates between 8-12 percent for each 5-year interval between the years of 2005 to 2020. The projections are based on historical growth trends for Luna County.

Deming Population Projections based on 56 Percent Ratio from Luna County Projections 2005 to 2030						
Both Sexes						
Age Groups	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
0 - 4	931	1156	1351	1430	1428	1458
5 - 9	1102	947	1173	1368	1446	1445
10 - 14	1344	1240	1084	1311	1505	1584
15 - 19	1361	1511	1409	1254	1479	1672
20 - 24	1159	1412	1559	1459	1304	1531
25 - 29	703	1148	1399	1544	1448	1292
30 - 34	766	772	1216	1467	1609	1516
35 - 39	905	904	912	1353	1603	1746
40 - 44	1011	1038	1039	1045	1484	1735
45 - 49	978	1124	1151	1153	1158	1595
50 - 54	878	1079	1222	1251	1255	1260
55 - 59	904	983	1183	1322	1353	1358
60 - 64	838	1018	1094	1292	1426	1460
65 - 69	869	958	1131	1202	1395	1524
70 - 74	870	922	1008	1173	1240	1426
75 - 79	651	801	852	934	1087	1152
80 - 84	391	517	644	691	772	909
85 - 89	220	274	364	468	514	591
90+	166	243	321	426	569	709
All Ages	**16047**	**18047**	**20112**	**22143**	**24075**	**25963**

Table 5 – City of Deming Population Projections 2005 to 2030

3.3 Forecast for Future Households

The forecast for future households was based on the age of householder for 5-year intervals using City of Deming population projections for the years 2005 to 2030. For the base period, the total population, and household population (including the age of householder) was taken from the 2000 Census, Summary File 2. The total population by 5-year age groups and 5-year time intervals beginning in 2005 through 2030 were taken from population projections for the City of Deming. Data in the base year were used to calculate the proportion of the total population residing in households for various age categories and householder rates. Householder rates were calculated for the age groups: 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85 and over. Table 6 shows the projections of future households for the City of Deming.

Project of Future Households	
Year	**Future Total Households**
2005	5782
2010	6024
2015	6047
2020	6341
2025	6632
2030	6773

Table 6 – Projection of Future Households for City of Deming, NM

3.4 Forecast for Future Housing

3.4.1 City of Deming Housing

The City of Deming has a total number of 6165 housing units as shown in the 2000 Census data. Housing Units refers to all types of housing which includes single-family detached units, manufactured homes, and recreational vehicles used as dwelling units. According to the Deming Comprehensive Plan, single-family detached homes represent the most common type of dwelling unit in the City, accounting for 52% of all units located in Deming. Multi-family units represent another 13 percent of the housing units within Deming. Manufactured housing represents a significant portion of single-family dwelling units with 1,678 being identified during the 2000 Census. Manufactured homes located in Deming account for 27% of all dwelling units. Table 7 shows the total housing units by type.

Housing Unit by Units In Structure	
Single Family	3368
Duplex	125
Multi-Family	803
Manufactured/Mobile Home	1678
Other	191
Total	**6165**

Table 7 – Deming Housing Units in Structure by Type from 2000 Census Data

3.4.2 Housing Characteristics

According to the Deming Comprehensive Plan, the housing in Deming is relatively new, having been constructed in the last 20 years. New housing units constructed since 1980 account for 31% of the total housing stock, which is comprised of a large portion of manufactured homes. The median price of a home in Deming is $65,200 and the majority of housing is valued between $50,000 and $100,000. Housing valued at less than $50,000 represents 29% of all housing in Deming, which is closely related to the percentage of manufactured homes. The median mortgage cost is $561 while the median gross rent found in Deming is $322. Table 8 and 9 represent the 2000 Census Housing Characteristics for Deming.

Deming Housing Data – 2000 Census	**Units**
Occupancy Status	
Occupied	5267
Vacant	925
Tenure	
Owner Occupied	3597
Renter Occupied	1670
Vacant (for sale or rent, Other)	700
Total Housing Units	**6192**

Table 8 – Deming Occupancy Status

Housing Units by Year Structure Built (2000)	
Year	**Total**
1939 or earlier	461
1940 to 1959	1135
1960 to 1969	1082
1970 to 1979	1554
1980 to 1989	956
1990 to 1994	408
1995 to 1998	450
1999 to March 2000	119

Table 9 – Deming Housing Units by Year Structure Built

3.4.2 Total Housing Need

Table 10 shows the projected number of new housing units for the City of Deming based on the population projections from 2005 to 2030. The number of potential new people to the Deming population was divided by 2.63, which is the average household size in Deming, to get the future housing forecast for Deming. The forecast shows a need for approximately 4504 new housing units in Deming between the years of 2005 to 2030.

Projected Number of Future Housing Units			
Year	**Population**	**Potential New People**	**Potential New Housing Units (Includes single family, high density, and senior housing)**
2000	14116		
2005	16049	1933	735
2010	18048	1999	760
2015	20112	2064	785
2020	22143	2031	772
2025	24076	1933	735
2030	25962	1886	717
Total Future Housing Units			**4504**

Table 10 – Projected Number of Future Housing Units for Deming, NM

3.4.3 Housing Issues in Deming

The Deming Comprehensive Plan Housing section indicates the following needs for planning future housing in the Deming area.

- Replacement of Dilapidated Housing
- Need for Affordable Housing
- Need for Multi-family and Entry Level Housing
- Need For Higher-End Housing in Deming
- Need for Senior Housing
- Need For Seasonal Housing

3.5 Employment Forecasts

3.5.1 Deming Employment Projections

The City of Deming future employment projections were calculated using several projection techniques such as the Constant-Share Method, the Shift-Share Method, and finally a Variation of the Shift-Share Method. This methodology approach was utilized to project reasonable employment projections for smaller geographical areas such as Deming with data based upon growth rates from larger geographical areas such as the State of New Mexico and the Southwestern Region Workforce area.

Using this approach, the Deming Employment Projections were completed in two stages and broken down into two periods 2000 to 2014 and 2015 to 2030. Stage one was calculated using the forecasting approach of the Constant-Share Method and the Shift-Share Method using data and growth rates for the State of New Mexico and the Southwestern Region Workforce Area. In stage two for the 2015 to 2030 period; these approaches could not be used because pattern area employment projections do not exist beyond 2014. Variations on the ratio method were developed to complete the employment forecast for the period 2015 to 2030.

Constant-Share Method
The constant-share method assumes a smaller geographical area ratio of the larger area's population is held constant at a particular historical level. Applying this share to the projections for the larger area produced projections for the Deming area. This method was utilized to project the Deming employment projections because of the New Mexico Department of Labor only had employment projections through 2014.

Shift-Share Method
The shift-share Method accounts for changes in population share over time. This method assumes that changes in share between the base year and the launch year (the base period) can predict future changes in population share.

A Variation on the Shift-Share Approach
A variation of the shift-share approach was used in stage two for the 2015 to 2030 period. For this methodology, the shift-term utilized was the predicted population growth rate for the 2015 to 2030 period incorporating the relationship between population and employment. The population growth rates and anticipated growth in 200 new US Border Patrol Agents to the Deming area, as well as the projected growth of a new subdivision, were used as a means of adjusting the growth effect in employment. This predicted overall employment growth rate was then used to moderate the predicted employment increases by industry. Table 11 shows the population projection growth rates used to adjust the employment growth rates.

Deming Population Projection Annual Growth Rate from 2005 to 2030	
	Annual Growth Rate
2005 to 2010	12.5%
2010 to 2015	11.4%
2015 to 2020	10.1%
2020 to 2025	8.7%
2025 to 2030	7.8%

Table 11 – Population Projection Growth Rates

3.5.2 Employment Projections

The Deming employment projections from 2014 to 2030 show growth rates that slow down in the 2015 to 2030 period. The growth rates were based on an extrapolation of the annual growth rates for the Deming population projections, which show a slight declining growth rate per industry.

The 2014 Deming employment projection reflects the Southwestern Region Workforce area growth rates that were forecasted by the New Mexico Department of Labor for 2014. In addition, the growth rates were adjusted to include new growth areas anticipated such as the addition of 600 new US Border Patrol agents to the public administration sector, and 700 new construction workers to the construction sector to support a growth in new housing and new golf course in Deming. A Luna County list of future capital projects for the Deming area is as follows:

Future Capital Projects

- *Joint Public Safety Complex*
- *Recreation Complex / Adult Softball Park*
- *Cattle Pens at Border*
- *Business by-pass at Port of Entry*

Table 12 shows the final Deming employment projections for 2014 to 2030. It should be noted that these projections were based on trends prior to the national economic decline of 2008-2009. As of Spring 2009, the number of US Border Patrol agents leveled at approximately 460, and the influx of construction workers had not yet occurred. Nevertheless, these projections represent a trend over the forecast period to account for periodic changes and may represent a conservative estimation.

		Deming Employment Projections from 2014 to 2030 Based on Population Projection Growth Rates from Variation on the Shift-Share Approach for Industry Type								
NAICS Code	NAICS Industrial Sector	2000 Deming Total Employment	Ten Year Region Growth Rate - 2004 to 2014	2014 Deming Employment Projection	2015 to 2020 Predicted Deming Employment Growth Rates (based on pop growth rates)	2015 to 2020 Deming Employment Projection	2020 to 2025 Predicted Deming Employment Growth Rates (based on pop growth rates)	2020 to 2025 Deming Employment Projection	2025 to 2030 Predicted Deming Employment Growth Rates (based on pop growth rates)	2025 to 2030 Deming Employment Projection
11	Agriculture	2113	-0.06	1995	0.25	2493	0.25	3107	0.24	3866
21	Mining	0	-0.47	0	0.00	0	0.00	0	0.00	0
22	Utilities	91	-0.05	87	0.57	136	0.56	213	0.56	331
23	Construction	381	1.65	1010	0.29	1304	0.29	1680	0.29	2160
31-33	Manufacturing	1073	0.16	1248	1.20	2748	0.01	2781	1.18	6056
42	Wholesale trade	120	0.18	141	0.18	167	0.18	197	0.17	230
44-45	Retail trade	1052	0.18	1237	0.18	1458	0.18	1716	0.18	2016
48-49	Transp & warehousing	127	0.40	177	0.40	248	1.37	588	1.36	1386
51	Information	31	0.02	32	0.64	52	0.63	85	0.63	138
52	Finance & insurance	93	0.01	94	0.01	95	0.01	96	0.01	97
53	Real estate	65	0.08	70	0.24	87	0.23	107	0.23	132
54	Prof, sci & tech svcs	117	0.28	150	0.28	192	0.28	246	0.27	312
55	Mgt of companies	0	0.50	0	0.00	0	0.00	0	0.00	0
56	Admin, support, waste mgt	61	1.48	151	1.41	364	1.39	871	1.38	2072
61	Educational services	852	0.28	1088	0.33	1445	0.32	1913	0.32	2528
62	Health care	466	0.50	698	0.78	1245	0.77	2210	0.77	3907
71	Arts, entertainment & rec	78	0.14	89	0.14	101	0.14	115	0.13	130
72	Accomm. & food svcs	469	0.32	618	0.32	815	0.32	1076	0.31	1410
81	Other services	149	0.25	186	0.32	246	0.31	323	0.31	423
92	Public Administration	369	1.50	923	0.01	932	0.01	941	0.01	950
99	Other	0	0.68	0	0.68	0	0.68	0	0.68	0
	TOTAL	7707		9993		14129		18264		28146

Note:
- (yellow) Shows where employment growth rate was adjusted to match 10 year Regional employment growth Rate.
- (pink) Border Patrol Increase by 600 new officers
- (blue) Increase of construction workers for anticipated capital projects

Table 12 - Deming Employment Projections for 2014 to 2030 by Industry Type with Adjusted Growth Rates Incorporating the Annual Population Projection Growth Rates & Anticipated Areas of Growth.

3.6 Forecast for Future Student Population

According to the Deming School District Master Plan Update 2007 by ARC, the total enrollment in Deming School District in the school year (SY) 2006/2007 was 5,443 students in grades pre-K through 12. This includes those students enrolled in Columbus, NM. District enrollment has fluctuated moderately between SY 1992/93 and SY 1998/99, based on 40-Day Enrollment figures provided by the NM Department of Public Education:

Since SY 2000/01 there has been overall a slight increase. The average annual growth rate between SY1992/93 and SY1999/00 was 0.7 percent. Between 2000/01 and 2006/07 the average annual growth rate dropped down to 0.4 percent.

Currently, approximately 520 students cross the border daily from Palomas, Mexico to attend school in the District. Most of the students attend Columbus Elementary and then ride the bus to Deming for middle and high school. If there is a change of national border policies – currently, children who were born in America are allowed to cross the border to attend U.S. public schools – then this number could change. For purposes of this study, it is assumed that these policies will continue.

Projections are based on historic enrollment trends since 2003 and a projected increase in births. Enrollment projections are based on the ARC medium growth projections of an average annual rate of 0.5% per year. SY 2007/08 figures were obtained from the NM Department of Education. Table 13 shows the future enrollment projections.

Year	Actual Enrollment	Projected Enrollment	Additional Students
2003/04	5,471		
2004/05	5,442		+29
2005/06	5,545		+103
2006/07	5,443		-102
2007/08*	5,548		+105
2014/15		6380	+832
2020/21		6544	+164
2025/26		6710	+166
2030/31		6845	+135
Total Students SY 2030/31		**6845**	

Source: ARC 2007 Deming Public Schools Master Plan Update. *Current SY 2007/2008 obtained from NM Dept. of Ed.

Table 13 – Deming Public Schools Enrollment Projections

For higher education, WNMU Mimbres Learning Center is in Deming. Currently they have approximately 644 students. Utilizing the same 0.5% growth:

2014 – 667 students
2020 - 687 students
2025 – 705 students
2030 – 722 students

3.7 Possible Factors Affecting Growth in Deming

According to the ARC study in 2007, there are existing plans for new subdivision construction in Deming calling for more than 1,500 units. While some of these units are for those ages 55 and older, the majority are open to all. In Columbus, there are plans for a 280 acre subdivision northwest of the Columbus village limits. Federal employment in the area is projected as growing as employees are being hired to work in border related jobs, but most of the government employment is local.

According to the Luna County website, there is a Federal project (business bypass) is underway at the port of entry and Luna County is serving as the fiscal agent. This means that Luna County receives Federal money to construct the project.

A Sheriff Sub-Station to be built SW of Columbus will be used by the Luna County Sheriff Department, Columbus Police Department, Border Patrol, State Police, and Customs.

An Adult Softball Park is planned for Deming, although at this time a location has not been secured. It is hoped the park will draw regional and State tournaments to Deming in the future. Scheduled completion is in spring 2009.

In the master planning stages is a multi-purpose recreation complex. This facility is also scheduled for completion in early 2010.

CHAPTER 4

TRANSPORTATION ISSUES AND CONSTRAINTS

4.0 TRANSPORTATION ISSUES AND CONSTRAINTS

4.1 Introduction

Transportation issues and concerns include congestion, safety, and limited or lack of transportation access. These issues were identified through stakeholder input, public comment, and analytical evaluation. Data in Section 2 of this report constitutes supporting documentation for the analysis of the transportation issues.

Constraints present impediments or barriers to the development of transportation infrastructure and may be geographic in nature or programmatic. They may not be insurmountable, but may have greater cost or schedule implications. Issues and constraints are presented in this section and evaluated in Section 6. The lists below are not necessarily ranked by order of importance.

4.2 Summary of Transportation Issues

Transportation issues can be grouped into several common categories as outlined below.

4.2.1 Commercial Traffic

The expansion of regional commercial traffic is a desired outcome of the community's economic development endeavors. Steady growth has been experienced at the Columbus Port of Entry (POE), and a recent project was implemented to enhance the processing of heavy commercial traffic into New Mexico at this crossing. Harvest season is particularly busy with a heavy influx of trucks through the POE that access the chile processing plant at the Deming Industrial Park in the southeast part of town. Regional planning activities have considered a truck route in the area as a means of alleviating congested POEs in the El Paso area.

Presently, the vast majority of truck traffic utilizes NM 11 through Deming to access I-10 or continues northward on US 180 or NM 26. This condition has lead to safety concerns and congestion experienced as a result of the mixture of heavy commercial with vehicular traffic. In addition, the new Peru Mill Industrial Park is planned in the northwest area of Deming with adjacent rail traffic; however, truck access will be required as well. Damage to area roads due to heavy commercial traffic presents another concern.

A truck bypass was considered in the recent past as part of the Governor Richardson's Investment Partnership, GRIP2 legislative program. However, the project was not included in the legislation for funding. The potential for a designated truck route to alleviate congestion downtown and provide safe, efficient access for heavy commercial vehicles is a long-standing concern to the community and will be evaluated with this study.

4.2.2 Traffic Congestion

Traffic congestion has been observed in downtown Deming and in areas with heavy commercial development. Notable roadway segments, as identified at the community open house meeting attended by public officials and private citizens, include the following:

- NM 549
- Country Club Rd.
- Florida St.
- NM 11
- Interstate 10
- 8th St.

In addition, certain intersections were identified as experiencing congestion or inadequate geometry (e.g. skew angles, lack of turn lanes, etc.), including:

- NM 549/East Pine Street
- 8th St. /Pear St.
- Gold St. /Cedar St.
- Gold St. /I-10 Frontage Rd.
- Spruce St. /Pine St.
- Spruce St./NM 418
- Spruce/8th St.
- Florida St./NM 418 – potential traffic signal
- Florida St./Hermanas Grade – potential 4-way stop
- Florida St./8th St. – potential traffic signal
- Pine St./8th St. – potential traffic signal
- I-10/Exit 81 & Exit 85 geometry
- Traffic signal timing & operations
- Raymond Reed/Country Club

As part of the existing traffic evaluation presented in Section 2 of this report, no individual intersections were identified as exhibiting poor operations, i.e. level of service (LOS) E or lower. However, two locations were shown with LOS D on certain approaches, namely at NM 11/Pear St. and Gold St. /Cedar St. (please refer to Table 3. Forecast traffic conditions should be taken into account when evaluating transportation infrastructure; this was performed using the traffic model as presented in Section 5.

4.2.3 Safety

Accident rates are typically used as an important measure of safety. Accident totals were addressed in Section 2 of this report; however, it was determined that the available data were insufficient to draw reliable conclusions with respect to quantitative measures of accidents.

Specific areas of concern with regard to traffic safety were identified at the community open house public meeting and include the following intersections:

- Hermanas Grade/NM 418 – severe skew angle
- NM 418/Hermanas Grade – severe skew angle
- Spruce St./NM 418 – severe skew angle & confusing movements
- I-10 Exit 81/Cedar St. – confusing movements
- Raymond Reed / Country Club – offset intersection

In addition, the following safety concerns were identified:

- Gold St. at I-10 – major storm drainage events result in substantial flooding. Storm drain pumps have been known to fail, with the result being in an impassible roadway. With no suitable alternative route from the south side to the north side of the city, this presents a significant public safety concern.

- Safe Routes to Schools – the Deming Public School system wishes to participate in a proposed statewide program to identify and develop safe school routes, particularly to address new school facilities in the west and northwest parts of the city.

4.2.4 Transportation Service

Access to developable areas is an issue, along with system continuity, i.e. certain portions of the transportation network are discontinuous.

- Cedar St. – provide extension of eastbound frontage to connect to the new Cedar St. loop north of Pine St.

- New proposed residential subdivisions will require adequate access: Rancho Riata, Deming Estates, Country Club Estates, World Corp., Mahoney Subdivision and Red Mountain Estates. In addition, the proposed Peru Mill Industrial Park will require roadway improvements.

- Pear St. – extend west to Chicken Farm Road.

- Pearl St. – extend northward across rail tracks to 1st St.

- Access should be upgraded to new school, Ruben Torres Elementary via Chaparral Blvd.

- Senior Center – geometric improvements on Granite Ave. to improve access

- Access to baseball fields once location is determined.

- Arrowhead Dr. to Peru Mill Road should be completed from the Luna Energy Facility.

4.2.5 Multimodal Service

Multimodal transportation serves other modes of travel than the automobile, such as transit, air transport, bicycles, pedestrians, etc. Air service is addressed through the City's aviation programs. Transit service is planned for administration via a Regional Transit District (RTD), known as *Corre Caminos*. For this study, consideration will be given to provisions for pedestrian and bicycle services, with the following areas identified for potential service:

- Trail along golf course – possibly extend south to Doña Ana Rd. and north to Pit Park
- Doña Ana Rd. east and west of NM 11
- Florida St.
- High School track
- Park and ride lots in conjunction with pedestrian facilities and/or transit services, as well as transit shelters & bus pullout lanes

Bicycle facilities may be considered within roadway sections as on-street bike lanes, or as off-street trails.

4.2.6 Other Issues

Several other issues were identified through the TAC or public meetings:

- General improvements are needed along Gold St., Spruce St., and Pine St.

- Interstate traffic is occasionally diverted to or through Deming as a result of incidents on the highway such as major dust storms.

- Parking in the downtown area presents concerns relative to turning maneuvers or obstructions.

- Sign clutter on Pine St. and Gold St. should be addressed.

- Speeds are of concern along Country Club Rd. (it should be noted that both opinions were expressed indicating the speeds are too high, as well as that the speed limit should be raised).
- More sidewalks along streets to encourage pedestrian and bicycle use.
- Population growth and related issues may tax the transportation network. Potential growth areas include: Customs and Border Patrol (CBP) replacement; and industrial expansion at the existing industrial park as well as at the proposed new Peru Mill Industrial Park.
- Sight distance blockage due to vegetation along County roads (e.g. Doña Ana and Ventura Rds.).
- Tapia Rd. may need to be realigned due to a proposed expansion of the runway protection zone (RPZ) as required by the Federal Aviation Administration (FAA).

4.3 Constraints

The following geographic constraints present impediments to the development of transportation infrastructure.

- Interstate 10 – only one full-service crossing exists in the north-south direction at Gold St.
- Railroad tracks – there are a limited number of crossings, and the proposed expansion of rail service will further impact traffic crossings. Furthermore, the proximity of the tracks to I-10 further limits the options for additional crossings.
- Municipal Airport – as indicated above, the RPZ may require expansion which may require the realignment of Tapia Rd.
- Major drainage – many roadway sections cross arroyos or floodways and would require positive conveyance. The Mimbres River reach is a major arroyo and would require major structure crossings and associated permitting.
- Right of way – available public right of way (ROW) may limit the potential for roadway widening and provision of sidewalks and/or bike lanes.

CHAPTER 5

TRANSPORTATION MODELING

5.0 TRANSPORTATION MODELING

5.1 Introduction

PTV America, in cooperation with the City of Deming and Luna County, has developed a computer-based transportation planning model for the City of Deming and Luna County, New Mexico. This 2008 base year model will help in the development and evaluation of future traffic conditions, analysis of alternatives for use in developing project concepts for future implementation.

This transportation planning model is a representation of the Deming area transportation facilities and the travel patterns using these facilities. The model contains inventories of the existing roadway facilities and of all housing, shopping, and employment in the area. These inventories and the model "rules" are compared with current traffic counts. When the model matches the traffic counts within acceptable ranges of error, the model can then be used to test future year scenarios. These scenarios may be changes in number of housing units, employment centers, travel behavior patterns, or roadway improvements. The transportation engineer or planner, using the transportation planning model, can project future traffic volumes without the cost of building inappropriate roadways or waiting for traffic congestion to severely impact travelers.

The Deming-Luna County model will be developed with the software package VISUM, this package includes the methodologies employed in the old TMODEL software which was a DOS based program. This document details the methodology that PTV America and City staff used to develop the model. Because modeling is a complex process, much of the theory, terminology, and concepts are also discussed.

5.2 The Modeling Process

A transportation planning model is constructed to forecast traffic. The model is calibrated to replicate existing or base-year travel patterns. The model inputs are then modified to represent future conditions, making it possible to project traffic volumes. This gives transportation planners and engineers the ability to determine the impact of different roadway or land use scenarios on the traffic network. This, in turn, allows the professional to evaluate economic decisions on potential capital improvements and then make appropriate plans. One such use of these models is to test several forecast conditions.

5.2.1 Model Area Identification

The modeling process begins by determining the area to be modeled. For the Deming-Luna County area, it was decided that the model area would be roughly bounded by:

- State Route 26 to the north,
- Solano Road to the south,
- Stirup Road to the east, and
- Skyview Lane to the west.

Construction of the model began by choosing the roadways to be included. The Deming model used all the streets classified as collector streets or higher. The model also included local streets and unpaved roads when necessary to "load" traffic to the network in an appropriate manner. The streets to be included in the model were determined by project team staff.

The model's zones, points where trips begin and end, were then determined. Two types of zones were used: internal and external.

Internal zones can consist of a single parcel, a group of like land uses, or a gathering of local land uses separated by natural, physical, or political boundaries. Several factors are considered to find the best zonal design. The primary factor is related to the results expected of the model. It may be logical to place the zone in a way that groups all land uses bounded by network roadways. The second factor is how the available land use information is geographically described. For this model, PTV staff sketched out a plan for Transportation Analysis Zone boundaries based on Block group data and the road network. These boundaries were further reviewed and modified based on the feedback given by the city and county staff. The land use data was collected using the zone boundaries determined by the study team . The data was then made available as a GIS data layer. The Deming-Luna County model was comprised of 146 internal zones.

External zones account for all vehicle trips that enter and leave the model area. Depending upon the desired results, it may be logical to place an external zone on each roadway that leaves the network. In other cases, local traffic conditions may establish a need to tie together several exiting roadways into a single zone so that the external destination of the trip can be simulated. For the Deming-Luna County model, it was decided that the external zones would be placed at the following locations:

Zone	1000	US 180 – North
Zone	1001	I-10 West
Zone	1002	NM 11 - South
Zone	1003	I-10 East
Zone	1004	NM 26 - Northeast

5.2.2 Data Collection and Coding

After the model area has been identified, the collection and entry of the necessary data to run the modeling program begins. As noted in Figure 6, there are three primary components to be entered: roadway link, intersection node, and land use data.

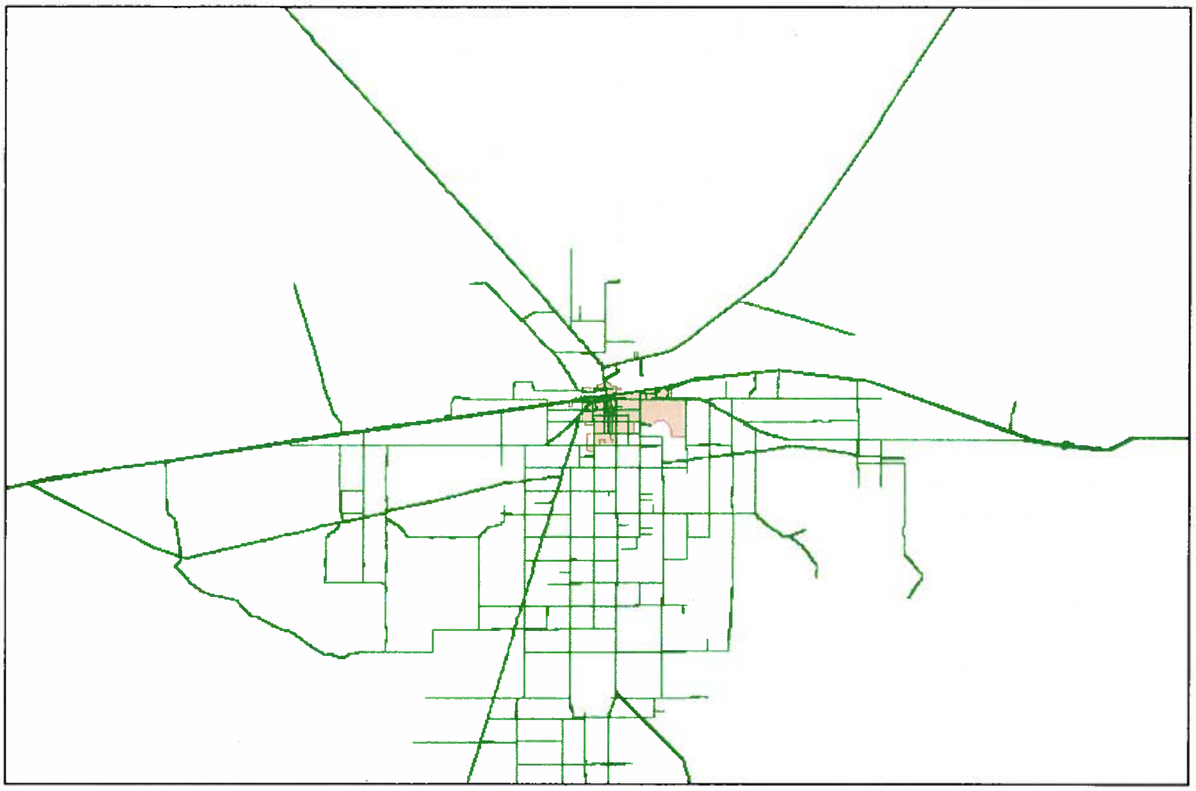


Figure 6 - Deming-Luna County Model Network

Other data may be needed to help in the calibration process (e.g., volumes for screenline crossings), to extract result data (e.g., turn movement counts at intersections), or to help reporting and presentation of the model results.

Data collection for the model involves extensive field work. This field work may include conducting peak-period turning movement counts, origin-destination surveys, trip generation studies, speed-delay travel runs, and other studies used to verify the calibration of the model. The study team collected and provided the necessary information for calibration.

Upon completion of data collection, development of the model's mathematical "rules" began by coding the information and readying it for entry into VISUM. Essentially all entered data is numeric. Each entry, such as speed limits for links, capacities for nodes, and collected land use data, is used by the model to estimate network volumes. VISUM contains many equations and algorithms that help the traffic volume computation process. Therefore, given the size of the transportation planning model, it is necessary to group like data together and assign blanket values. For example, link and node capacities are assumed to be uniform for links and nodes of similar classifications and types throughout the model area. In actual practice, these capacities are considered unique to the location and road conditions. The method for developing these blanket values is considered part of the model's rule-building process.

5.2.3 Calibration

After all data has been collected, coded, and entered in VISUM, the calibration process begins. In this task, the data and the model rules are refined so that the model closely simulates existing travel patterns and volumes on the roadway network. Calibration is performed by conducting a series of simulation runs and evaluating the results. The calibration is considered complete when the results of the simulation runs are statistically similar to the traffic count volumes and other measures of travel behavior.

Distribution and assignment are the two steps undertaken during a typical model simulation run. Distribution is the process of allocating trips between various zones within the network. The product of the distribution is a trip table that lists the number of trips between the model's zones. VISUM performs this process using the gravity model.

Application of the gravity model in transportation modeling is derived from earlier work with economic interaction through a study of social physics. The idea, simply put, is that more interactions (between different zones) take place when the cost of interacting is less. As with the physics of gravitation between masses, it has been found that many human interactions can be related to the distance or cost between interactors using a negative exponential function.

The form of gravity model used in VISUM is:

$$\text{Trips}_{ij} = \frac{\dfrac{P_i A_j}{(d^b_{ij} + K(d^a_{ij}))}}{\sum \dfrac{A_j}{(d^b_{ij} + K(d^a_{ij}))}}$$

where:

Tripsij	=	Trips between zones i and j
Pi	=	Productions (Origins) at Zone i
Aj	=	Attractions (Destinations) at Zone j
dij	=	distance between the zones
K	=	constant
a,b	=	exponents

In the Assignment portion of the simulation run, the distributed trips on the trip table are allocated to the shortest travel paths between each zone. The assignment is done incrementally. That is, slices of the trip table from each zone are loaded on the network. Trips from all zones are assigned each increment, with all zones being treated equally. As each slice is added to the network, the number of trips on each link builds. As these trips build, some links and nodes approach capacity. This changes the travel time on subsequent skims and reallocates the shortest paths between the zones representing trips being diverted by traffic congestion. After the entire trip table is assigned, the accumulated trips along a link represent its assigned volume.

The series of calibration simulation runs involves review of the assumptions used to construct the model. In the distribution portion of the simulation, the exponents to the distance function of the gravity model are examined. During the assignment portion of the simulation, the assumptions for link speeds, capacities, and delay parameters are studied. Between each run, different parameters are evaluated and necessary adjustments made to the "rules" so that the desired results (i.e., calibration) are reached. Before any adjustments to the Deming-Luna County model parameters were made, they were justified either through the collected travel pattern data or the judgment of PTV America and their experience with transportation planning models and travel conditions throughout the model area.

5.2.4 Model Forecasts

The fourth and final step to modeling is travel network forecasting. With a working calibrated transportation planning model, different land use and/or roadway projections can be entered to forecast results on the roadway network. Before the actual forecast can begin, this question must be raised: Are the rules established in calibration still applicable to future scenarios?

Only professional judgment can answer this question. Most rules that are questioned will involve the roadway characteristic assumptions (speed, capacity, number of lanes, etc.) and should not require any model recalibration. To complete the forecasts, the appropriate link, node, or trip table file is changed by entering the future scenario data.

VISUM has a screen graphics editor that simplifies the forecast process in entry and review modes. Changes to the model files can be made quickly for several simulation runs using various scenarios. Further, the results can be represented graphically, either on-screen or through a hard-copy plot.

After the forecast evaluation is complete, it is possible to make recommendations for the study area and test each recommendation to analyze its effectiveness on the roadway network. VISUM can compute link volume variations due to changes in capacity, different land uses, new roadways, etc. These types of VISUM features are a valuable resource for decision makers and transportation professionals in determining the most effective solutions for mitigating existing and potential roadway congestion.

5.3 Background Data and Modeling Assumptions

The primary goal of this transportation planning model is to simulate the PM peak hour of travel on the roadway network in the Deming area. In order for this simulation to be effective, it is important to obtain all transportation related data for that peak hour (a "snapshot" of time). It was also decided that the traffic model would replicate a 2008 weekday evening (PM) peak-hour.

The following section describes the various data used to develop the model. It is subdivided into three areas corresponding to the three primary components of a transportation planning model:

- roadway link,
- intersection node, and
- land use and travel characteristics data.

5.4 Model Network Development

5.4.1 Links and Nodes

Incorporation of Navteq Data

The Navteq data set for Luna County was used to create a routable model network. The Navteq data is the background information used by Yahoo Maps, Mapquest, Google Maps and numerous other sources that provide routing and Points of Interest information to users all across the world. The Navteq data was brought into the VISUM model network to provide information of roadway types, street names, land uses such as hospitals, parks and shopping centers as well as to enhance the graphical output of the model network. This data was further checked and scrutinized to true representation of field condition by City of Deming staff and entered accordingly into the VISUM database by PTV America Staff. The data provided by City of Deming staff included Roadway speeds, Number of lanes and information on one-ways.

The Navteq data also contains items such as City and County Boundaries. These items were brought into the model as territories. VISUM allows automatic calculations for items such as vehicle miles or vehicle hours traveled by territory.

A graphic showing the model network with the Navteq enhancements is shown in Figure 7.

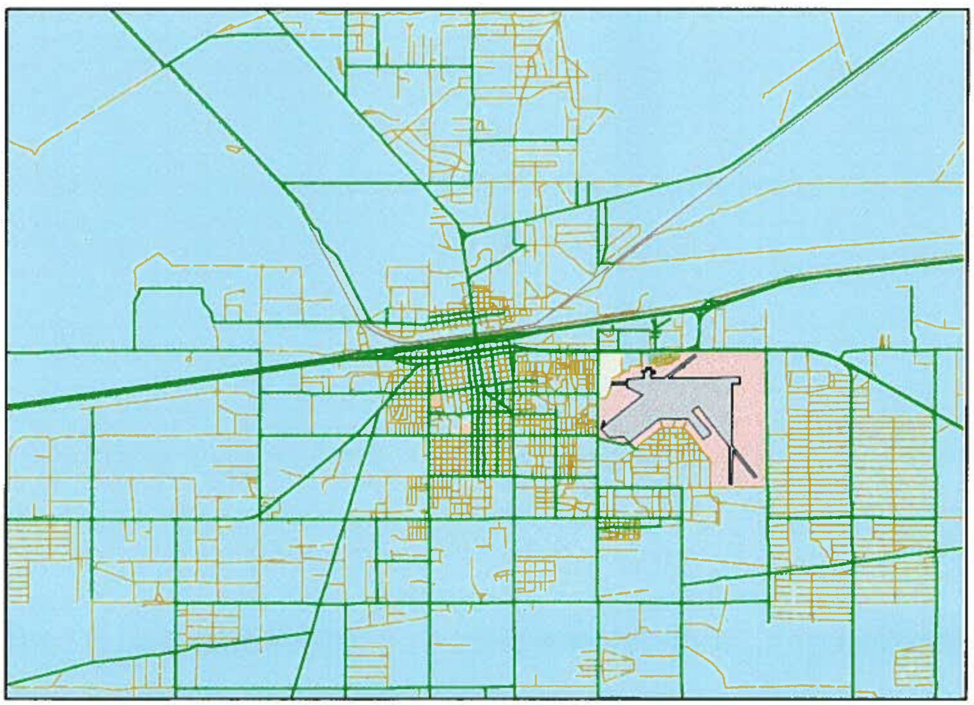


Figure 7 - Base Network with Navteq Enhancements

Functional Classification of Links

Each street in the model is represented by a link or a group of links. Each link contains attribute data that defines the operation of that link. A link is a directional description of connection between beginning and ending node points. Data attributes needed for a link in VISUM include:

- Type (user-specifiable)
- Number of Lanes
- Capacity
- Length
- Design Speed (or posted speed limit)
- Volumes

5.4.2 Link Type (Classification)

The numeric codes for link type used are listed in Table 14. Link types were used to define link capacities and to set the speed-delay functions used in the highway assignment process. Existing NAVTEQ Classification data was reviewed and corrected as per data currently existing in the field. Note that not all of these classifications are currently used in the Deming-Luna County model. Link type designations can also be added for possible future use with the analysis of alternatives.

Type Number	Facility Type	Capacity (vphpl)
1	Freeway	2000
2	Ramps	1500
3	Multi_Lane Highway	1800
4	Arterial Class I	1600
5	Arterial Class II	1400
6	Arterial Class III	1200
7	Arterial Class IV	1000
8	Major Collector	800
9	Minor Collector	700

Table 14 – Link Class & Capacities 2006 Deming Transportation Planning Model

These link types are defined in more detail as follows.

1) Freeway - Divided highway facility with full control of access and two or more lanes for the exclusive use of traffic in each direction. There are no at-grade intersections and direct access to or from adjacent property is not permitted. There are no signalized or stop-controlled at grade intersections, and access to and egress from the freeway are limited to ramp locations.

2) Ramps - A ramp is a length of roadway providing an exclusive connection between two highway facilities. Ramps are generally designed to permit high-speed merging and diverging maneuvers, thus minimizing disruptions to mainline traffic.

3) Multi-lane Highway - Multilane Highways generally have posted speed limits between 55 and 65 mph. The usually have four or six lanes, often with physical medians or two-way left-turn lane medians, although they may also be undivided. Traffic signals may be found along such highways, although traffic signals spaced at 2 miles or less typically create urban arterial conditions. Vehicles may enter and leave the highway at intersections and driveways and through the median at selected points. The general design standards of multilane highways tend to be lower than those found on freeways, although an ideal multilane highway approaches freeway conditions as access point and turning volumes approach zero.

4) Arterial Class I - These are defined as Principal arterials with Suburban design. A Principal arterial serves major through movements between important centers of activity and a substantial portion of trips entering and leaving the area. Its importance is derived from the service provided to traffic passing through the urban areas. Service to abutting land is subordinate to the function of moving through traffic. Suburban design represents an arterial with a low driveway access-point density, separate left turn lanes, and no parking. It may be multilane divided or undivided or a two-lane facility with shoulders. Signals are spaced for good progressive movement (one to five signals per mile or at even greater distances). Roadside development is of low to medium density, and the speed limits are usually 45 to 55 mph.

5) Arterial Class II - These are defined as Principal arterials with Suburban design. A Principal arterial serves major through movements between important centers of activity and a substantial portion of trips entering and leaving the area. Its importance is derived from the service provided to traffic passing through the urban areas. Service to abutting land is subordinate to the function of moving through traffic. Suburban design represents an arterial with a low driveway access-point density, separate left turn lanes, and no parking. It may be multilane divided or undivided or a two-lane facility with shoulders. Signals are spaced for good progressive movement (one to five signals per mile or at even greater distances). Roadside development is of low to medium density, and the speed limits are usually 40 to 45 mph.

6) Arterial Class III - These are defined as Principal arterials with typical Intermediate design or Minor arterials with Suburban design or Intermediate design. A Principal arterial serves major through movements between important centers of activity and a substantial portion of trips entering and leaving the area. Its importance is derived from the service provided to traffic passing through the urban areas. Service to abutting land is subordinate to the function of moving through traffic. A Minor arterial is a facility that connects and augments the principal arterial system. Although its main function is still traffic mobility, it performs this function at a somewhat lower level and places more emphasis on land access. A system of minor arterial serves trips of moderate length and distributes travel to geographical areas smaller than those served by the principal arterial. Intermediate design represents an arterial with a moderate driveway access-point density. It may have some separate or continuous left-turn lanes and some portions where parking is permitted. It has a higher density of roadside development than the typical suburban design and usually has 4 to 10 signals per mile. Speed limits are normally 30 to 40 mph.

7) Arterial Class IV - These are defined as Principal arterials with typical Urban design or Minor Arterials with Intermediate or typical Urban Design. A Principal arterial serves major through movements between important centers of activity and a substantial portion of trips entering and leaving the area. Its importance is derived from the service provided to traffic passing through the urban areas. Service to abutting land is subordinate to the function of moving through traffic. A Minor arterial is a facility that connects and augments the principal arterial system. Although its main function is still traffic mobility, it performs this function at a somewhat lower level and places more emphasis on land access. A system of minor arterial serves trips of moderate length and distributes travel to geographical areas smaller than those served by the principal arterial. Intermediate design represents an arterial with a moderate driveway access-point density. It may have some separate or continuous left-turn lanes and some portions where parking is permitted. It has a higher density of roadside development than the typical suburban design and usually has 4 to 10 signals per mile. Speed limits are normally 30 to 40 mph. Urban design represents an arterial with a high driveway access-point density. It frequently is an undivided one-way or two-way facility with two or more lanes. Parking is usually permitted. There are few separate left-turn lanes, and some pedestrian interference is present. It commonly has 6 to 12 signals per mile. Roadside development is dense with commercial uses. Speed limits range from 25 to 35 mph.

8) Major Collectors - Collectors are streets providing both land access and traffic circulation within residential, commercial, or industrial areas. The access function is more important that that of arterials, and unlike arterials, the operation is not always dominated by traffic signals.

9) Minor Collectors – Minor collectors are mainly for access function, operate at a design level just above that of a local street, and are generally controlled by two-way stop signs.

Number of Lanes

This attribute is used to assign capacities to network links. This field is not used during the VISUM distribution and assignment processes. However, it is important for assigning capacities to network links. It is also used for display and in some network calculator functions. All model links were checked for accuracy with this designation.

Link Capacity

Capacity is entered in terms of vehicles per hour (vph) for each link, directionally. Due to the number of links contained in the Deming-Luna County model, it wasn't possible to complete individual capacity analyses on each link to find suitable capacities. Therefore, a global link capacity system based on functional classification was adopted. The capacities were based upon Special Report 209 "Highway Capacity Manual," Transportation Research Board, National Research Council, Washington, D.C. 1985.

In the context of model operation, the capacities are used in conjunction with link speeds, link lengths, and speed-delay functions to derive a realistic travel speed to be used in the distribution of travel and the derivation of appropriate travel routes. In the context of network analysis, the capacities are used to identify deficiencies and recommend improvements. In both cases, it is desired that the capacities used in the model be as accurate and realistic as possible.

A step defined in the procedure parameter file was used to compute the link capacities of all links using the Type and Number of Lanes columns. This step can be defined using the edit attribute feature in VISUM.

Figure 8 shows the feature with input and target attributes.

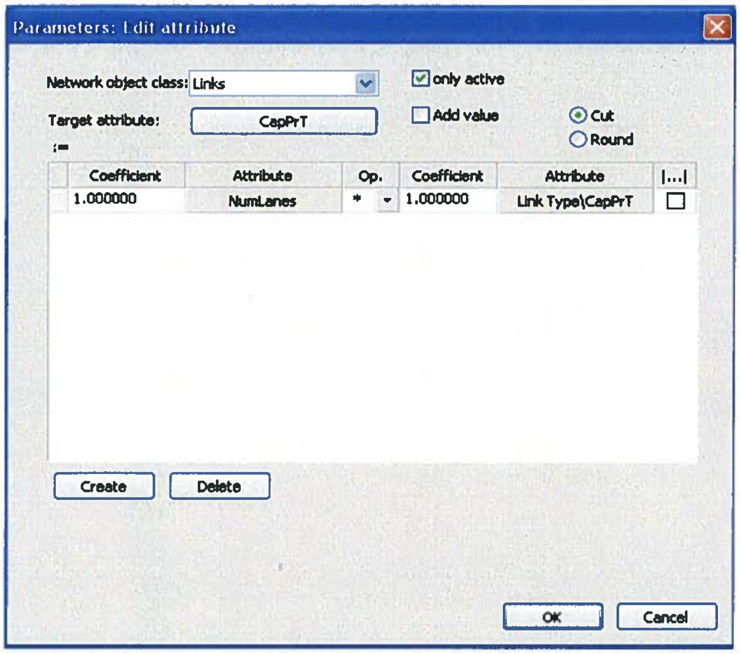


Figure 8 - Node Capacity Calculation Implemented with Edit Attribute

<u>Posted Speed Limit</u>

Link speeds are entered in VISUM in miles per hour. Speeds have a direct influence on the computation of travel times during model runs. Generally, posted speed limits are used in the program. However, posted limits do not always accurately depict the free-flow conditions on the roadway. For example, some state highways have speed limits that are ignored. Conversely, some locations may have posted limits greater than what can be achieved (e.g., arterials in fully developed areas with numerous driveways and signalized intersections). During the model update process, a plot of coded speeds was reviewed for consistency with posted speeds. Changes were made to all links noted on the plots to begin the calibration process using the posted speeds.

During the calibration process, roadway operating speeds from the model were reviewed to justify modifications to the posted speed limit coded in the model as well as link and node delay coefficients. These modifications were made to reflect conditions and traveler perceptions that are different from the posted speeds. Very few link speeds were modified during calibration.

<u>Link Delay Function</u>

Travel time on each individual link typically increases as the traffic volume on the link approaches capacity. Current research has shown that the amount of travel time increase depends on the functional classification of the link as well as the region and the behavior of the drivers using that link. VISUM offers the TMODEL methodology as one method to adjust the travel time increases on the link as the volume-to-capacity (V/C) ratio changes by functional classification of the link. This feature was used during the calibration process.

During calibration analysis, both link operating speeds and total (including both link and node delays) operating speeds can be analyzed. This differential analysis is used to adjust both the link and node delay coefficients.

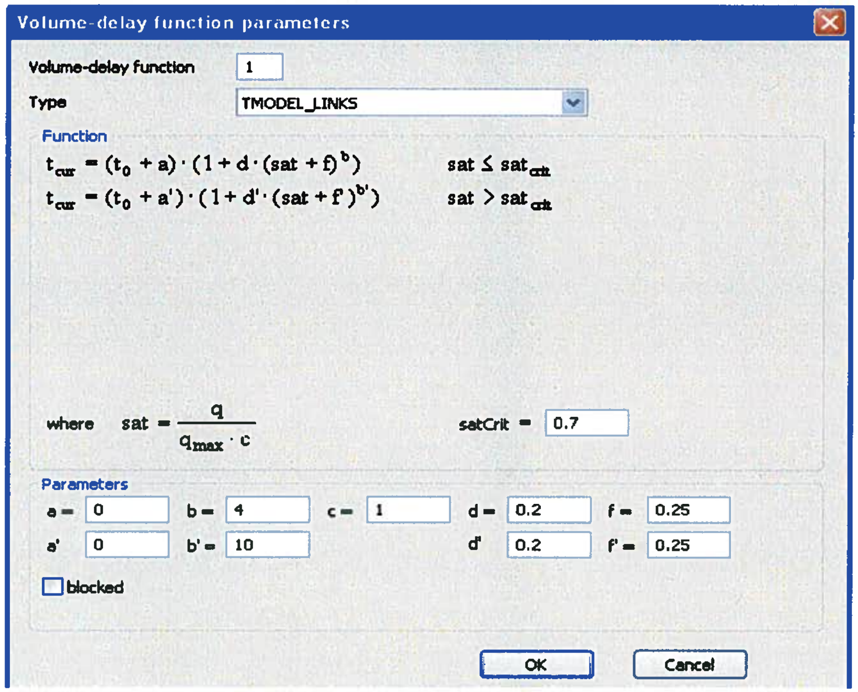


Figure 9 - Link Delay Functions

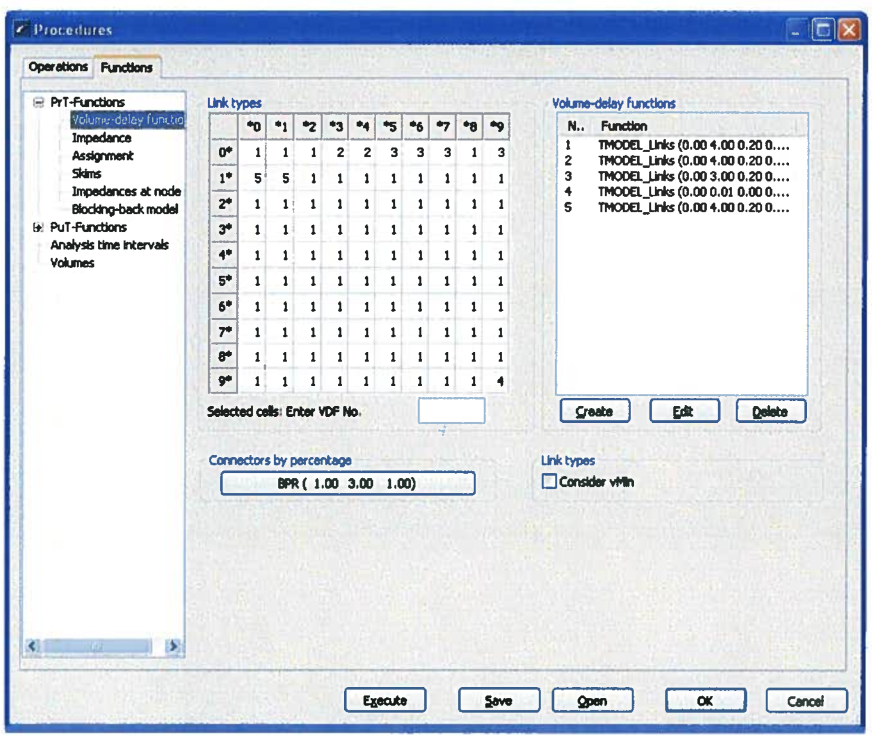


Figure 10 - Link Delay Function Lookup Table

Intersection Control (Nodes)

The beginning and end points of each link are called nodes. A node can be an intersection, a zone centroid, or an intermediate point between intersections. In VISUM, all nodes are coded with data, which defines the operating characteristics of that node. Data needs for nodes in VISUM include the following:

- Type (user-specifiable)
- Capacity
- Special Delay Links (SDLs)
- Base Delay

Node Type

The node classifications were coded in the model dependent upon the intersection control. Delay equations are defined by node type, so it is important that the node type is properly coded. Table 15 lists the node classifications used in the Deming-Luna County model. These were refined during the model calibration process. The node type system closely follows the link functional classification system. Node types, as seen in Table 15, have been grouped to show whether the intersection represents an arterial meeting an arterial, an arterial meeting a collector, etc.

Node Type	Description
1	Node In-Link (Shape Nodes)
2	Partial Way/Two-way Stop
3	Traffic Signal
4	Freeway Ramp Terminals – Merges
5	Freeway Ramp Terminals – Diverges
10	All-Way Stop

Table 15 – Node (Intersection) Types

Node Capacity

Capacities at all nodes are used in VISUM to compute delays based upon traffic congestion at the intersections. TMODEL methodology was used to model delay at intersections. This feature has been incorporated into the Deming-Luna County model so that delays at these critical points on the network can be modeled to reflect the impacts upon traffic flow patterns.

For the Deming-Luna County model, VISUM uses the TMODEL methodology to calculate preliminary node capacities using the following node equation, this node equation has been implemented using the edit attribute functionality in VISUM:

$$Cap. = K_1 + K_4 \text{ (sum of capacity of entering links)}$$

where:

Cap.	=	Intersection Capacity
K_i	=	Constant
E_i	=	Exponent
No. of Lanes	=	Number of Entering Lanes from all links entering the node
Entr. Cap.	=	Sum of Entering Capacities from all links entering the node

Node capacities for the Deming-Luna County model used the K_4 constant. K_4 was used to simulate the effect that a green time-to-cycle length (G/C) ratio has at an intersection. For modeling purposes, it was assumed that when like classes meet, the G/C ratio is fairly even, and as the roadway meets lesser class roadways, the green time, or G/C ratio, increases on the major facility.

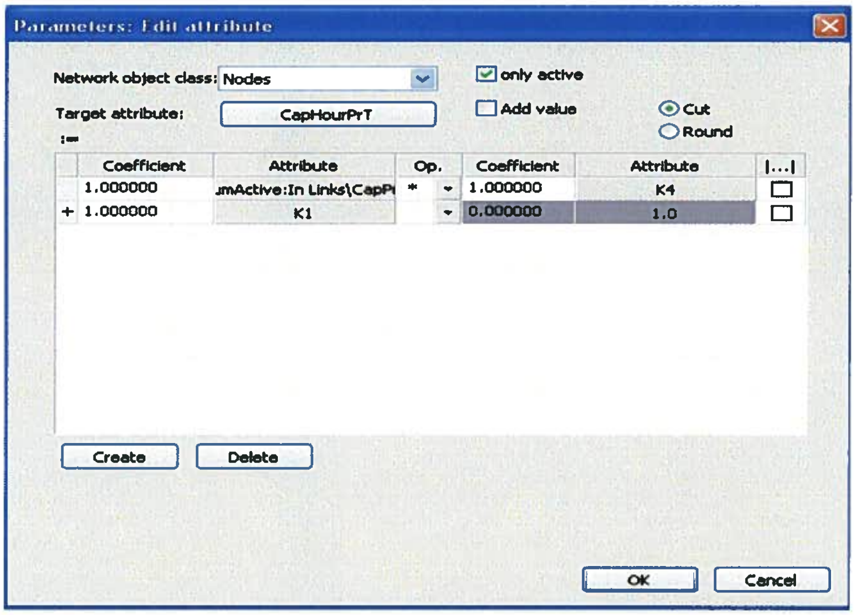


Figure 11 – Node Capacity Calculation Implemented with Edit Attribute

For intersections that are 3-legged, the capacities were increased due to the reduced number of conflicting turns and increased G/C ratio as compared to 4-legged intersections. The K_4 values on the 3-legged intersections were increased by 0.05 from the equivalent classified 4-legged intersection The K_4 values are calculated from the following equation:

$$K_4 = CC_1 + CC_2 \text{ (class difference of intersecting links)}$$

where:

CC_1	=	Constant related to number of legs of the intersection
CC_2	=	Constant related to link class index, 0.05 in this case

Number of legs	Value
2	0.55
3	0.50
4	0.45
5+	0.35

Table 16 – CC_1 Values for K_4 Calculation

TModel Delay Links (SDLs)

Another feature in VISUM adopted from TMODEL is the ability to model intersections under STOP or YIELD control. SDLs at a node denote which link(s) are under two- or three-way STOP or YIELD control. If an intersection is a four-way STOP, then no SDLs are entered, because node delay is applied equally to all approaches.

SDLs are applied during the assignment phase in VISUM. As traffic is loaded onto the network, the program calculates Volume-to-Capacity (V/C) ratios at each node. Intersection delay is calculated using the V/C ratio (more on how the program calculates the delay is presented in later sections of this report). If SDLs are specified at the nodes, then any delay calculated during the model run is assigned to the special delay link(s) approaching the node to simulate a STOP or YIELD condition. Under a four-way STOP condition, delay is experienced on all four legs and no SDLs are entered for this condition. SDLs were placed at all partial way stop signs.

These links can be defined in VISUM using the TModel tab in the node editor dialog. The link to which the delay has to be assigned is indicated by a check mark. This dialog is shown below.

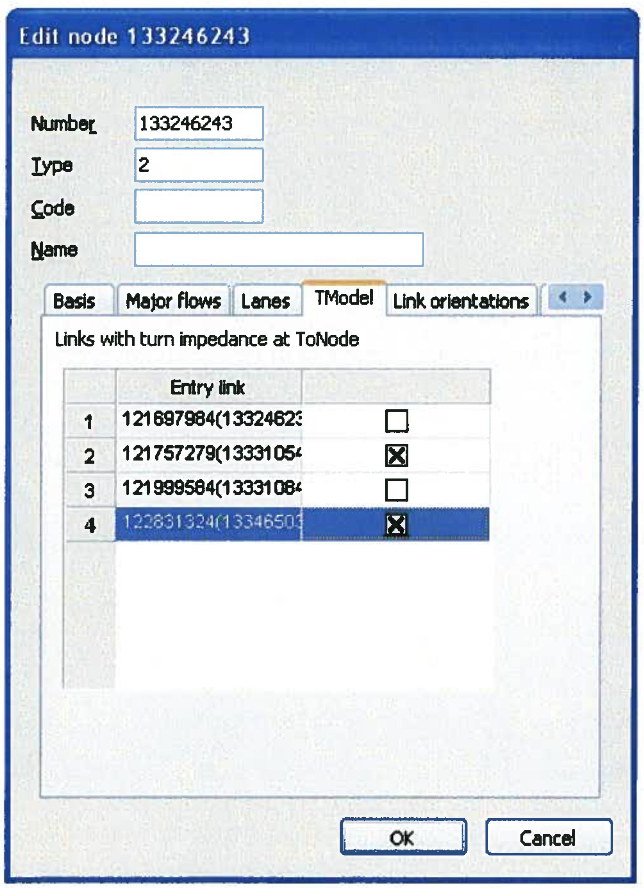


Figure 12 – Definition of TModel Delay Links

Base Delay

Additional delay can be added to an intersection if a known condition exists. These conditions could include an all red condition at a signal, pedestrian phases, or a node representing significant delays at railroad crossings. In the Deming-Luna County model, no additional node delays were used.

The figure below shows the entry box for base delay. Base delay is entered in the area shown in blue.

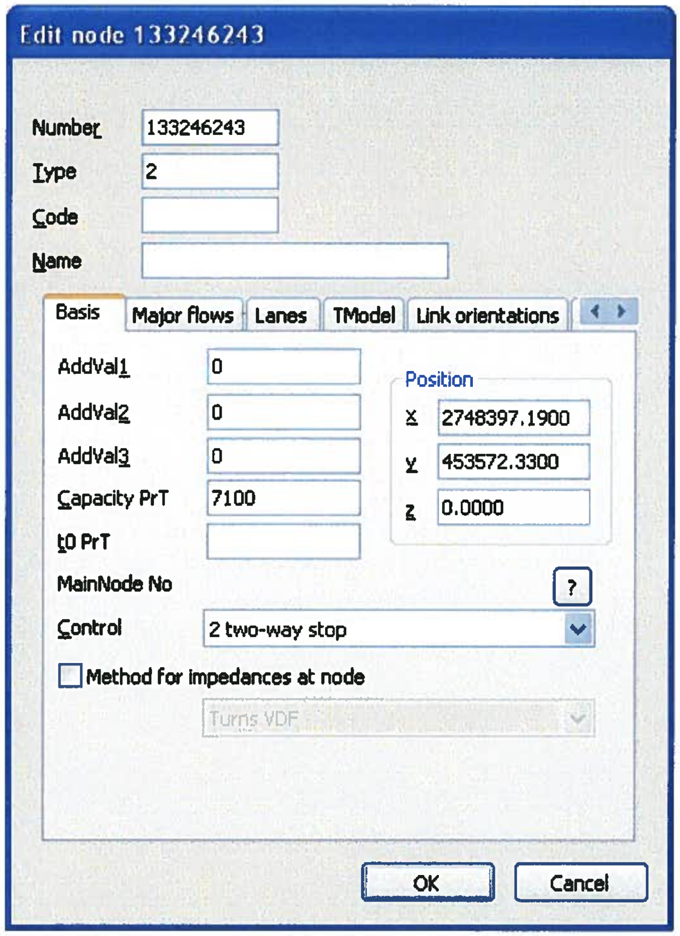


Figure 13 – Entry Box for Base Delay on Node

Turn Penalty

At some locations on a network it may not be possible to execute a certain turn movement, there can be a capacity constraint due to the drivers' perceptions of potential safety concerns, or it is desired to restrict movements through a zone centroid. A turn penalty can be applied in VISUM to such turn movements to simulate these conditions. Within the Deming-Luna County model, turn penalties were used to penalize left turns through the network. Additional delays were assigned at left turn movements at all signalized and stop control intersections. These additional delays improved model operation to eliminate any excessive "stair-stepping" movements. The turn penalty types are shown in Table 17.

Type Number	Penalty Description	Penalty
1	Left Turns Capacity Restriction	250 vehicles/hr
2	Left Turn at Delay	3 sec

Table 17 – Turn Penalties 2008 Deming Transportation Planning Model

It is important to place these turn penalty delays at any locations in the forecast network that have changed conditions. The information shown in Table 17 may be entered manually using the entry box shown in Figure 14 below. Delay is entered corresponding to t0-PrT and Capacity is entered corresponding to Capacity-PrT.

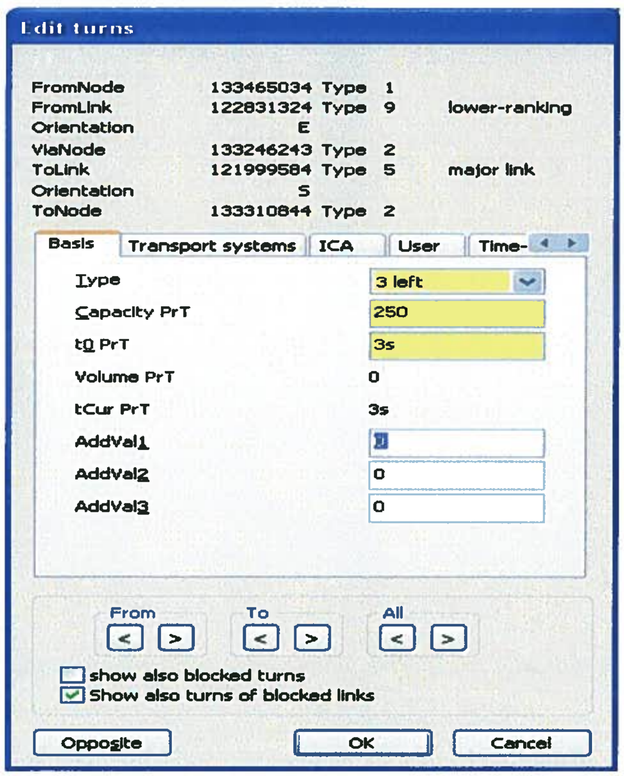


Figure 14 – Manual Entry Box for Turn Capacity and Delay

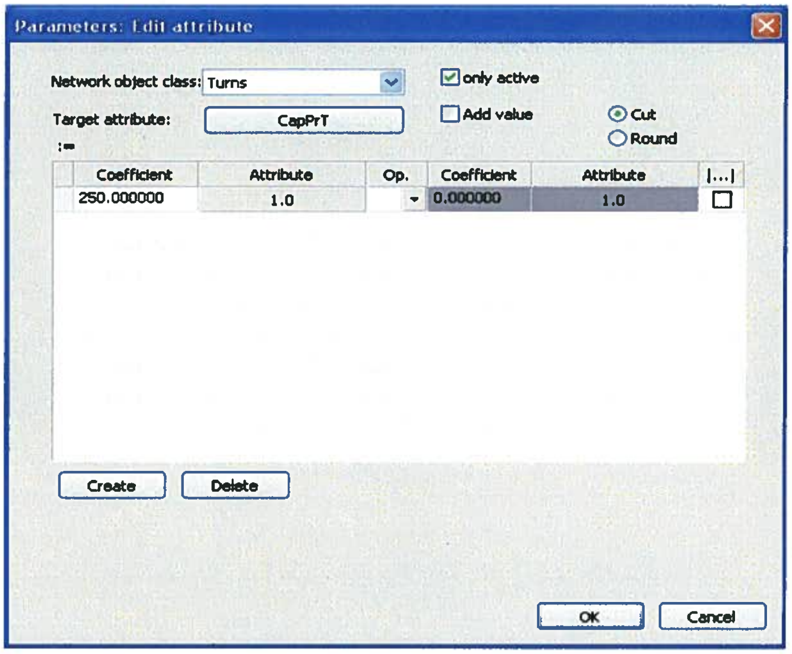


Figure 15 – Setting Turn Capacity Values with Edit Attribute

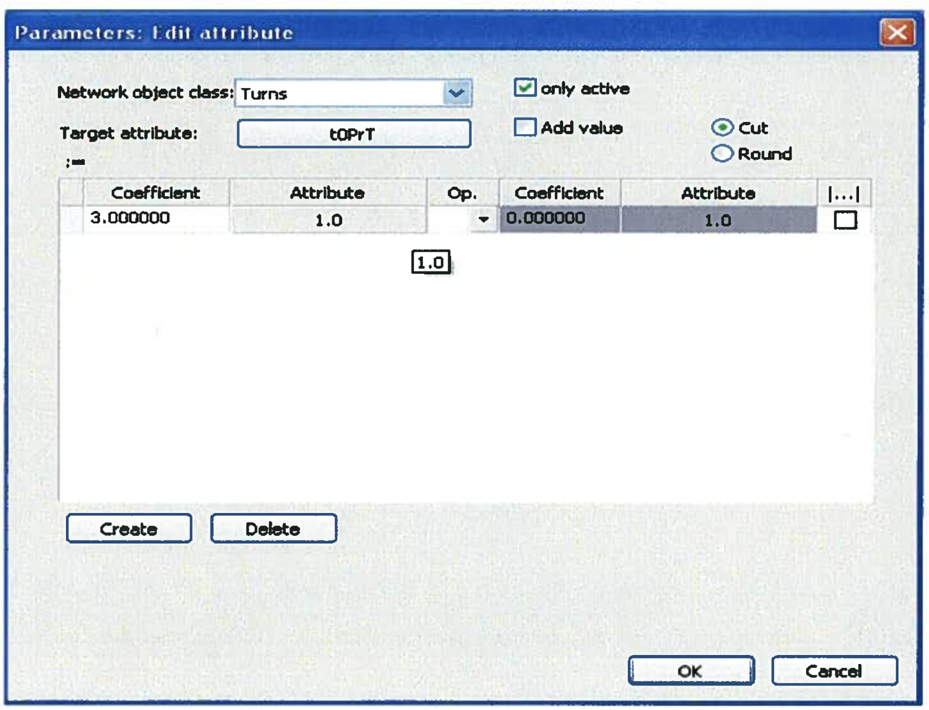


Figure 16 – Setting Turn Delay Values with Edit Attribute

Node Delay Coefficients

The delay caused by different classifications of intersection control must be defined to reproduce the delays that drivers perceive. The resultant extra travel time is dependent upon the volume-to-capacity ratio (V/C) and varies by class of the nodes.

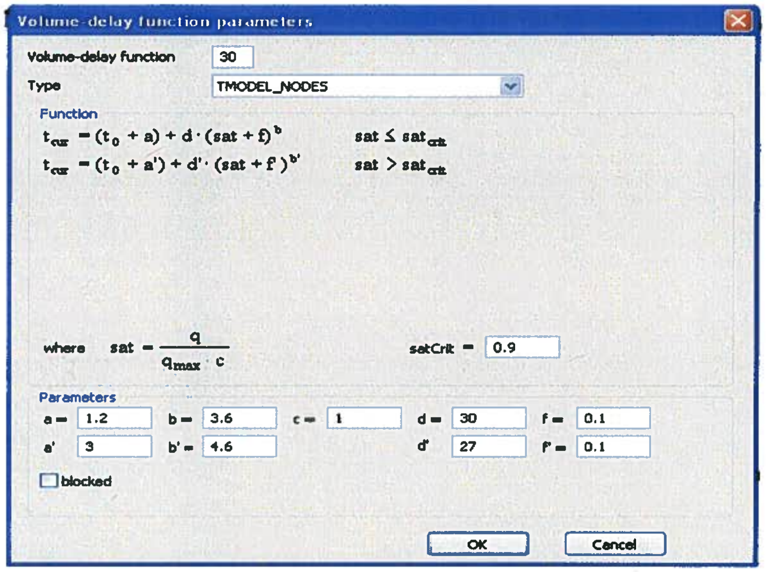


Figure 17 – Node Delay Function

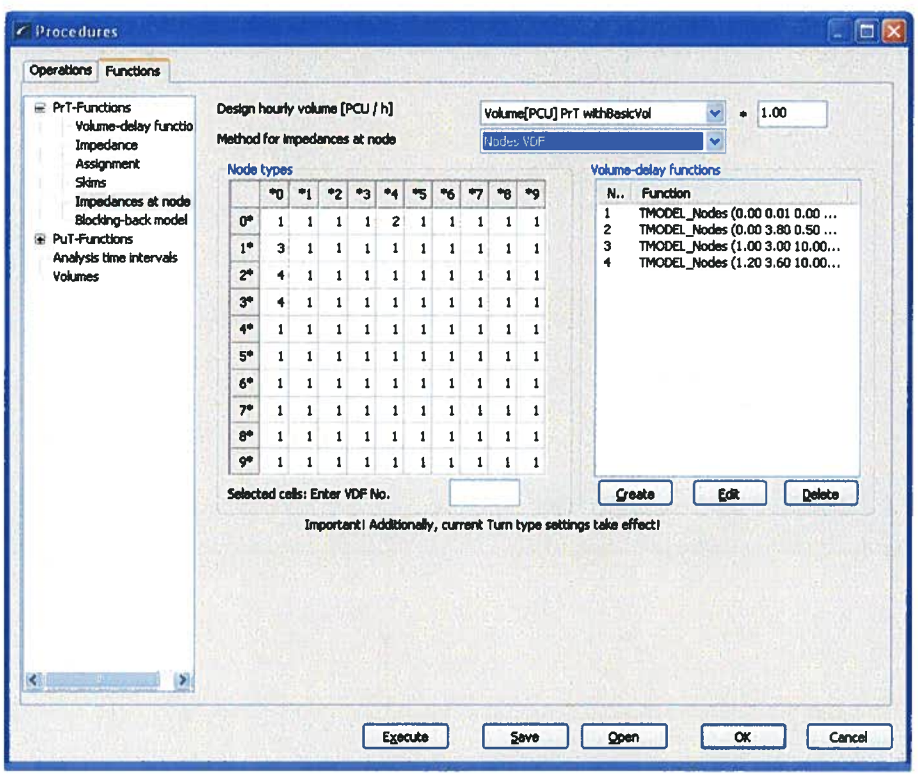


Figure 18 – Node Delay Function Lookup Table

Traffic Counts

Traffic count information was provided by City of Deming staff to PTV America in the form of a database file. These counts were entered as turning movement counts and then aggregated to obtain link volume counts. All count data entered was for the PM peak hour.

5.5 Zones and Connectors

The central point of each traffic analysis zone (TAZ), where trips begin and end on a transportation planning model network, is called a zone centroid. Zone centroids are at the center of a zone which consists of a variety of land uses bounded by either the roadway network or other geographic or municipal boundaries.

The Deming-Luna County model consisted of two zone types: internal and external. Internal zones were those zones within the study area, and external zones were placed along roadways entering and leaving the Deming-Luna County model area.

VISUM allows for discontinuous numbering zones. Zone numbering for the Deming-Luna County model was done in accordance with the type of the zone. The following convention was used when numbering the zones in the Deming-Luna County model:

1 to 240Internal Zones - representing zones within the Deming area.
1000 to 1004 External Zones - representing the entry/exit points from the model area.

Traffic Analysis Zone Import and Revision

Traffic Analysis zone boundaries were initially imported using the GIS database layers for block groups provided as shape files by the City of Deming. These zones were then disaggregated after further review. The new zone boundaries were defined in accordance with the natural boundaries such as the surrounding street network.

Land Use Data

As mentioned earlier, project team staff collected the land use data for the base year as well as the forecast data. The data was provided as a GIS shape file by the city of Deming staff .This data was then aggregated as per the zone boundaries using buffer based intersection feature in VISUM. All inputs were checked and reviewed using the listing capabilities of VISUM. These categories were also used for the model forecasts.

The land use categories used for the internal zones have been listed below:

SFDU	Single-family	Dwelling Units
SFDU_OUTER	Single-family Outer	Dwelling Units
MFDU	Multi-Family	Dwelling Units
MOTEL_HOTEL	Motel/Hotel	Rooms
INDMANWH	Industrial/Manufacturing/Warehouse	Employees
RETAIL	Retail	Employees
FIRES_OF_SERV	Finance, Insurance, and Real Estate Services (FIRES)/Office/Service	Employees
MEDICAL	Medical	Employees
EDUCATION	Schools	Students
AG	Agriculture	Employees

Table 18 – Land Use Categories for Deming

Single Family Outer Based upon experience with other models in New Mexico the Single-family dwelling units were stratified into a category of "Single-family Outer." This was based upon experience that when a house is further away from other services that the trip generation rate is usually lower. This stratification allowed the use of a lower trip generation rate for these units.

Multi-Family Residential uses contain three or more residential units on a parcel of land. Also, this category includes mobile home parks, apartment buildings, and some condominiums. Measured in households.

Hotel/Motel includes Occupied motel rooms, hotels, and camp areas. Measured in rooms.

Industrial, Manufacturing, and Wholesale uses include a broad range of general or specialty contractors: the production of food, textile, wood, furniture, paper, printing, metal, machinery, electrical and other products; and also includes Transportation, Communication and Public Utilities, such as railroads, trucking and warehouse, air transportation, pipelines, communication towers and electrical, gas and sanitary services. Wholesale Trade facilities include the storage of durable or non-durable goods. Measured in employees.

Retail Trade includes those uses identified in SIC categories: 43, 45, 52-59 and 72-79. Retail uses include a broad range of establishments which sell goods directly to the general public, such as restaurants, automotive dealers, home furnishings, food stores or other products. Also included are service establishments that have significant customer traffic, post office and air transportation. Measured in employees.

Finance, Insurance, and Real Estate Services (FIRES), Offices and Services are those lands that have more customer traffic than typical offices. These include financial institutions, banks, insurance, real estate offices, and travel agencies. Services and offices include business services such as advertising, engineering, legal services and other assorted services. These also include services are which are owned, or operated by units of government and provide the administration of public programs. Measured in employees.

Medical are those land uses that include all health services, doctors offices, and hospitals. Measured in employees.

Education are the lands where schools are located. Measured in numbers of students.

AGriculture, Forestry, Mining are those uses that are generally relate to agricultural production, services, timber tracts and products, and mining extraction activities. Measured in employees.

External Trip Estimation

Origin and destination values for external zones were set at the base-year peak-hour traffic volumes. As with internal zones, traffic generated externally is also apportioned among different trip purposes.

Trips generated by external zones fall into two categories. Traffic that travels from external zone to external zone, or through the network, is called a through trip. These movements are designated as X-X trips in VISUM, which stands for eXternal to eXternal travel. The primary characteristic of these trips is that they travel through the network but do not stop or start within an internal or perimeter zone. In the Deming-Luna County model the best illustration for this movement is the trip that starts in Silver City/Hurley and ends in Columbus without making a stop in Deming.

The second trip type generated by an external zone is the one that begins at an internal zone and ends in an external zone, or vice versa. These trips, often designated as I-X and X-I trips (for Internal to eXternal, eXternal to Internal) can be illustrated by the movement from Las Cruces to Deming.

Trip distribution is typically only performed for I-I (Internal-Internal), I-X, and X-I trips; the remaining X-X traffic is difficult to simulate (or in this case, distribute) with the gravity model. They are usually placed in a trip table. This trip table, listing the number of direct movements between zones, is estimated, or back-calculated, from the traffic counts at the external stations. The "TFlowFuzzy" module in VISUM can help produce this X-X trip table automatically. The X-X trips were combined with the model's origin-destination file for the simulation runs.

An important segment of the travel demand within Deming area is the commercial vehicle (truck) trips. In contrast to the extensive research on car demand as represented by ITE trip rates, the truck demand modeling is much less studied. The addition of the truck demand segment increases the model complexity for both the internal and external travel demand forecast. The internal truck trip demand will be introduced in the next section, and the external demand for both cars and trucks is estimated through a set of VISUM modules in a sequential process. These modules include both "TFlowFuzzy" and demand matrix projection methods.

VISUM provides a module "TFlowFuzzy" of using traffic counts to estimate the demand segments; and this feature is used to estimate the external total demand through Deming area based on the traffic count data that were assembled from the original data set provided by the city and New Mexico DOT.

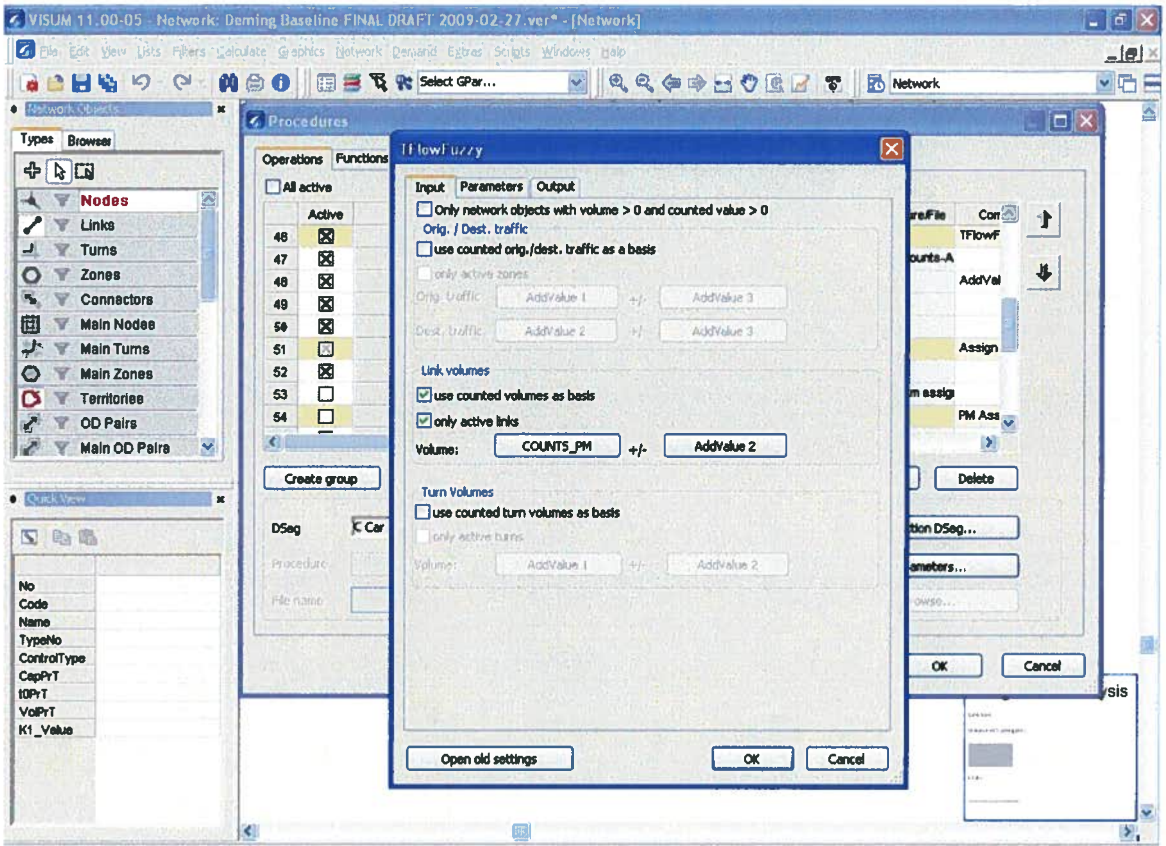


Figure 19 – External Demand Estimation usingTFlowFuzzy Method in VISUM

The eXternal-eXternal matrix obtained from the above TFlowFuzzy process is then divided into car trips and truck trips separately based on the truck percentage and truck count data provided to PTV. Two separate demand matrix adjustment processes were run using VISUM's double-bounded projection method as shown in below Figure.

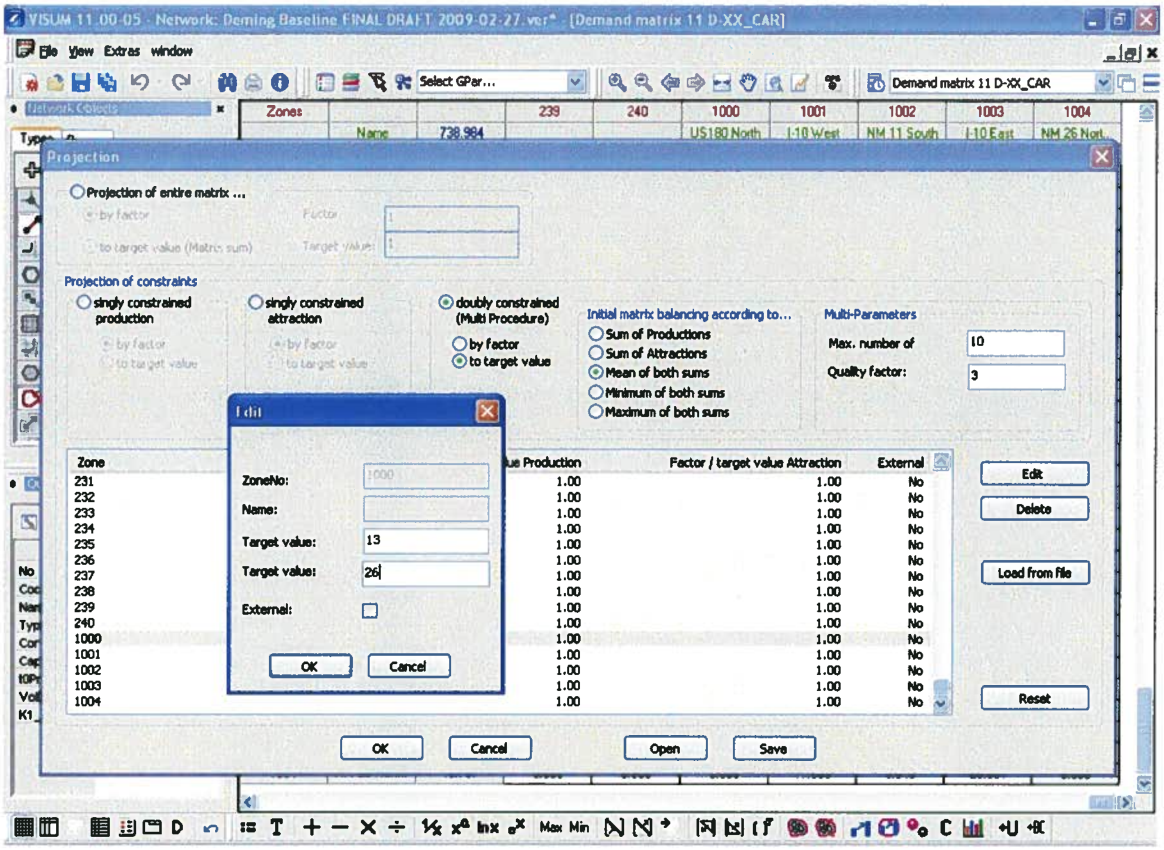


Figure 20 – External – External Demand Projection for Car and Commercial Vehicle Demand Segments

The X-I and I-X trips for both car and truck demand segments are then estimated based on the above two processes and the traffic counts at the external stations.

<u>Connectors</u>

Connectors are network objects in VISUM that are used as loading links for trips originating and terminating at a zone. Connectors thus help in loading trips in the system onto the transportation network. VISUM supports multipoint assignment, wherein multiple connectors can be created for one zone with specific weights/percentages so that loading and exit points for trips can be accurately represented.

5.6 Travel Demand Model

The demand model for Deming is a three stage model. The three stages of the model are: Trip Generation, Trip Distribution and Assignment. These steps have been described in detail the following section.

Trip Generation

After the collected land use data was distributed to the network's zonal system, the number of trips generated by each zone was calculated. This procedure, called trip generation, is a compilation of several mathematical formulas that determine the number of trips produced and attracted to each model zone.

Most transportation engineering projects use the Institute of Transportation Engineer's (ITE) Trip Generation report to determine trip generation for proposed projects. Research by ITE established a series of trip generation rates that, when multiplied by amount of proposed development (e.g., number of dwelling units, employees of commercial or industrial, etc.), produce an estimate of the total number of vehicles.

While the above application is suitable for most traffic engineering projects, modeling uses a more disaggregate trip generation approach. When a distribution model (such as the one used in TMODEL) is applied to origins and destinations, different trip purposes exhibit different travel characteristics. For example, the characteristics of a home-to-work trip are different from a home-to-shopping trip. If trip generation estimates were made simply following just the ITE rates, no distinction could be made. Therefore, it is important that the model generate different trip productions (origins) and attractions (destinations) for different trip purposes so that different travel characteristics can be accounted for in the gravity model.

In its NCHRP report 187 & 365, the Transportation Research Board (TRB) describes a methodology for trip generation that includes the following trip purposes:

- Home-Based Work (HBW) trips,
- Home-Based Other (HBO) trips, and
- Non-Home-Based (NHB) trips.

These three trip purposes are typically used with most daily transportation models. The Home-Based Work trips were divided into trips between Home-to-Work and Work-to-Home. The Home-Based Other trips were divided into trips between Home-to-Other and Other-to-Home. By splitting the HBW and HBO trip purposes into their components, this eliminated the possibility of a problem of excessive trips between households. Therefore five trip types were used:

- Home-to-Work (H-W) trips,
- Work-to-Home (W-H) trips,
- Home-to-Other (H-O) trips,
- Other-to-Home (O-H) trips, and
- Non-Home-Based (NHB) trips.

The truck trips are also one of the concerns with the Deming authorities. In the model, the commercial vehicle travels of truck trips are also explicitly added in addition to the above car trips.

Trip Generation Rates

PTV America developed the following trip generation factors for use in the model. The base trip generation rates were taken from ITE's Trip Generation Report. Factors used to separate the trips into the three purposes and origins-destinations were from NCHRP report 365 and experiences by PTV America.

Trip generation rates are set at values during the beginning calibration simulations. As the calibration process is completed, adjustments are made to the rates to better reflect the known (or base-year) travel conditions. Table 6 presents the final calibrated trip generation rates used for the weekday evening peak hour model.

Land Use	HW		WH		HO		OH		NHB		TRUCK	
	Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
SFDU	0.0117	0.0000	0.0000	0.0731	0.1488	0.0000	0.0000	0.1430	0.0478	0.1080	0.0043	0.0083
SFDU_OUTER	0.0096	0.0000	0.0000	0.0516	0.1272	0.0000	0.0000	0.1130	0.0340	0.0749	0.0035	0.0061
MFDU	0.0079	0.0000	0.0000	0.0563	0.1051	0.0000	0.0000	0.1152	0.0266	0.0742	0.0043	0.0102
MOTEL_HOTEL	0.0037	0.0176	0.0275	0.0176	0.0514	0.0741	0.0808	0.0494	0.0147	0.0106	0.0055	0.0071
INDMANWH	0.0000	0.0132	0.0881	0.0000	0.0000	0.0586	0.2040	0.0000	0.0788	0.0059	0.0927	0.0688
RETAIL	0.0000	0.0103	0.0292	0.0000	0.0000	0.2068	0.1574	0.0000	0.0962	0.0323	0.0087	0.0090
FIRES_OF_SERV	0.0000	0.0046	0.1392	0.0000	0.0000	0.0928	0.2134	0.0000	0.0974	0.0122	0.0139	0.0064
MEDICAL	0.0000	0.0078	0.0911	0.0000	0.0000	0.1173	0.1579	0.0000	0.0455	0.0227	0.0091	0.0086
EDUCATION	0.0000	0.0041	0.0354	0.0000	0.0000	0.0615	0.0413	0.0000	0.0378	0.0135	0.0035	0.0029
AGRICULTURE	0.0000	0.0023	0.0736	0.0000	0.0000	0.0322	0.0920	0.0000	0.0110	0.0090	0.0074	0.0025
XI-O	0.0500	0.0000	0.3000	0.0000	0.3500	0.0000	0.2200	0.0000	0.0800	0.0000	0.0000	0.0000
IX-D	0.0000	0.0400	0.0000	0.2500	0.0000	0.4300	0.0000	0.2200	0.0000	0.0600	0.0000	0.0000
XI-O_TRUCK	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
IX-D_TRUCK	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000

Table 19 – Trip Rates for PM Peak Hour of Travel

Trip Distribution

As explained earlier, Trip distribution is the process of converting the trip production and attraction vectors generated in the trip generation process, and converting them into the matrix containing the number of trips going from one zone to the other. The number of trips that go from one zone to another are based on a perceived impedance of traveling from one zone to another. This impedance value is most commonly based on the travel time between zones. The method used for trip distribution in the Deming-Luna County model is the Gravity model.
The function used for calculation of impedance values from travel time skims is of the following form:

$$1/(U^b + c\,U^a)$$

where:

U is the value held in the skim matrix (usually travel time)
a, b, c are exponent values

The exponent values for various trip purposes used in the Deming-Luna County model are given in the table below:

Trip Purpose	Parameters		
	a	b	c
Home-Work	-0.5	1.6	25
Work-Home	-0.5	1.6	25
Home-Other	-0.5	2.0	50
Other-Home	-0.5	2.0	50
Non-Home	-0.5	7.5	75

Table 20 – Parameters used in the Impedance Function by Trip Purpose

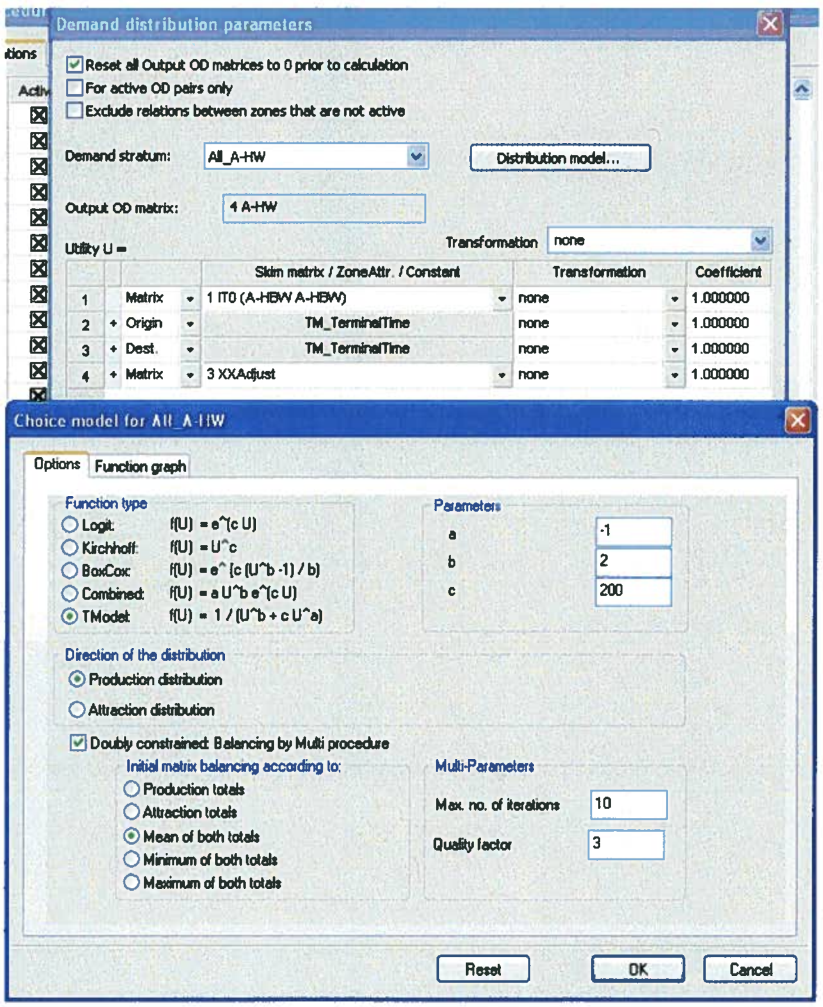


Figure 21 – Implementation of Trip Distribution of VISUM

Highway Assignment

Highway assignment is a process in which the trips distributed in the trip distribution stage are assigned on the highway network. Highway assignment thus involves distributing the trips going from one zone to another onto the various paths available between those zones. Highway assignment is an iterative process in which trips are successively loaded on links, as more trips are loaded on links, the travel time on the link changes due to higher level of congestion on the link. As a result of more trips, congestion also increases on the nodes due to higher conflicting movements. Link and node congestion is modeled in an assignment using link and node volume delay functions. These functions have been discussed in more detail later in the text.

This model uses the unique feature of Multi-Point Assignment (MPA). Traditionally in a transportation planning model, all trips begin or end at the zone centroid, a point in the center of the zone. In reality, trips begin at driveways, parking lots, and other places in the zone. MPA allows the modeler to define the access points for each zone. Loading points were defined and were adjusted during the calibration.

The series of calibration simulation runs involves review of the assumptions used to construct the model. During the assignment portion of the simulation, the assumptions for link speeds, capacities, and delay parameters are studied. Between each run, different parameters are evaluated and necessary adjustments made to the "rules" so that the desired results (i.e., calibration) are reached. Before any adjustments to the Deming-Luna County model parameters were made, they were justified either through the collected travel pattern data or the judgment of PTV America and the study team and their experience with transportation planning models and travel conditions throughout the model area.

Link Volume Delay Functions

Travel time on each individual link typically increases as the traffic volume on the link approaches capacity. Current research has shown that the amount of travel time increase depends on the functional classification of the link as well as the region and the behavior of the drivers using that link. VISUM offers the TMODEL methodology as one method to adjust the travel time increases on the link as the volume-to-capacity (V/C) ratio changes by functional classification of the link. This feature was used during the calibration process. The figures below show the screenshots of the menus used to implement a link volume delay function in VISUM.

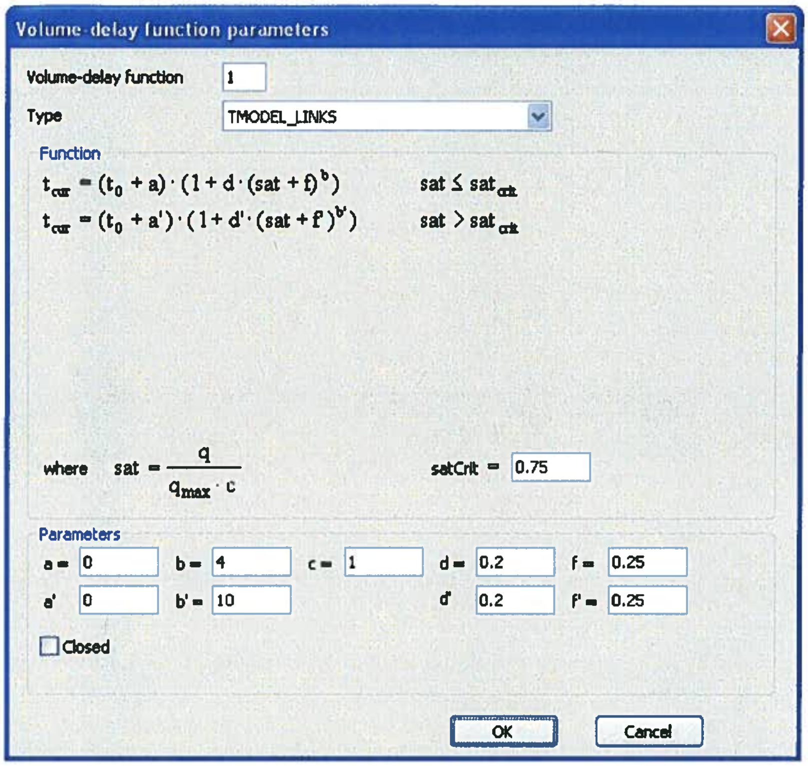


Figure 22 – Like Volume Delay Function Menu in VISUM

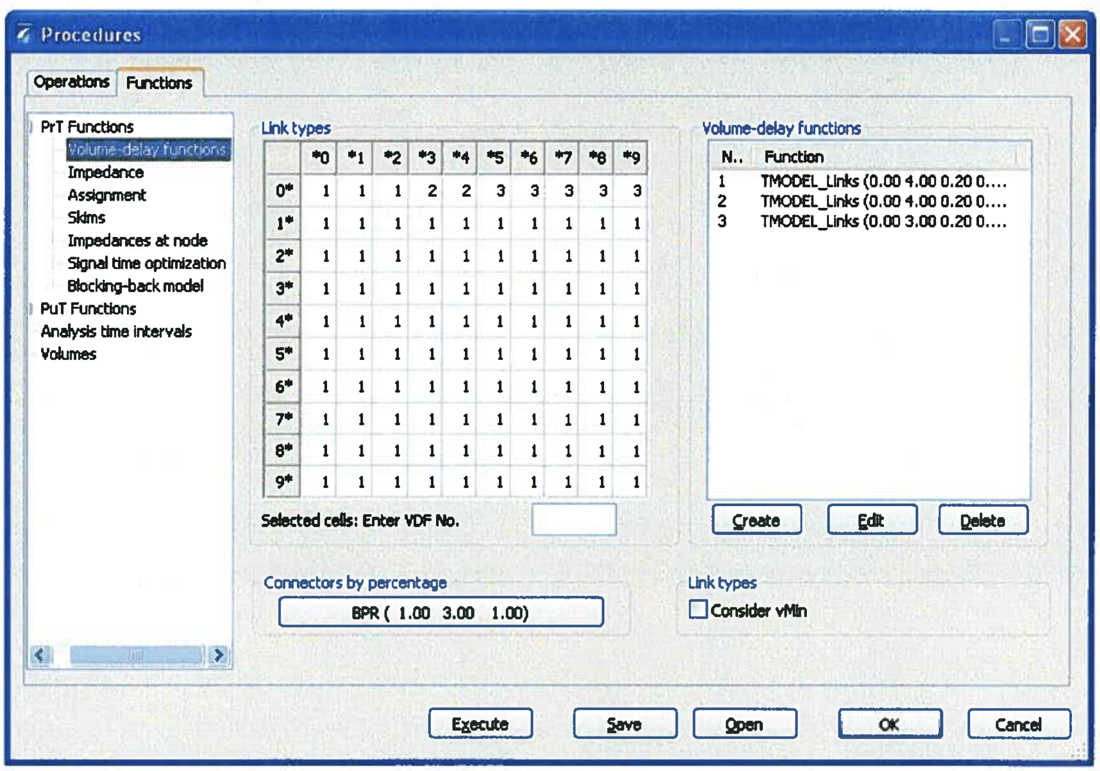


Figure 23 – Link Volume Delay Function Lookup Table Menu in VISUM

The values for various parameters used in the volume delay function are shown in the table below:

Parameter	VDF1	VDF2	VDF3
satCrit	0.75	0.7	0.7
a	0	0	0
a'	0	0	0
b	4	4	3
b'	10	10	10
c	1	1	1
d	0.2	0.2	0.2
d'	0.2	0.2	0.2
f	0.25	0.3	0.3
f'	0.25	0.3	0.3

Table 21 – Link Volume Delay Function Parameters

<u>Node Volume Delay Functions</u>

The delay caused by different classifications of intersection control must be defined to reproduce the delays that drivers perceive. The resultant extra travel time is dependent upon the volume-to-capacity ratio (V/C) and varies by class of the nodes. The figures below show the menus used for the implementation of node volume delay functions in VISUM.

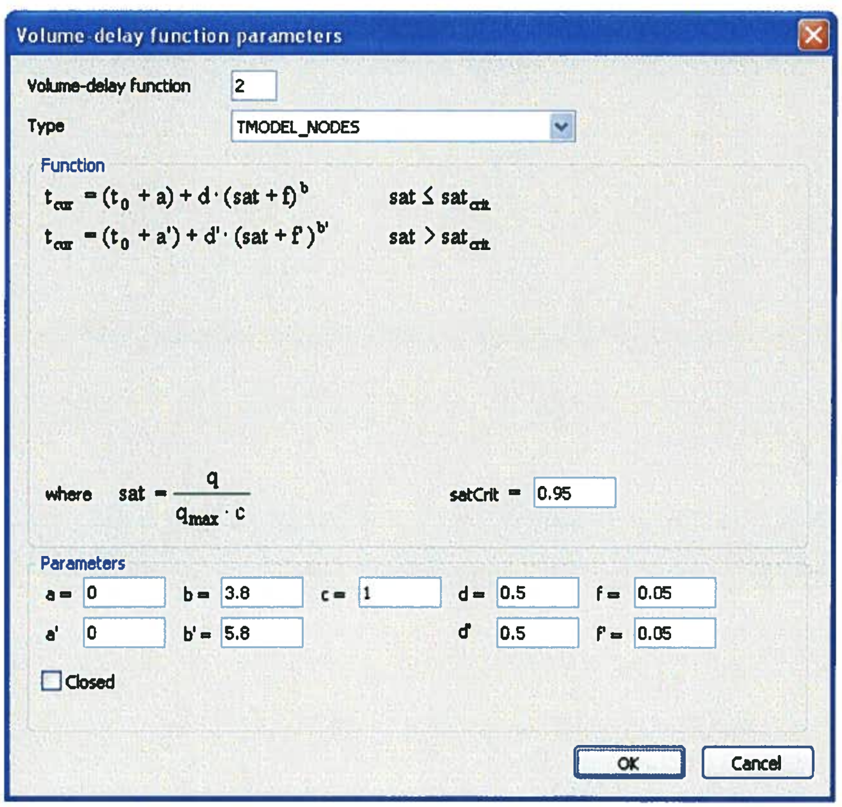


Figure 24 – Node Volume Delay Function Menu in VISUM

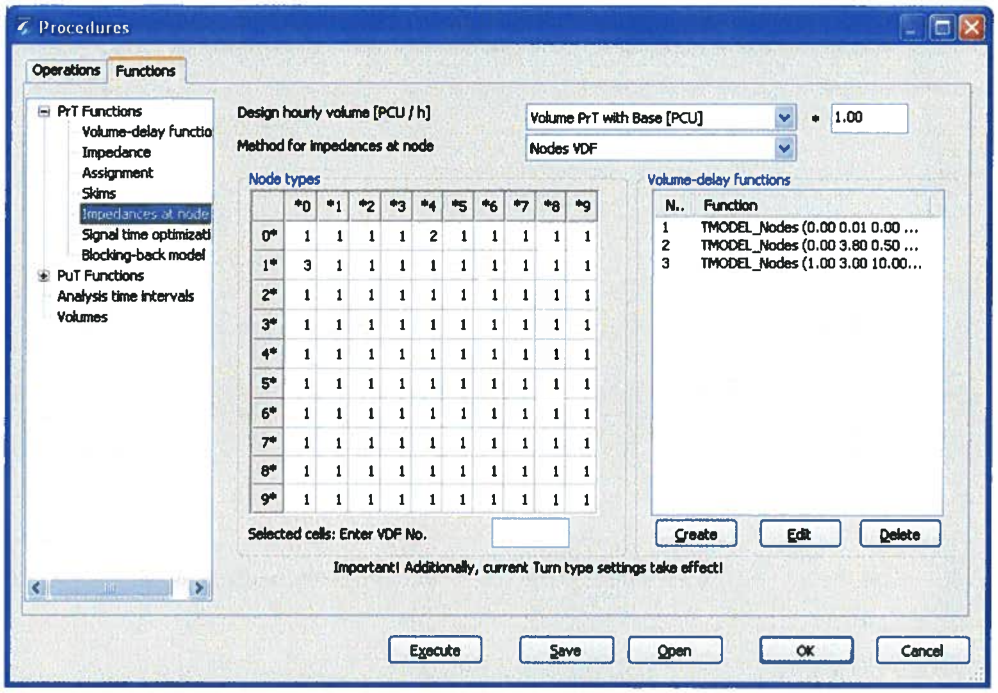


Figure 25 – Node Volume Delay Function Lookup Table Menu in VISUM

The table below shows the parameters used in the node volume delay function for the Deming-Luna County model.

Parameter	VDF1	VDF2	VDF3
satCrit	0	0.95	0.85
a	0	0	1
a'	0	0	2
b	0.01	3.8	3
b'	0	5.8	5
c	1	1	1
d	0	0.5	10
d'	0	0.5	15
f	0	0.05	0.15
f'	0	0.05	0.15

Table 22 – Node Volume Delay Function Parameters

5.7 Base Model Validation Statistics

The calibrated model is verified against the base-year traffic counts. The verification process is a series of post-simulation run analyses that are designed to analyze the accuracy and degree of confidence presented in the calibrated results. Included in these analyses are tests of the screenlines and comparisons of the traffic count data vs. modeled link volumes.

Link Volume Statistics

The figure below shows link ground counts on the X-axis and assigned volumes on the Y-axis. On the 'goal' line the assignment volume is equal to the ground count. The linear 'regression' line shows the best straight line estimate of the assignment volume for any count. The 'allowable' curves show the maximum allowable errors according to the graph discussed from NCHRP 255. Statistics calculated are:

No.Obs shows the number of count locations included in the analysis.

AvgVol is the average assignment volume for all analyzed links.

%RMSE, the percent root mean square error, a summary statistic representing the average assignment error, disregarding sign, in percent.

$$\%\ \text{RMSE} = 100 \times \frac{\sqrt{\dfrac{\sum(\text{Assignment Errors})^2}{\text{Number of Links}}}}{\text{Average Count}}$$

%In shows the percent of assigned volumes within the recommended allowable error curves from NCHRP 255.

R^2, the coefficient of determination or 'goodness of fit' statistic, shows how well the regression line represents the assignment data.

Slope shows the slope corresponding to the equation of the correlation line.

Y Int shows the Y-Intercept corresponding to the equation of the correlation line.

Overall shows the percentage by which the model volumes differ from the volume counts.

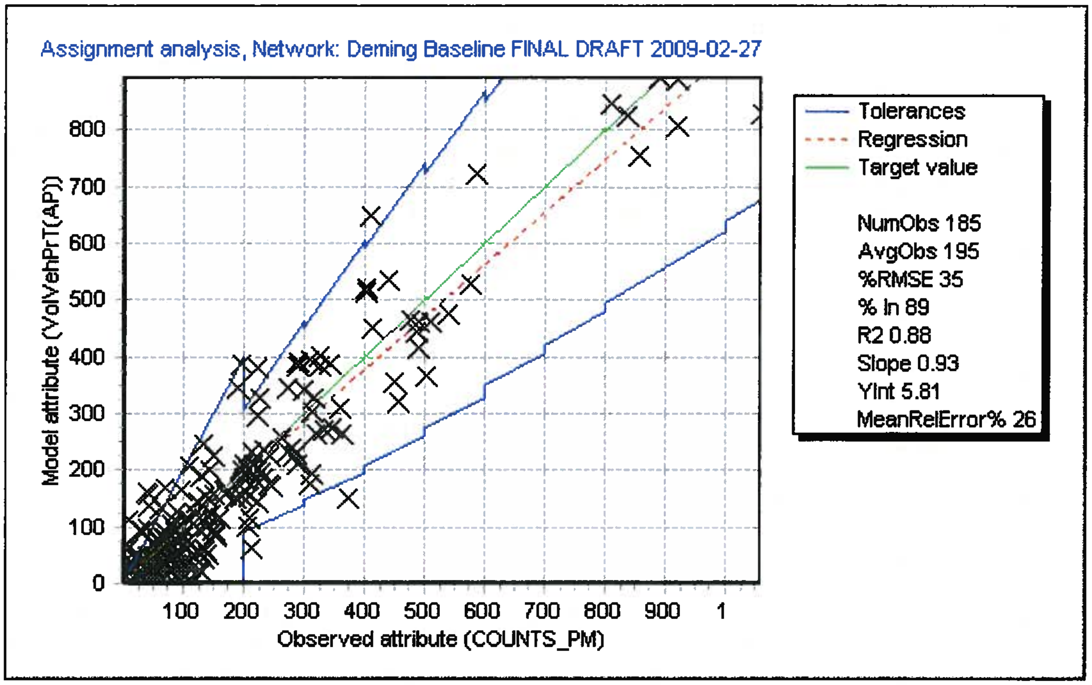


Figure 26 – PM Peak Hour Assignment Analysis

There are no national standards for R^2 or RMSE. However, there are guidelines that have been established by Caltrans for data used in air quality analysis. The guidelines recommend an R^2 of 0.88, a maximum RMSE of 35%, and a minimum %In of 75% for links classified as Arterials and above.

The comparison of the Deming-Luna County model statistics shows an R^2 of 0.88, an RMSE of 35% which meets the guideline of 35%, and a %In of 89% which is better than the guideline of 75%. These statistics are within the threshold of the guideline, so the model can be used for alternative scenario analysis.

5.8 Base and Future Model Results

2030 Travel Demand Forecast Scenario

Future Build-out Land Use Data

The projected urban area growth was provided to PTV in the form of a spreadsheet that listed the future build-out land use data. These data was checked against the base year land use data by PTV staff to ensure their validity and accuracy.

External Demand Growth

For the forecast year 2030, the external trips are projected separately for X-X, X-I and I-X demands. For the X-X demand, a commonly applied growth rate of 1.5 percent per annum is used for the Deming area. The traffic count data were collected in 2007 and the projected eXternal-eXternal demand growth rate is computed to be 40.8% over the base year.

The X-I and I-X trips for the forecast Year 2030 is estimated in synchronization growth with the internal trip productions and attractions, respectively. The same modeling procedures in VISUM are run with the forecast land use data and the ratios of total productions and attractions against their counterparts in the baseline model are computed. The following ratios were used as the growth factor for the I-X and X-I trips for both cars and trucks, respectively.

Car X-I	Car I-X	Truck X-I	Truck I-X
1.47	2.44	3.86	4.73

Table 23 – External Demand (X-I and I-X) Growth Factors for Cars and Trucks: 2007 to 2030

Future Year Model Run and Highway Assignment

The future year no-build scenario model is the updated version of the baseline model with the above updates of the future land use data and the external demand growth. The exact same model procedures were run to obtain the future year no-build scenario model. The following figure captures the highway assignment volumes colored by the V/C ratios scales.

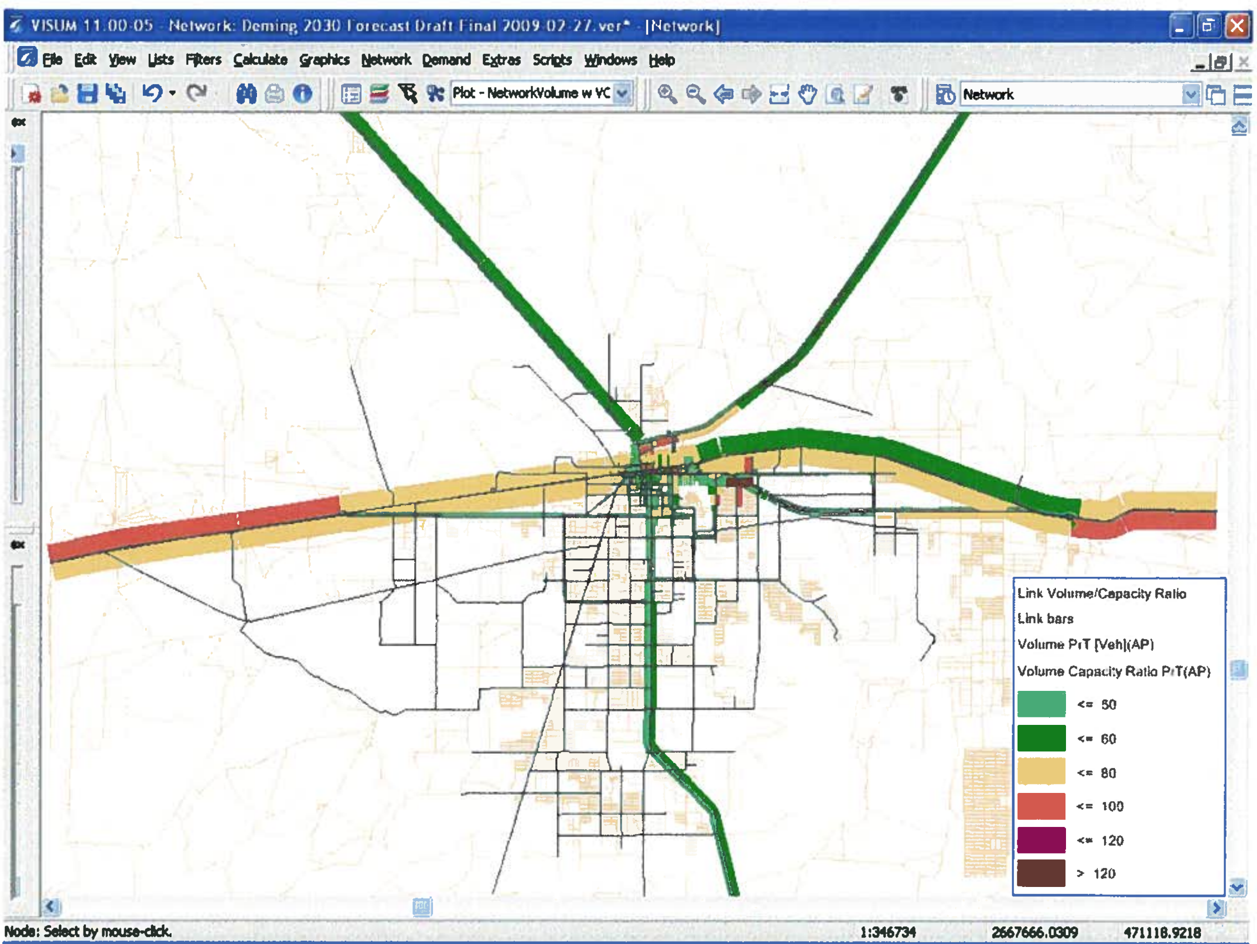


Figure 27 – Site Map

CHAPTER 6

TRAFFIC FORECAST ALTERNATIVES

6.0 TRAFFIC FORECAST ALTERNATIVES

Population growth in the Deming area, as documented in Section 3 of this report, has contributed to increased congestion in areas of town and is expected to increase. In addition, trends experienced at a national level have also been experienced at the local level, such as increased automobile ownership, more household members in the work force, longer commute trips, etc. Furthermore, potential developments are expected to influence traffic patterns including the construction of a new high school in the southwest part of town and the Peru Mill Industrial Park, which would draw traffic from other parts of town.

Several alternative scenarios were developed for analysis of the transportation issues identified in Section 4 of this report. The alternative scenarios consist of various combinations of proposed projects that were intended to address deficiencies in the roadway network and that were evaluated singularly or grouped according to logical development timeframes.

The travel demand model described in Section 4 of this report was utilized in the analysis with forecast population and employment data from Section 3. From this activity, conceptual roadway alignments, or *project concepts*, have been formulated to address the deficiencies of the roadway network. Project descriptions are provided for the purpose of developing preliminary project scopes from which full project packages can be formed. This information will be included in the transportation improvement program (TIP) and will be useful in the presentation of scoping reports, requests for proposals, and funding applications.

It should be noted that not all projects lend themselves to analysis with the travel demand model. For example, a pavement rehabilitation project would have negligible affects on the capacity of a corridor; therefore, those types of projects were not evaluated with the model but nevertheless included in the TIP for ongoing programmatic implementation. For each alternative scenario, the *planning method* was applied as described in the *Highway Capacity Manual (HCM)*. This methodology is appropriate for future conditions where intersection operating factors may not be available. Performance measures, or measures of effectiveness (MOEs), were tabulated in order to quantitatively compare alternative scenarios and to identify incremental benefits of successive improvements.

6.1 No-Build (Base Case) Scenario

A traffic simulation was performed for the base year 2008. The results were compared with actual traffic counts to gauge how reliable the travel demand model is at replicating traffic patterns. Section 4 of this report describes the results of the travel demand model calibration process and concludes that the model reliably replicates traffic conditions for the Deming area.

The travel demand model was utilized to analyze forecast conditions if no improvements were made to the transportation network, referred to as the "no-build" or base case scenario. This scenario reflects the existing roadway network as presented in Section 2 and projected population growth as presented in Section 3 of this report. Figure 32 in Appendix C presents the areas of expected growth as determined by the Technical Advisory Committee (TAC) based on recent development trends. The resulting traffic projections represent a significant increase in travel activity which is concentrated near the growth areas.

Figure 2 in Appendix C present the capacity analysis summary for network links (roadways). Volume to capacity (V/C) ratios greater than one (1) indicate that the traffic volumes have exceeded the available capacity of the roadway. With a few exceptions, the roadway network is expected to operate at satisfactory level of service (LOS) through the forecast year, indicating that some reserve capacity exists within the existing transportation network to accommodate much of the projected growth.

Forecast conditions at the nodes (intersections) present a different story. Many intersections are projected to operate below satisfactory levels, particularly along the NM 11, Country Club Rd., Gold St. and Pine St. corridors. These results indicate that remedial work will be required at the locations with LOS E or LOS F depicted in Figure 1.

6.2 Analysis of Alternates

Five traffic forecast alternates were identified and evaluated with the travel demand model. The following paragraphs provide detailed descriptions for these test networks. The results are compared and further recommendations are provided for evaluation of the project concepts.

Committed projects consist of improvements that were under construction, completed after model development but before completion of this study, and *programmed* projects that would be implemented within a year of this study. These projects are summarized in below. Some of the projects were not reflected in the travel demand model as they did not impact the network capacity; for example, a pavement rehabilitation project would not improve roadway capacity and thus would not be modeled.

6.2.1 Alternate Scenario 1: Truck Bypass – Segments A(1 - 5) & B

The proposed route would primarily serve to remove heavy commercial traffic from downtown Deming, predominantly along NM 11. The designated 'Segment A(1 - 5)' route would be south of I-10 and would avoid residential areas as much as possible while providing access to the existing Deming Industrial Park. 'Segment B' constitutes a northern extent of the proposed truck bypass providing an alternate access across I-10 and the railroad tracks while providing access to the Peru Mill Industrial Park and regional routes US 180 and NM 26. A more detailed description is provided below.

The results of this analysis indicate that the travel demand for the proposed truck bypass is moderate, and would provide moderate relief to NM 11 as well as to I-10. Several factors may affect the potential use of the bypass:

- the proposed bypass is two lanes and utilizes existing two-lane routes;
- the greater the distance from NM 11 the lower the benefit to congestion relief;
- a circuitous route may also reduce the benefit to congestion relief due to indirect travel;
- the limited number of crossings at I-10 and the railroad tracks limits opportunities for use of other routes.

Nevertheless, the proposed truck bypass facility shows moderate travel demand while addressing the safety concerns regarding heavy commercial traffic in the downtown area. It should be noted that the projected traffic represents average conditions throughout the year and do not reflect the truck traffic upsurge during harvest season.

6.2.2 Alternate Scenario 2: Truck Bypass – Segments A(1 - 5) & C

Alternate Scenario 2 provides the southern portion, Segment A(1 - 5), as described above, coupled with an alternative alignment for the northern portion, Segment C, which would extend as a one-way parallel frontage road system along I-10. Access to the north side of I-10 to the Peru Mill Industrial Park as well as US 180 and NM 26 would occur via Gold St./US 180.

This alternate provides additional reduction to vehicular delay over that of Alternate 2. This is likely due to the higher-speed access along I-10. The feasibility of constructing the two-way frontage roads is discussed in further detail in Section 6.4 below.

6.2.3 Alternate Scenario 3: Short-Range Program

Projects that are intended to address needs of a somewhat immediate nature, or for which planning is already under way, were grouped as near-term projects in the travel demand model. These included congestion relief to existing facilities and additional capacity in growing areas. The projects are summarized in Section 6.3 below and tabulated in Table 25.

The modeled results for this alternate indicated a significant overall reduction in intersection delay and a moderate improvement in the network-wide v/c (as summarized in Table 24). However, intersections along the NM 11, Country Club Rd., Gold St. and Pine St. corridors continue to exhibit unacceptable levels of service (LOS) and require mitigation. Level of service (LOS) plots are contained in Appendix C of this report.

6.2.4 Alternate Scenario 4: Intermediate Range Program

Intermediate range projects, as depicted in Table 26, are intended to address needs that are less critical than the short-term projects. Additional congestion relief to existing facilities and additional capacity in growing areas would be addressed with these projects. The projects are summarized in Section 6.4 below.

6.2.5 Alternate Scenario 5: Long-Range Program

The completion of the remaining proposed projects are included in this alternate scenario, which are described in this section and presented in Table 27. The results indicate further improvements in traffic operations as would be expected. As with Alternate Scenarios 3 and 5, intersections would continue to operate at unsatisfactory levels of service without further mitigation.

6.3 Performance Measures

Performance measures for each alternative are summarized in Table 24 below. This data provides a basis for comparing the various alternates and the results of incremental improvements over time. Traffic benefits, such as reduced congestion and improved operations, will be evaluated in the context of each of the proposed project concepts.

For each modeled scenario, the following data are presented

- Vehicle-miles traveled (VMT) represents the sum for the entire network of the product of vehicles multiplied by the distance traveled. A higher number indicates greater travel activity and/or opportunity
- Vehicle-hours of traveled (VHT) is the sum for the entire network of the product of vehicles multiplied by their time traveled. As network delay increases, so does the VHT value.
- Total intersection delay is the sum total across the network of all cumulative intersection delays. Higher values indicate greater delays at intersections.
- Level of service (LOS) average delay represents the overall intersection LOS delays computed at every intersection and then averaged over the network. Higher values indicate that more intersections experience greater delays

- Average node volume-to-capacity (V/C) ratio represents the average over the entire network of V/C for each intersection. The lower the number, the greater amount of capacity is available at the intersections.

Scenario	VMT	VHT	Total intersection Delay	LOS Avg Delay*	Avg Node V/C
Base	147585	2551	12 hours 20 min	10 sec	0.12
Forecast Base	285580	58860	248 hours 39 min	1 min 11 sec	0.24
Alternative 1	285702	56625	265 hours 38 min	1 min 18 sec	0.15
Alternative 2	285606	57074	154 hours 34 min	1 min 7 sec	0.14
Alternative 3	287017	57095	107 hours 43 min	1 min 4 sec	0.13
Alternative 4	286945	57155	215 hours 55 min	1 min 8 sec	0.14
Alternative 5	286442	57068	183 hours 17 min	1 min 7 sec	0.14

Table 24 – Alternatives Analysis Performance Measures

Several conclusions can be drawn from the summary results:

- The Base scenario modeled for year 2008 experiences low delays, although several intersections (nodes) are roadway segments (links) experience significant delays as presented in Figure 1 of Appendix C.
- The Forecast Base represents projected traffic conditions on the existing network as a baseline against which alternative scenarios may be compared. Results contained in Table 24 indicate dramatic increases in delay which would result in inferior operations if no further improvements are made to the network
- All of the 'build' alternates show operational improvements over the forecast 'no-build' conditions.
- For the Transportation Improvement Program (TIP), incremental project additions result in mildly progressive improvements in performance measures with the addition of new capacity.

6.4 Evaluation of Project Concepts

The project team has identified and evaluated a number of projects which consist of intersection improvements, addition of travel lanes and new roadways within the project area to address deficiencies in the network. Also included are other important infrastructure improvements such as pavement rehabilitation projects. These projects are described in more detail below which can be used for the development of a Transportation Improvement Program (TIP).

Committed Projects

Committed Projects are improvement projects within the project network that were under construction and were completed after the development of the model which can be seen in Figure 28 which can be found at the end of this section. *Programmed* projects are projects that would be implemented within a year of the study. These projects include:

NM 26: From Deming to Hatch

A. **Project Description.** This project involves a stretch of road that is used by many as a shortcut to Interstate 10 from Interstate 25. This project consists of the addition of 8' shoulders, pavement rehabilitation, drainage structure upgrades, traffic signs and striping. This project begins just short of the intersection of US 180 and NM 26 and continues to Hatch, New Mexico. At the time of this report, the last phase of the project is under way and is scheduled to be complete in June of 2010.

   This project has GRIP and STIP funds associated with the project.

B. **Costs**. $14.44M Right-of-way – N/A

I-10 Pavement Rehabilitation

A. **Project Description.** This project is a NMDOT funded project that consists of pavement rehabilitation of Interstate 10 from west of the west on ramp to east of the east on ramp within the Deming City limits. The existing asphalt within this section has exceeded its design life and will be milled and overlaid with new asphalt. Both east and westbound lanes within this corridor will be reconstructed. This project is currently under construction at the time of this report.

B. **Cost.** $7.2M Right-of-way – N/A

Florida Drainage Improvements

A. **Project Description.** This MAP project involves drainage and street improvements beginning at the intersection of NM 11 and Florida Street proceeding west to Iron Street. This project will improve and widen the ROW ditch along the north side of Florida Street and reconstruction of each intersection approach along this corridor to accommodate new concrete valley gutters. Also new concrete will be installed in the ROW on the slopes at the intersection of Florida Street and NM 11 to minimize friction as water flows along Florida Street under NM 11. The anticipated completion date for this project is September of 2009.

B. **Cost.** $270,000 Right-of-way – N/A

Raymond Reed Boulevard

A. **Project Description.** This MAP project involves a re-alignment of the existing Raymond Reed Blvd. where it intersects with Country Club road. This realignment will begin about XX feet from the existing intersection and include a reverse curve north to intersect with Florida Street. This will improve the safety of this offset intersection by forming a four-way intersection alignment. The existing road will be obliterated.

Along with the intersection improvements, drainage improvements will also be included A new crossing will be installed to convey water off of Florida to cross underneath Country Club Road via new culverts from the north side of Florida Street to the east side of Country Club Drive. The anticipated completion date is September of 2009.

B. **Cost.** $650,000 Right-of-way – N/A

Pear Street and Country Club Road Intersection Improvements

A. **Project Description.** The proposed Municipal Arterial Program (MAP) project is for street and drainage improvements at the intersection of Pear Street and Country Club Road. The current drainage system conveys storm water under Country Club road which has been deteriorated over the years. The project will reconstruct the east end of Pear Street slightly north of the intersection of Country Club Road. Also included are drainage improvements at the intersection which includes replacement of the existing culverts. Country Club Road will be widened to allow for a dedicated left turn lane at Pear Street.

B. **Cost.** $281,000 Right-of-way – N/A

Spruce Street & 8th Street Intersection Improvements

A. **Project Description.** This project entails the reconstruction of the intersection of Spruce and 8th Streets. Currently the existing concrete intersection has deteriorated and is in need of full reconstruction. This LGRF funded project is within the GRIP 2 funded project which reconstructs Spruce Street from NM 11 to Pine Street. The extents of the project is begins on mile (0.42) to mile (0.45) on FL 4331.

B. **Cost.** $75,000 Right-of-Way – N/A

US 180 from Deming, NM to Bayard, NM

A. **Project Description.** This GRIP funded project is for pavement rehabilitation along US 180 from Deming, NM to Bayard New Mexico. The inclusion of intersection improvements of NM 26 and US 180 is also part of this project. The widening of existing shoulders and passing lanes are also part of this project. The scheduled completion date for this project is November of 2010.

B. **Cost.** $41M Right-of-way – $57,000

NM 11 from Deming NM to Columbus, NM

A. **Project Description.** This GRIP funded project is for pavement rehabilitation along NM 11 from Deming, NM to Columbus, NM. Also included in this project is widening of existing shoulders to meet current NMDOT standards. The scheduled completion date of this project is August 2010.

B. **Cost.** $10.2M Right-of-way – N/A

Pearl Street Extension

A. Project Description. This STIP funded project is for the extension of Pearl Street. The existing pearl street currently dead ends at the existing frontage road on the Southside of the interstate. This project will allow for an extension of Pearl Street to intersect with 1st street. This extension will entail construction of a new segment of Pearl Street as well as an at-grade railway crossing.

Coordination with the BNSF and property owners will need to be included.

B. Cost. $1M Right-of-way – N/A

Spruce Street Reconstruction

A. Project Description. This project includes pavement reconstruction of Spruce Street from Columbus Road (NM 11) to Pine Street. This GRIP 2 funded project is a 1.1 mile stretch of Spruce Street which includes pavement reconstruction along with striping and signage improvements throughout the corridor. Minor intersection and geometric improvements to the side street intersections will also be included in this project. Some specific examples of projects within this corridor is the realignment of NM 418 (Old Lordsburg Highway) at the intersection of Spruce Street. The existing intersection currently is at a skewed angle which limits sight distance and safety at this location. The intent of this project will be to realign NM 418 to a more desirable angle which will increase sight distance and safety for both vehicle traffic and pedestrian traffic. Barrier curb and gutter will be added on the east end of the intersection where the existing road was located. The existing roadway outside the improved area will be obliterated and a new driveway will be added for existing business access. An additional project is the realignment of 13th Street approximately 300 ft from the intersection of 13th Street on Spruce Street. This realignment will improve sight distance and safety of the intersection for both vehicle and pedestrian traffic. The proposed design incorporates new curb and gutter and wheel chair ramps at the intersection. The existing asphalt is deteriorated and will be obliterated. Construction to be complete in March 2010.

B. Cost. $3.4M Right-of-way – N/A

Short Term Improvements (2010 – 2015)

Short term projects as mentioned in section 6.2.3 are intended to be projects that are more immediate in nature. These projects are slated to begin within the next five (5) years and are intended to be projects that are currently in the planning stages and to provide congestion relief. Figure 30 outlines the projects that are slated to be complete under this time frame.

Cedar Street Extension 4

A. Project Description. This project is the final phase in the Cedar Street extension project. The first three phases constructed a new Cedar Street road located behind the existing Wal-Mart super store and consisted of a two and three lane section which ends at the Motel / I-10 access road. This project allows for vehicles to continue east on the old Cedar street frontage road and connect with the new Cedar Street road through a right turn condition.

B. Cost. $1.8M Right-of-way – N/A

Truck Route Segment A

A. **Project Description.** Five alignment alternatives were developed for consideration to alleviate heavy commercial truck traffic within the downtown area; these may be evaluated, along with other potential alternatives, according to the *NMDOT Location Study Procedures*. These preliminary alignment alternatives provide a starting point for a detailed evaluation of potential truck bypass options under the *NMDOT Location Study Procedures*. Each option described below can be seen in Figure 29. This process is designed to ensure compliance with federal guidelines if federal funds are solicited for the projects.

The first option (*Option A1*) will run north on NM 11 and east on Solana Road to Country Club Road. This option will utilize Country Club Road to Pine Street. At the Pine Street intersection, trucks will head east to access I-10 via exit 85. Access to the existing industrial site can be obtained via J Street. Improvements to Solana Street include pavement rehabilitation and shoulder widening. A center turn lane is proposed along Country Club Road to improve capacity and safety by removing turning vehicles from the through lanes. The total project length along Solana Road and Country Club Road is approximately 4 miles.

An alternative alignment (*Option A2*) would utilize NM 11, Solana and Country Club Road as mentioned in Option A1, however trucks will access the industrial site via J street and exit using Tapia Road. Trucks will turn north on Tapia Road to NM 549, head north on East Pine Street to I-10. This project will include pavement rehabilitation along Solana Road, Country Club Road, J Street and Tapia Road along with shoulder widening. Some improvements will need to be made to the intersections of Solana and Country Club Road, Country Club Road and J Street, and J Street and Tapia Road. The total project length for Option A2 is 5 miles.

A third alternative alignment (*Option A3*) would also utilize NM 11, Solana and Tapia as mentioned in option A2; however, the north/south alignment would utilize McCan Road. This proposed bypass alignment would use NM 11 to Solana Road, then head east to McCan Road. Trucks would travel on McCan Road until it intersects with J Street. Trucks will then be able to go east on J Street to Tapia Road and continue on the same path to the interstate as option A2. This project will include pavement rehabilitation along Solana, McCan Road, J Street, and Tapia Road along with shoulder widening. Intersection improvements will need to be evaluated at the intersections of Solana and NM 11, Solana and McCan Road, McCan Road and J Street, as well as J Street and Tapia Road. The total length of the project is approximately 7.4 miles

A fourth alternative alignment (*Option A4*) should also be considered as a possible alignment. This alignment will utilize the NM 11 to Solana Road as in Option A2 and A3; however, trucks will continue along Solana Road until Tapia Road. Trucks will then turn north on Tapia to NM 549 and continue to the interstate. Trucks will be able to access the existing industrial site via J Street. Roadway and pavement rehabilitation will be needed along Solana from NM 11 to McCan, Tapia from Doña Ana to NM 549. Full roadway construction along with right-of-way acquisition will be needed from McCan Road to Tapia Road along Solana Road and along Tapia from Solana to Doña Ana. Intersection improvements will be need to be evaluated at the intersections of Solana and NM 11, Solana and Tapia, and Tapia and J Street. The total length of this project is approximately 7.4 miles.

A fifth alternative alignment (*Option A5*) would also utilize the existing McCan Road as a viable alternative to access the existing industrial site; however, Option A3 would utilize Rockhound Road. Trucks would turn east on Rockhound Road to McCan Road and head north to J Street. From that point they would turn east to Tapia Road and continue on as described in Option A3 to the interstate. Improvements to intersection will need to be evaluated at NM 11 and Rockhound Road, McCan and Rockhound Road, McCan and Solana, McCan and Doña Ana, McCan and J Street, J Street and Tapia. The project will include pavement rehabilitation along Rockhound Road, McCan Road, J Street, and Tapia Road along with shoulder widening. The total length of the project is approximately 9.25 miles.

A signal warrant analysis will need to be conducted at the intersection of Solana and Country Club Road for options A1, A2, A3 and A4. If warranted, permissive left turn lanes will need to be incorporated along with dedicated left turn lanes on Country Club Road. For the intersection of Dona Ana and Country Club Road, dedicated left turn lanes should be added to Doña Ana.

B. Cost. Option 1 - $11.7M — Right-of-way - $75,000

Option 2 – $15.3M — Right-of-way – N/A

Option 3 – $ 22.6M — Right-of-way – N/A

Option 4 – $ 26.5M — Right-of-way – N/A

Option 5 - $ 34.2M — Right of way - $187,500

Country Club Road Phase I

A. Project Description. This proposed project involves increasing Country Club Road from an existing two lane facility to a three lane facility. This one mile section will be improved to include a continuous left turn lane to improve traffic flow and increase safety. The extents of this project will be from E. Pine Street to Florida Road. Some drainage improvements will be added to this project as well as pavement rehabilitation, shoulder widening and pedestrian facilities. A multi-use pedestrian facility will be included as part of this project from north of Pit park to Florida Road. This segment of road is also included in alternative alignment one of the Truck Bypass project. If alternative alignment 2 is selected, this should be considered a standalone project.

B. Cost. $3.7M — Right-of-way – N/A

Gold Avenue Improvements

A. Project Description. This project involves minor geometric improvements and traffic signal modifications along Gold Street from Spruce Avenue to Interstate 10. Phasing of the traffic signal at Spruce Street and Gold Street will need to be evaluated to allow for permissive left turn lanes to improve the current level of service at this intersection. The addition of left turn lanes 300 feet on all approaches and right turn lanes on all approaches are also part of this proposed project. Also, left and right turn lanes are also to be included on Gold Street at the intersection of Gold and Cedar

Street. The existing signs located within this corridor should also be evaluated. Any signs that do not meet current design criteria or are no longer valid should be removed and salvaged.

B. Cost. $800,000 Right-of-way – N/A

8th Street Improvements Phase 1

A. Project Description. This project includes pavement reconstruction along with sidewalk facilities along 8th Street from E. Pine Street to Florida Street. This one mile stretch of road is the first phase of improvements proposed for 8th Street. Within this corridor a high number of pedestrians are present and sidewalks will enhance the safety and conveyance of these pedestrians. Geometric and safety improvements to the intersection of Pine Street and Spruce Street will also be included

B. Cost. $3.8M Right-of-way – N/A

Intermediate Improvements (2015 - 2020)

Intermediate projects are intended as projects that are viewed as less critical than the short term projects. These projects include alleviating traffic congestion in growing areas as well as adding additional capacity to the existing corridors. Figure 30 outlines the projects that are slated to be complete under this time frame.

Arrowhead Drive

A. Project Description. This project involves 0.70 miles of pavement reconstruction, drainage improvements and improved signing and striping along Arrowhead from US 180 to the existing Luna County Energy Facility. The existing intersection is currently at a skew with US 180 which hinders the sight distance and is a safety concern for users. Geometric improvements to the intersection will also be included in this project.

B. Cost. $2.5M Right-of-way – N/A

Pine & 8th Street Improvements

A. Project Description. Minor geometric modifications, consisting of new turn lanes are proposed at the intersection. The forecast output indicates overall acceptable LOS for the intersection, however, a detailed traffic analysis is recommended to evaluate the AM peak and delays attributed to turning vehicles.

B. Cost. $500,000 Right-of-way – N/A

Country Club Road Phase II

A. Project Description. This project is a second phase of a short term project described above. The existing two lane facility will be increased to a three lane road with a continuous left turn lane to maintain traffic flow and improve safety. The extents of this phase will begin where Phase I ended, Florida Road, and extend to Dona Ana Road. This one mile stretch of Country Club Road will include drainage improvements, pavement rehabilitation, shoulder widening and pedestrian facilities. A multi-use pedestrian facility will be included as part of this project from Florida Street to Dona Ana Road.

Within this corridor, both options of the Truck Bypass Project are included. For option one, the corridor is entirely within the project limits, and option two, it is halfway within the County Club Road Phase II project. This project description will need to be altered based on the location of the proposed truck bypass.

B. Cost. $4.9M Right-of-Way – N/A

Cody Road Improvements

A. Project Description. This project involves the pavement reconstruction and intersection improvements along Cody Road between Walnut Street and Pine Street. This 1.1 mile corridor will involve full evaluation of existing conditions and recommendations for pavement reconstruction and improvements.

B. Cost. $3.72M Right-of-way – N/A

Pine Street Improvements

A. Project Description. This project involves minor geometric and intersection improvements along Pine Street between the Wal-Mart entrance and Country Club Road. An additional left turn lane will need to be added to the southbound approach from the Wal-Mart entrance to Pine Street. The existing model shows that significant delay will be experienced for this approach and an additional left turn lane is warranted. At the intersection of Pine and Country Club Road, 400' dedicated left turn lanes will be added along with 200' right turn lanes. This 0.75 mile stretch of road will include pavement reconstruction, drainage improvements, and minor intersection reconstruction.

B. Cost. $3.715M Right-of-way – N/A

Florida and NM 418 Geometric Improvements

A. Project Description. The project involves geometric improvements and traffic control at the intersection of Florida and NM 418 (Old Lordsburg Highway). The existing intersection occurs at a severe skew angle which affects sight distance and turning maneuvers, presenting safety concerns. The intersection should be realigned to improve turning geometry and sight distance. Although the traffic forecast resulted in an acceptable LOS for the peak period, a more detailed traffic study should be performed using actual traffic counts near the new schools to account for 'off-peak' traffic conditions; this evaluation should include a signal warrant study. Improvements will include reconstruction of the existing intersection, realignment of the approaches, drainage, signing/striping, and possible new traffic controls.

B. Cost. $1.5M

Exit 85 Interchange Reconstruction

A. **Project Description.** This project involves the rehabilitation and/or reconstruction of Exit 85 along interstate 10. The existing interchange does not meet current geometric standards and may not have adequate vertical clearance, posing potential safety concerns. In addition, the forecast volume-to-capacity (V/C) ratio along the I-10 mainline through Deming is expected to approach 0.8, indicating fewer opportunities for entering and exiting vehicles at the interchange ramps. Furthermore, the development of truck bypass Segment B would be improved by realigning the overpass and extending it northward. A grade separation at the railroad track would be required due to the proximity of the interchange bridge and the need to provide an unimpeded railroad crossing alternative (the grade separation is included as a Truck Route Segment B project development cost).

An option to partially replace the interchange would utilize the existing south ramps with the addition of acceleration and deceleration lanes, and replace the north ramps with tight diamond ramps rising to the overpass grade. However, a full range of potential alternatives should be evaluated through an alignment study following the *NMDOT Location Study Procedures,* along with an Interstate Justification Report (IJR) submission. This project should be developed independently or in conjunction with one of the proposed truck route projects.

B. **Cost.** $15.2M Right-of-way - $200,000

Truck Route Segment B, C or D

A. **Project Description.** This project involves an extension of the proposed truck route described in Section 6.4 of this report. Two alignment alternatives were developed for evaluation for the following purposes: 1) to alleviate heavy commercial truck traffic within the downtown area; 2) to provide alternative access to the north side of town in the event of flooding or other obstruction of Gold Street (US 180) at I-10; 3) to provide access to the Peru Mill Industrial Park; and 4) to provide access to undeveloped lands. These alternatives along with other potential alignment alternatives should be evaluated according to the *NMDOT Location Study Procedures*.

Truck Route Segment B. This extension will involve the construction of an additional leg of the interchange of I-10 and East Pine Street (Exit 85), located on the east end of the City. The alignment begins at the intersection of I-10 and East Pine Street and continues northwest to intersect with US 180 at Chaparral Road (see Figure 29). Trucks will cross US 180 for access to the proposed new Peru Mill Industrial Park located in the northwest part of town. This 3.3 mile alignment will provide truck traffic access to both industrial sites while reducing truck congestion in downtown Deming. The improvements will include construction of two-12' lanes, 8' shoulders, and major drainage improvements including a crossing of the Mimbres River. This option does not include an I-10 interchange upgrade but does include a grade separation at the railroad tracks.

Truck Route Segment C provides an alternative to *Truck Route Segment B* and uses some existing infrastructure and Right-of-Way to gain access to both industrial sites. It will begin with the improvements of the existing frontage roads on the north and south side of Interstate 10, extending eastward from the existing termini to the Exit 85 interchange. The route would then be designated along US 180 to the Peru Mill Industrial Park or other regional destinations. This 2.25 mile corridor will continue with the roadway section that already exists for the frontage road, two 12' lanes. Also included will be drainage improvements and upgraded intersection geometry at Gold Street (US

180). Minor Right-of-Way would be anticipated adjacent to the interstate ramps to accommodate widening or maintenance easements. The upgrade of the I-10 interchange is not included in the cost of this portion.

Truck Route Segment D would provide access from the existing interchange to NM 26. This 1.6 mile stretch would be a new roadway which would need to be raised near the interchange in order to meet grade. The exact location where it would intersect with NM 26 will need to be further studied along with right of way acquisition and environmental clearances. This road will be anticipated to be a two-12' lane facility with shoulders. A drainage study will also need to be conducted due to the crossing of the existing wash.

B. Cost. Option B: $14.6M — Right-of-way - $1.42M

Option C: $10.4M — Right-of-way - $100,000

Option D: $8.0M — Right-of-way - $120,000

Long Term Projects (2020 – 2025)

Long term projects is a continuation of the improvements of the traffic operation system within the City of Deming. Figure 30 outlines the projects that are slated to be complete under this time frame.

Hermanas Grade and NM 418 (Old Lordsburg Highway)

A. Project Description. This project involves geometric improvements to the intersection of Hermanas Grade and NM 418. The existing intersection is at an angle which partially limits the sight distance and is a safety concern. The intersection should be realigned to improve sight distance and turning angles. The traffic forecasts resulted in an acceptable LOS for the peak period; however, a more detailed traffic study should be performed using actual traffic counts near the new schools to account for 'off-peak' traffic conditions. Improvements will include reconstruction of the existing intersection, full pavement rehabilitation, drainage improvements, and improved signing and striping.

B. Cost. $960,000 — Right-of-way - $30,000

Pear Street Extension Phase I

A. Project Description. This project involves construction of a new roadway between NM 418 (Old Lordsburg Highway) and Hermanas Grade on Pear Street. The existing 0.65 mile dirt road will be reconstructed with asphalt pavement, drainage improvements, and improved signing and striping. The existing turning movement configuration will remain the same however a 500 foot left turn lane will be added to convey traffic to Hermanas Grade more efficiently.

B. Cost. $2.21M — Right-of-way - $60,000

8th Street Improvements Phase II

A. **Project Description.** This project is an extension of a previously mentioned project. This phase is along 8th street from Florida Road to Doña Ana road. This one mile stretch of 8th street experiences a large amount of pedestrian traffic thus the need for sidewalks along the corridor. Geometric, pavement reconstruction and drainage improvements will also be included in this project.

B. **Cost.** $3.1M Right-of-way – N/A

Pear Street Extension Phase II

A. **Project Description.** This project is an extension of phase one described in the intermediate project list. Pear Street will be improved from NM 418 (Old Lordsburg Highway) to Skyview Road. This existing one mile dirt road will be improved to a two lane paved surface with 8' shoulders, drainage improvements, and updated signing and striping.

B. **Cost.** $2.14M Right-of-way – $125,000

Peru Mill Access

A. **Project Description.** Traffic Signal evaluation and geometric improvements for the proposed industrial park access at US 180.

B. **Cost.** $750,000

NM 11 Improvements

A. **Project Description.** This project involves geometric improvements along NM 11 (Columbus Road) from Doña Ana road to Walnut. This 1.2 mile stretch of roadway connect the two areas that were previously mentioned under the programmed projects and the intermediate projects. The improvements will include widening to a 3 lane section, pavement reconstruction, drainage improvements, and updated signing and striping.

B. **Cost.** $4.8M Right-of-Way – N/A

Florida and 8th Street Improvements

A. **Project Description.** Minor geometric modifications, consisting of new turn lanes are proposed for this intersection. The forecast output indicates overall acceptable LOS for this intersection, however, a detailed traffic analysis is recommended to evaluate the AM peak and delays attributed to turning vehicles.

B. **Cost.** $850,000

NM 549 and NM 377 Roadway Improvements

A. **Project Description.** The traffic forecast indicated congestion building at this intersection over the forecast period. This project would encompass of a traffic signal evaluation and geometric improvements, consisting of potential turn lanes and/or enlarged return radii for better turning maneuvers.

B. **Cost.** $1.5M

Tapia Road and NM 549 Realignment and intersection improvments

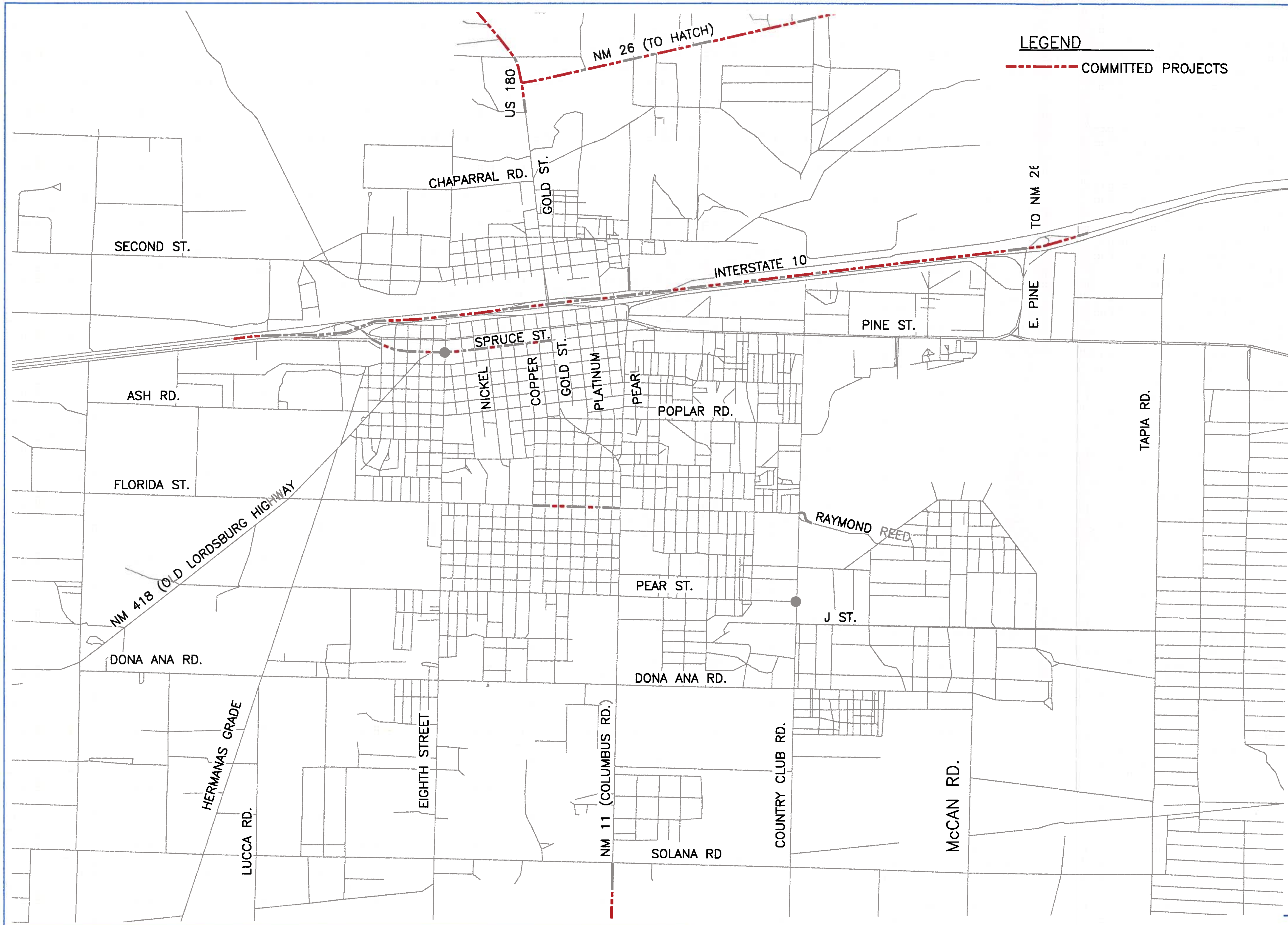
A. **Project Description.** This project involves realignment of Tapia road near the east/west runway to conform with FAA current standards. In addition to the possible relocation of the existing intersection, a study to determine if a signal is warranted at this intersection due to the possible increase of truck traffic from the Truck Bypass and the additional traffic the new Deming Estates, Country Club Estates will incur.

B. **Cost.** $3.36M

Granite Street

A. **Project Description.** This project involves the geometric improvements on Granite Street to better access the existing Senior Center. This improvement will allow users to enter and exit the site more efficiently and safely. The addition of geometric improvements will improve safety for patrons and oncoming traffic

B. **Cost.** $100,000



WHPacific
6501 Americas Pkwy NE, Suite 400
Albuquerque, NM 87110
505-247-0294 Fax 505-242-4845
www.whpacific.com

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REVISIONS			
NO.	BY	DATE	REMARKS

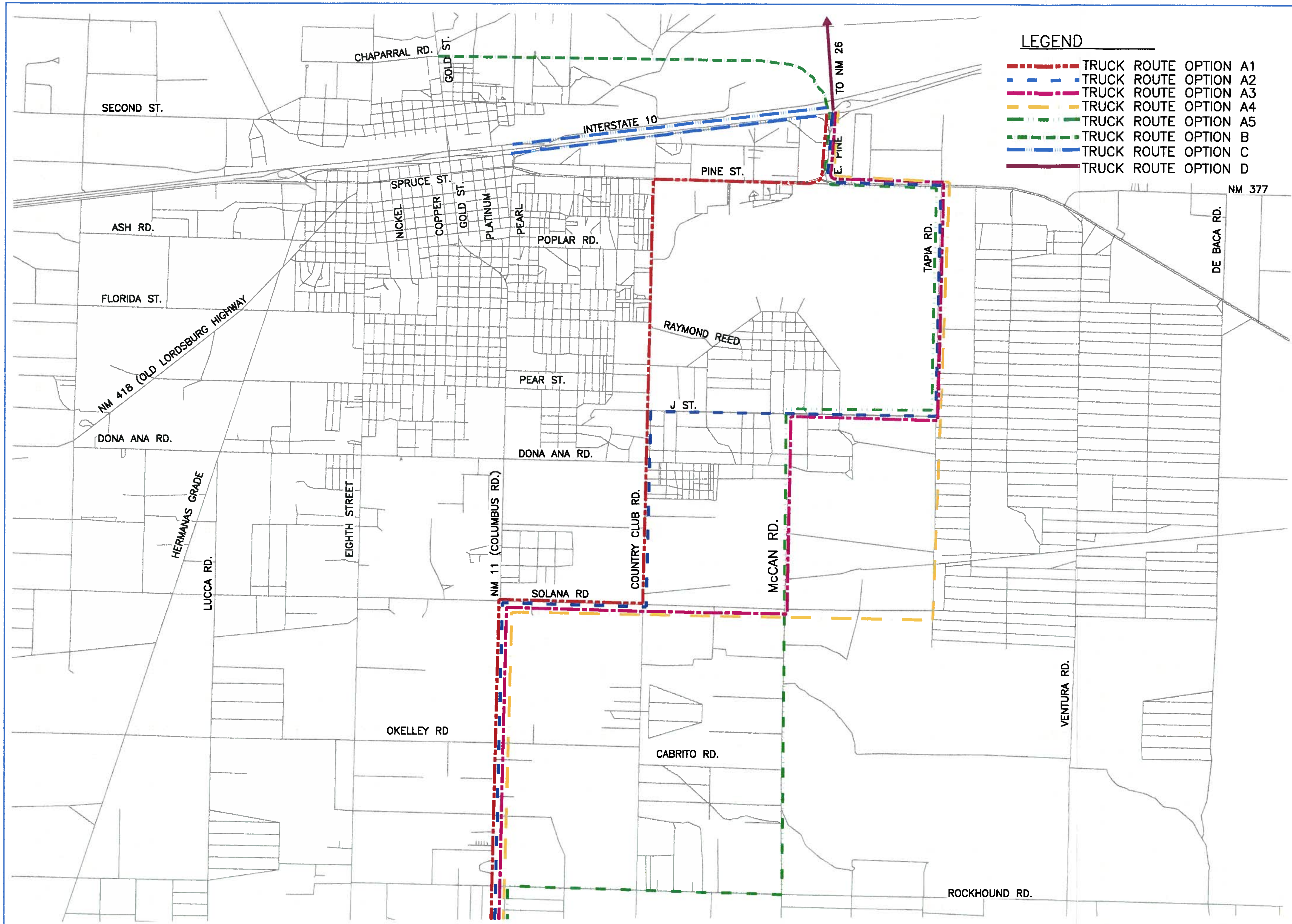
DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN
COMMITTED PROJECTS

SCALE 1" = 800'

PROJECT NUMBER 209.209831

DRAWING FILE NAME Committed Projects

SHEET NUMBER
FIGURE 28



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Albuquerque, NM 87110
505-247-0294 Fax 505-242-4845
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DEMING / LUNA COUNTY
TRANSPORTATION MASTER PLAN
TRUCK ROUTE ALTERNATIVES

SCALE 1" = 1000'

PROJECT NUMBER 209.209831

DRAWING FILE NAME TRUCK BYPASS EXHIBIT

SHEET NUMBER

FIGURE 29

CHAPTER 7

TRANSPORTATION IMPROVEMENT PROGRAM

7.0 TRANSPORTATION IMPROVEMENT PROGRAM (TIP)

Implementation of the recommended improvements is provided in the plan described below which is comprised of three "phases." The first phase is made up of improvements that may be implemented in the first six years (2010-2015), making up the *Short Range Program.*

Subsequent improvements over the next five-year period, from 2015 to 2020, result in improvement projects which fall in the *Intermediate Range Program.* The *Long Range Program* consists of those recommended improvements which require more planning and programming, and are to be implemented in the last ten-year period (2020-2030), encompassing the plan period.

The TIP will include the recommended improvements, estimated project costs, projected time period for implementation and a discussion of the available funding sources. Refer to Figure 30 for graphic representations of the phases. Tables 25 to 27 summarizes the projects in tabular form.

7.1 Short Range Program (2010-2015)

The Short Range Program consists of projects that are or will be programmed to address congestion or safety problems of an immediate nature. Nine committed and six proposed projects have been identified for implementation into the Short Range Program as listed below and as depicted in Figure 30.

The projects are intended to provide important upgrades to current standards such as pavement rehabilitation and shoulder widening on state highways, drainage improvements, and geometric modifications to improve safety and mobility. A prominent element of the Short Range Plan is the development of the truck bypass. The plan also includes provisions for pedestrian facilities.

7.2 Intermediate Range Program (2015 – 2020)

The Intermediate Range Program includes projects which should, to some extent, address roadway deficiencies. Since these projects are planned for growth areas of the City and help to move the road network toward fuller development, many can be fully or partially implemented through subdivision development. The projects, as described below, are tabulated in Table 26 and presented in Figure 30.

7.3 Long Range Program (2020 – 2025)

Projects included in the Long Range Program are intended to provide a more complete road network, while addressing deficiencies related to growth. The need for these projects stems from travel and access demands arising from ongoing population growth in the area. They also address safety issues and other deficiencies. Projects not included in the Short or Immediate Range Programs are listed below with graphical representation in Figure 30 and tabulation in Table 27.

7.4 Project Development

The planning, programming, and implementation of the projects listed in the TIP involve an elaborate process. Federal, state, and local guidelines and regulations govern the application of funding programs, and should be closely followed in order to make available use of funding opportunities. The funding sources are presented in the following section.

Project development involves tasks associated with the study, design, and construction of transportation projects. The process begins with the definition of the project scope from the TIP and other planning activities. A brief definition of the project and associated costs are included in the TIP for the purpose of defining the magnitude and scope of the project, including whether further study or analysis is required. The project description may be used and modified as appropriate to define a project's need, which is an important element of any environmental study.

The project development process, as locally applied, is described in sufficient detail in the Local Government Agency Handbook developed by the NMDOT. The manual describes the process of developing a project from the initial concept through plan production and construction. This document is a useful tool for implementing projects using federal or state funds, or to provide general guidance.

7.5 Funding Sources

Funding sources for transportation projects include federal, state, and local agencies, as well as private entities. Historically in New Mexico, funding has not kept pace with increases in travel demand. In order to achieve a measure of success in improving the roadway network in the Deming area, it is essential that the projects identified in the TIP be pursued with a strong commitment by all cooperating agencies.

The Local Government Agency Handbook provides a useful summary of transportation funding programs. Because of the strong influence of federal programs on New Mexico's transportation program, the Handbook lists the programs and matching ratios relative to federal and state funding.

Federal funding programs encourage the development of programs which are continuing, comprehensive, and cooperative in nature. In New Mexico, this process is carried out through Metropolitan Planning Organizations (MPO) in urban areas with population greater than 50,000, and Regional Planning Organizations (RPO). Changes in federal legislation will continue to have significant impacts to New Mexico's program, further necessitating ongoing planning efforts.

Possible funding sources are indicated in the TIP (Tables 25 - 27). These should be updated regularly as part of the City's capital improvement program with entries indicating the specific funding sources for each project, as they are secured.

7.6 Costs

The estimated costs for the proposed projects contained in the TIP include construction costs and Right of Way (ROW) costs, where applicable. These were developed using average unit costs from the NMDOT's average bid listings and from local construction bids, estimated in 2009 dollars. The costs should be updated prior to implementation to account for inflation and other impacts to the projects or roadway network.

7.7 Transportation Planning Process

As previously indicated in this report, the TIP is designed to be a tool used in an ongoing transportation planning process. This process was enhanced by the development of the Deming Regional Comprehensive Transportation Study (RCTS), which incorporated several major features as described below:

- ***Technical Advisory Committee*** – this group was assembled to provide technical direction to the study, and was composed of a cross-section of the community as described at the beginning of this report.
- ***Analysis of Existing Condition*** – this effort employed extensive date collection activities through a thorough literature review, and field data collection and analysis program to assess deficiencies in the roadway network.
- ***Traffic Modeling*** – a computerized traffic simulation model was developed to evaluate existing traffic patterns, deficiencies, and impacts due to growth in travel demand over a forecast period.
- ***Socio-Economic Forecast*** – a forecast of population and employment was performed to assess the impacts on the transportation system resulting from growth in the area.
- ***Transportation Improvement Program*** – as described in this chapter, provides a tool for efficient planning of transportation improvements in the City's capital improvement program; the TIP includes an implementation plan which helps describe proposed improvements, funding sources, and implementation years.
- Transportation planning activities typically involve three main features, as follows:
- ***Planning Organization*** – for Deming, the Regional Planning Organization (RPO), Southwest New Mexico Council of Governments.
- ***Planning Work Programs*** – typically developed by the MPO/RPO; for the City, this is involved in the capital improvement program.
- ***Transportation Improvement Program (TIP)*** – includes short- and long-range elements as described below.

The Short Range Program includes the Annual Element for the current fiscal year and the Five Year element. The Annual Element lists projects which are scheduled for the current fiscal year, while the Five Year Element consists of projects which will address additional transportation deficiencies of an immediate nature which will be scheduled within the short range, as listed in Table 25

The Long Range Program provides a framework for programming major streets on a system-wide basis as depicted on the Long Range Street Plan (Figure 28). As described above, the Intermediate Range Program and Long Range Program includes transportation improvements which are proposed to meet forecast demands over the course of the study period.

In summary, the RCTS has provided the City with tools for use in continued, comprehensive, and cooperative planning participation through the RPO and the City's capital improvement program. The tools include analytical capabilities which will enable the City to modify its program as the need arises, providing important flexibility to address changing circumstances.

7.8 Conclusion

The Transportation Improvement Program (TIP) provides a useful tool for the planning and development of transportation improvements in the Deming area. The recommended improvements presented in the TIP are proposed to improve the efficiency of the existing roadway network, as well as to accommodate forecast growth. Because the needs are great and funding is limited, it is important that the TIP and associated planning efforts be continually and cooperatively implemented by all local entities in order to meet the mobility needs for the Deming area.

The process used to develop the Deming Regional Comprehensive Transportation Study and the TIP will enable the City and other agencies to develop the TIP as a dynamic document, or tool, for use in ongoing transportation planning activities. A well-developed plan will provide an important element of maintaining the community's quality of life with regard to transportation.

Table 25 – Short Term Projects (2010 – 2015)

Project Description	Current Status (Lead Agency)	Annual Element (Funding Sources)	2010 – 2015	Amount ($1,000)
Cedar Street Extension Phase 4 – Roadway Connection	(City)	(D,S)	2010	$1,800
Truck Route Segment A – Option A1 Option A2 Option A3 Option A4 Option A5	(City)	(D,S,L,F)		$11,800 $15,300 $22,600 $26,500 $34,386
Country Club Road Phase I – 2 lanes to 3 lanes, Pedestrian and Drainage Improvements from Pine to Florida	(City)	(D,S)		$3,700
Gold Ave. Improvements - Geometric and Drainage Improvements	(City)	(D)		$800
8th Street Improvements Phase I – Pavement reconstruction, sidewalk from Florida to Pine	(City)	(D,S)		$3,800

D – City of Deming

L – Luna County

S – State (NMDOT)

F – Federal (FHWA)

Table 26 – Intermediate Improvement Projects (2015 – 2020)

Project Description	Current Status (Lead Agency)	Annual Element (Funding Sources)	2015 – 2020	Amount ($1,000)
Arrowhead Drive – Roadway improvements from US 180 to existing Energy Facility. Pavement reconstruction and drainage Improvements	(City)	(D,S)		$2,500
Pine & 8th Street Improvements – Geometric and intersection improvements	(City)	(D)		$500
Country Club Road Phase II - 2 lanes to 3 lanes, Pedestrian and Drainage Improvements	(City)	(D,S)		$4,900
Cody Road Improvements – Pavement Reconstruction, Geometric Improvements, from Walnut to Pine Street	(City)	(D,S,L)		$3,720
Pine Street Improvements – Additional left and right turn lanes, drainage improvements, pavement reconstruction from Wal-Mart traffic signal to Country Club Road	(City)	(D,S,L)		$3,715
Florida & NM 418 Geometric Improvements – Geometric Improvements	(City)	(D,S)		$1,500
Exit 85 Interchange Reconstruction – rehabilitation or full reconstruction of the existing interchange to meet current standards as well as incorporate future proposed projects	(City or NMDOT)	(D,L,S,F)		$16,020
Truck Route Segment B,C or D – Extension of the proposed truck route A to alleviate congestion and provide access to Peru Mills Industrial Park	(City)	(D,L,S,F)		Option B - $15,900 Option C - $10,500 Option D - $XX,XXX

D – City of Deming L – Luna County S – State (NMDOT)

F – Federal (FHWA)

Table 27 – Long Term Projects (2020 – 2025)

Project Description	Current Status (Lead Agency)	Annual Element (Funding Source)	2020 - 2025	Amount ($1000)
Hermanas Grade and NM 418 (Old Lordsburg Highway) – Geometric, intersection, and drainage improvements	(City)	(D,S)		$990
Pear Street Extension Phase I – New asphalt section, left turn lane on Hermanas , and Drainage Improvements	(City)	(D,S)		$2,270
8th Street Improvements Phase II – Pavement reconstruction, sidewalk from Florida to Dona Ana	(City)	(D)		$3,100
Pear Street Extension Phase II – New asphalt section, drainage improvements, and updated signing and striping from NM 418 to Skyview	(City)	(D,S)		$2,265
NM 11 Improvements – Pavement reconstruction, drainage improvements, signing and striping	(State)	(D,S,L)		$4,800
Florida & 8th Street Improvements – Geometric and intersection improvements	(City)	(D)		$850
Peru Mill Access – Traffic Signal Evaluation and Geometric Improvements	(State)	(D,S,F,L)		$750
NM 549 & NM 377 – Traffic Signal Evaluation and Geometric Improvements	(State)	(D,S,L,F)		$1,500
Tapia Road & NM 549 Realignment – Realignment of Tapia Road to intersect east of the existing intersection. Two lane with drainage improvements.	(City)	(D,S,F)		$3360
Granite Street – Geometric Improvements on Granite Avenue to better access existing Senior Center	(City)	(D)		$100

D – City of Deming L – Luna County S – State (NMDOT)
F - Federal (FHWA)

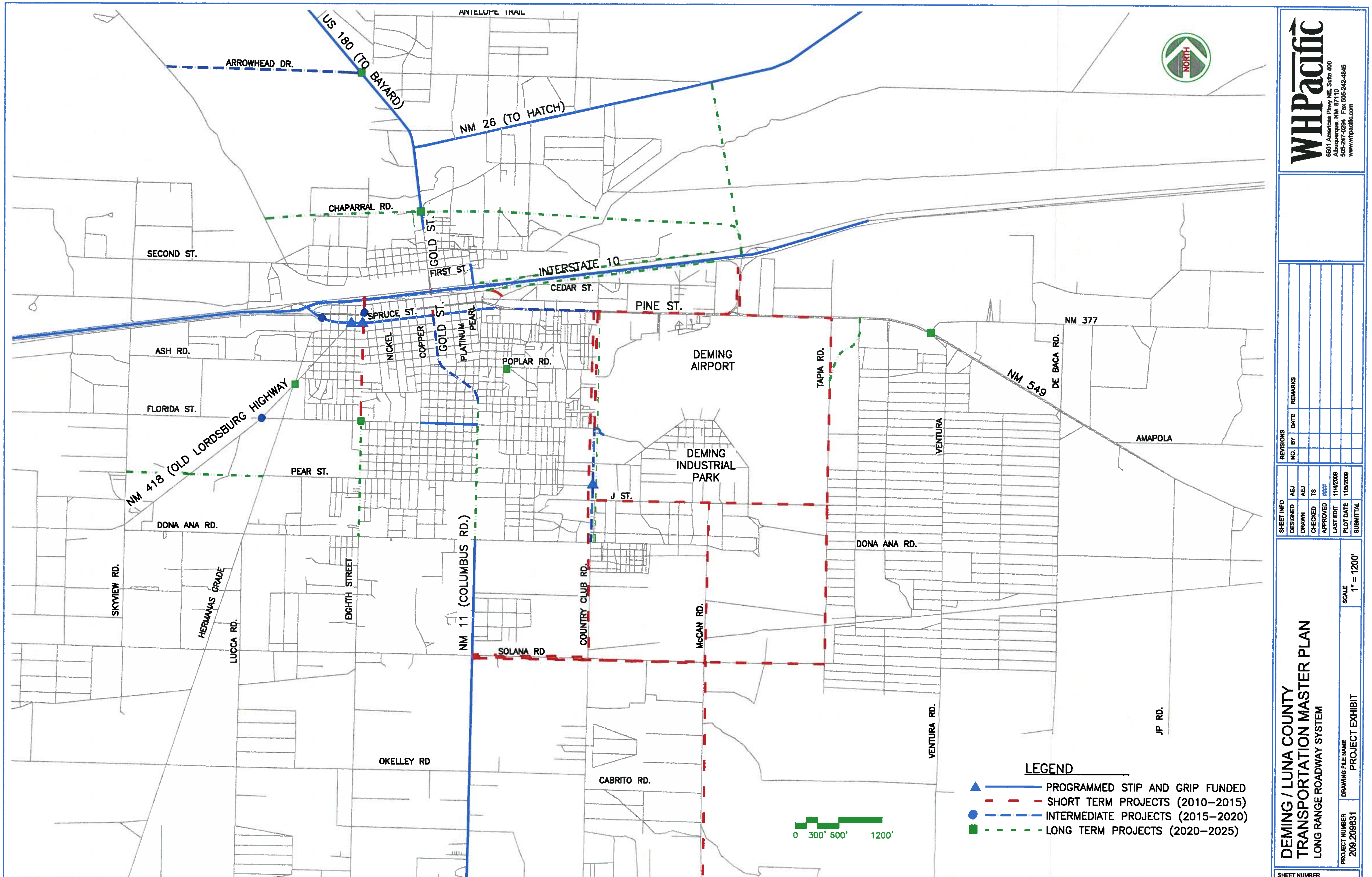
ANTELOPE TRAIL
ARROWHEAD DR.
US 180 (TO BAYARD)
NM 26 (TO HATCH)
NORTH
CHAPARRAL RD.
SECOND ST.
GOLD ST.
FIRST ST.
INTERSTATE 10
CEDAR ST.
PINE ST.
SPRUCE ST.
NICKEL
COPPER
GOLD ST.
PLATINUM
PEARL
NM 377
ASH RD.
POPLAR RD.
DEMING AIRPORT
TAPIA RD.
DE BACA RD.
NM 549
FLORIDA ST.
NM 418 (OLD LORDSBURG HIGHWAY
VENTURA
AMAPOLA
PEAR ST.
DEMING INDUSTRIAL PARK
J ST.
DONA ANA RD.
DONA ANA RD.
SKYVIEW RD.
HERMANAS GRADE
LUCCA RD.
EIGHTH STREET
NM 11 (COLUMBUS RD.)
COUNTRY CLUB RD.
McCAN RD.
SOLANA RD
OKELLEY RD
CABRITO RD.
VENTURA RD.
JP RD.
ROCKHOUND RD.
0 300' 600' 1200'
LEGEND
PROGRAMMED STIP AND GRIP FUNDED
SHORT TERM PROJECTS (2010–2015)
INTERMEDIATE PROJECTS (2015–2020)
LONG TERM PROJECTS (2020–2025)
WHPacific
6501 Americas Pkwy NE, Suite 400
Albuquerque, NM 87110
505-247-0294 Fax 505-242-4845
www.whpacific.com
REVISIONS
NO. BY DATE REMARKS
SHEET INFO
DESIGNED AEJ
DRAWN AEJ
CHECKED TS
APPROVED ####
LAST EDIT 11/4/2009
PLOT DATE 11/5/2009
SUBMITTAL
SCALE 1" = 1200'
DEMING / LUNA COUNTY
TRANSPORTATION MASTER PLAN
LONG RANGE ROADWAY SYSTEM
PROJECT NUMBER 209.209831
DRAWING FILE NAME PROJECT EXHIBIT
SHEET NUMBER

FIGURE 30

REFERENCES

References

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APPENDIX A

BASE YEAR TRAFFIC DATA

APPENDIX B

LAND USE AND DEMOGRAPIC DATA

Deming Land Use Information

ZONE NO	SFDU	SFDU_OUTER	MFDU	MOTEL_HOTEL	INDMANWH	RETAIL	FIRES_OF_SERV	MEDICAL	EDUCATION	AG	
1	255	0	0	0	20	20	100	10	17	0	
2	21	0	0	0	2	46	30	11	367	0	
3	310	0	88	0	26	0	0	0	0	0	
4	178	0	0	0	0	0	4	94	35	0	
5	103	0	0	0	10	81	34	7	93	0	
6	0	0	0	0	0	0	0	0	0	0	
7	52	0	0	117	65	36	12	0	0	7	
8	167	0	34	0	22	30	17	20	11	0	
9	142	0	0	0	4	5	5	0	0	0	
10	292	0	0	0	0	0	3	16	332	0	
11	50	0	0	0	1	0	0	5	0	10	
12	0	0	0	0	0	0	0	12	0	0	
15	0	0	0	0	4	0	0	0	0	0	
16	222	0	0	0	0	0	1	0	0	2	
17	71	0	0	0	5	0	1	0	0	2	
18	115	0	0	0	5	0	0	0	0	2	
19	19	0	0	92	4	287	3	0	0	0	
20	17	0	0	0	0	0	0	0	0	10	
21	0	0	0	165	4	276	3	0	0	0	
22	0	0	0	0	4	0	0	0	0	0	
23	25	0	0	0	0	0	0	0	0	5	
24	0	15	0	0	0	0	0	0	0	10	
25	0	0	0	0	0	0	0	0	0	0	
26	0	0	0	0	0	0	0	0	0	20	
27	0	0	0	0	0	0	0	0	0	10	
28	0	0	0	0	0	0	0	0	0	0	
29	0	0	0	0	0	0	0	0	0	0	
30	0	22	0	0	0	0	0	0	0	10	
31	13	0	0	0	0	0	0	0	0	10	
32	0	69	0	0	0	0	0	0	0	5	
33	0	24	0	0	0	0	0	0	0	10	
34	0	44	0	51	3	0	0	0	0	5	
35	0	61	0	0	0	0	0	0	0	5	
36	40	0	0	227	62	34	12	6	644	0	
37	0	0	0	0	62	0	0	0	0	6	
38	0	0	0	0	0	0	0	0	0	10	
39	0	0	0	0	0	0	0	0	0	0	
40	0	6	0	0	0	0	0	0	0	0	
41	0	0	0	0	0	0	0	0	0	0	
42	0	25	0	0	0	0	0	0	0	5	
43	0	130	0	0	0	0	0	0	0	5	
44	0	24	0	0	3	0	0	0	0	5	
45	0	229	0	0	3	0	0	0	0	3	
46	0	12	0	0	0	0	0	0	0	10	
47	0	60	0	0	0	0	0	0	0	10	
48	0	89	0	0	0	0	0	0	0	10	
49	0	19	0	0	3	0	0	0	0	15	
50	0	3	0	0	0	0	0	0	0	5	
51	0	10	0	0	0	0	0	0	0	0	
52	0	19	0	0	0	0	0	0	0	6	
53	0	18	0	0	0	0	0	0	0	6	
54	0	0	0	0	0	0	0	0	0	0	
55	0	0	0	0	0	0	0	0	0	0	
56	0	0	0	0	0	0	0	0	0	2	
57	0	7	0	0	0	0	0	0	0	2	
58	0	6	0	0	0	0	0	0	0	2	
59	0	45	0	0	0	0	0	0	0	6	
60	0	15	0	0	0	0	0	0	0	6	
61	0	26	0	0	0	0	0	0	0	6	
62	0	85	0	0	0	0	0	0	0	0	
63	0	18	0	0	0	0	0	0	0	0	
64	0	0	0	0	0	0	0	0	0	3	
65	0	0	0	0	0	0	0	0	0	20	
66	0	5	0	10	0	0	0	0	0	0	
67	0	1	0	0	0	0	0	0	0	6	
68	0	18	0	0	0	0	0	0	0	6	
69	0	7	0	0	0	0	0	0	0	6	
70	0	25	0	0	0	0	0	0	0	2	
71	0	20	0	0	0	0	0	0	0	2	
72	0	0	0	0	0	0	0	0	0	0	
73	0	5	0	0	0	0	0	0	0	2	
74	0	0	0	0	0	0	0	0	0	0	
76	0	44	0	0	0	0	0	0	0	6	
77	0	45	0	0	0	0	0	0	0	6	
78	0	0	0	0	0	0	0	0	0	6	
79	0	0	0	0	0	0	0	0	0	6	
86	0	0	0	0	0	0	0	0	0	6	
96	0	0	0	0	0	20	0	0	0	3	**FIGURE 1**
99	0	0	0	0	0	0	0	0	0	3	**APPENDIX B**
104	0	5	0	0	0	0	0	0	0	6	

Deming Land Use Information

ZONE NO	SFDU	SFDU_OUTER	MFDU	MOTEL_HOTEL	INDMANWH	RETAIL	FIRES_OF_SERV	MEDICAL	EDUCATION	AG		
105	0	31	0	0	0	0	0	0	0	6		
106	0	4	0	0	0	0	0	0	0	6		
107	0	11	0	0	0	0	0	0	0	6		
108	0	0	0	34	0	2	0	0	0	3		
109	0	0	0	0	0	0	0	0	0	0		
110	0	0	0	0	0	0	0	0	0	0		
111	0	3	0	0	0	0	0	0	0	3		
112	68	0	0	0	3	2	3	0	0	3		
113	0	26	0	0	0	0	0	0	0	3		
114	0	0	0	0	0	0	0	0	0	3		
115	0	0	0	0	0	0	0	0	0	3		
116	0	0	0	0	0	0	0	0	0	3		
117	0	0	0	0	0	0	0	0	0	3		
118	0	0	0	0	0	0	0	0	0	0		
119	0	0	0	0	0	0	0	0	0	3		
120	0	0	0	0	0	0	0	0	0	6		
121	63	0	0	0	0	0	0	0	0	6		
122	84	0	0	0	0	0	0	0	0	6		
123	26	0	0	0	0	0	0	0	0	6		
124	10	0	0	0	0	0	0	0	0	6		
125	7	0	0	0	0	0	0	0	0	6		
126	0	2	0	0	0	0	0	0	0	3		
127	0	4	0	0	0	0	0	0	0	3		
128	0	0	0	0	0	0	0	0	0	3		
129	0	11	0	0	0	0	0	0	0	3		
130	0	0	0	0	3	0	0	0	0	3		
131	0	10	0	0	3	0	0	0	0	3		
132	106	0	0	0	62	0	0	0	0	6		
133	0	10	0	0	0	0	0	0	0	3		
134	0	30	0	0	0	0	0	0	0	3		
135	0	82	0	0	0	0	0	0	0	3		
136	0	33	0	0	0	0	0	0	0	3		
137	0	17	0	0	0	0	0	0	0	3		
138	0	3	0	0	0	0	0	0	0	6		
139	0	5	0	0	0	0	0	0	0	6		
140	0	4	0	0	0	0	0	0	0	3		
141	37	0	0	0	0	0	0	0	0	3		
142	20	0	0	0	0	0	3	0	0	3		
143	20	0	0	0	0	0	0	0	0	6		
144	24	0	0	0	0	0	0	0	0	3		
145	0	7	0	0	0	0	0	0	0	3		
146	0	12	0	0	0	0	0	0	0	3		
147	0	35	0	0	0	0	0	0	0	6		
148	0	14	0	0	0	0	0	0	0	2		
149	0	7	0	0	0	0	0	0	0	2		
150	0	17	0	0	0	0	0	0	0	2		
151	0	21	0	0	0	0	0	0	0	2		
152	0	12	0	0	0	0	0	0	0	2		
153	0	37	0	0	0	0	0	0	0	2		
154	0	24	0	0	0	0	0	0	0	2		
155	0	13	0	0	0	0	0	0	0	2		
156	0	0	0	0	0	0	0	0	0	0		
157	0	28	0	0	4	0	0	0	0	2		
158	0	0	0	0	0	0	0	0	0	0		
159	0	5	0	0	0	0	0	0	0	2		
160	0	44	0	0	0	0	0	0	0	2		
161	0	11	0	0	0	0	0	0	0	2		
162	15	0	0	0	1	0	5	0	0	2		
163	1	0	0	0	0	0	0	0	453	0		
164	0	0	0	0	0	0	0	0	0	2		
165	0	0	0	0	0	0	0	0	0	2		
166	0	22	0	0	0	0	0	0	0	2		
167	0	2	0	0	0	0	0	0	0	2		
168	185	0	0	0	0	0	0	0	0	2		
169	0	7	0	0	0	0	0	0	0	3		
170	0	37	0	0	0	0	0	0	0	3		
171	0	47	0	0	0	0	0	0	0	3		
172	0	16	0	0	4	0	0	0	0	2		
173	0	23	0	0	0	0	0	0	0	2		
174	5	0	0	0	7	0	0	0	0	3		
175	0	0	0	0	0	0	0	0	0	0		
176	33	0	0	0	7	0	0	0	0	3		
177	21	0	0	0	7	0	0	0	0	3		
178	36	0	96	0	7	0	0	0	0	3		
179	0	15	0	0	0	0	0	0	0	3		
180	24	0	0	0	7	20	4	2	0	3		
181	120	0	0	150	7	0	0	0	0	3		
182	0	0	0	0	0	0	0	0	0	0	**FIGURE 1**	
183	0	52	0	71	7	0	0	0	0	0	**APPENDIX B**	
184	0	50	0	0	0	0	0	0	0	3		

Deming Land Use Information

ZONE NO	SFDU	SFDU_OUTER	MFDU	MOTEL_HOTEL	INDMANWH	RETAIL	FIRES_OF_SERV	MEDICAL	EDUCATION	AG	
185	0	11	0	0	0	0	0	0	0	3	
186	117	0	0	0	0	0	0	0	0	3	
187	100	0	0	0	0	0	0	0	0	3	
188	47	0	0	0	0	0	0	0	0	3	
189	180	0	0	0	0	0	0	0	0	3	
190	25	0	0	0	0	0	0	0	0	3	
191	50	0	0	0	0	0	0	0	0	3	
192	10	0	0	0	21	0	0	0	0	3	
193	0	0	0	0	0	0	0	0	0	0	
194	0	0	0	0	0	0	0	0	0	0	
195	0	0	0	0	0	0	0	0	0	0	
196	1	0	0	0	10	0	0	0	0	0	
197	125	0	0	0	0	0	0	0	0	2	
198	128	0	0	0	0	2	1	0	260	0	
199	104	0	0	0	0	2	1	0	0	0	
200	0	0	0	0	0	0	0	0	0	0	
201	0	0	0	0	0	0	0	0	0	0	
202	0	0	0	161	4	11	2	1	0	0	
203	5	0	0	13	4	41	2	1	0	0	
204	55	0	0	76	4	70	2	0	0	0	
205	0	0	0	21	10	81	34	0	0	0	
206	24	0	0	0	10	81	34	0	0	0	
207	255	0	0	0	62	34	12	0	0	0	
208	0	0	0	0	82	409	12	0	0	0	
209	221	0	0	0	20	8	7	3	143	0	
210	65	0	76	0	62	34	12	0	0	0	
211	222	0	0	0	26	0	14	0	0	0	
212	210	0	0	0	5	70	4	0	0	0	
213	170	0	0	0	5	0	4	0	486	0	
214	35	0	0	0	0	0	0	0	0	2	
215	55	0	0	0	0	0	0	0	0	2	
216	225	0	148	0	0	0	10	50	0	0	
217	243	0	0	0	0	0	5	0	74	0	
218	80	0	0	0	4	5	5	2	0	0	
219	43	0	0	0	4	5	5	0	0	0	
220	43	0	0	0	4	5	5	0	3	0	
221	172	0	0	0	0	0	0	0	0	5	
222	0	28	0	0	0	0	0	0	0	2	
223	0	19	0	0	0	0	0	0	0	2	
224	0	0	103	0	0	0	0	0	2018	0	
225	0	10	0	0	0	0	0	0	0	2	
226	0	14	0	0	4	11	2	0	0	0	
227	0	2	0	106	4	11	2	0	0	2	
228	80	0	0	0	0	0	0	0	0	0	
229	76	0	0	0	4	11	2	0	0	0	
230	12	0	0	0	1	45	4	422	856	0	
231	73	0	52	0	0	0	0	0	0	0	
232	80	0	0	0	2	46	187	11	0	0	
233	57	0	0	0	2	46	30	11	17	0	
234	54	0	0	0	20	7	4	2	0	3	
235	0	0	0	30	62	34	12	0	0	0	
236	0	0	0	0	277	34	48	6	0	0	
237	0	0	0	0	62	237	12	0	0	0	
238	0	0	0	0	62	0	12	0	0	6	
239	0	0	0	0	80	34	12	0	0	0	**FIGURE 1**
240	0	0	0	0	62	34	12	0	0	0	**APPENDIX B**
TOTAL	**6439**	**2184**	**597**	**1324**	**1420**	**2267**	**750**	**692**	**5809**	**619**	

Landuse with Technical Advisory Committee Comments (Figure 2, Appendix B)

ZONE NO	Revised Base SFDU (Year 2000 to 2005)	Revised Base SFDU_Outer (2000 to 2005)	Revised BaseMFDU	Base MOTEL_ HOTEL	Base INDMANWH (2005)	Base RETAIL	Base FIRES_OF_ SERV	Base MEDICAL	Base EDUCATION	Base AG
1	1170	0	0	0	0	0	7	15	735	0
2	715	0	0	0	0	0	10	20	525	0
3	172	0		0	0	0	0	0	0	0
4	95	0	20	115	0	100	12	0	35	0
5	410	0	0	0	0	0	20	50	500	0
6	0	0	0	0	0	0	0	0	0	15
7	965	0	22	17	252	0	0	0	0	0
8	10	0		0	50	0	0	0	0	0
9	10	0	0	0	0	0	0	0	0	10
10	165	0	20	125	0	25	3	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	15
16	15	0	0	0	0	0	0	0	0	2
17	14	0	0	0	0	0	0	0	0	0
18	50	0	0	0	100	0	0	0	0	0
19	0	0	0	35	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0
21	0	0	45	55	0	410	100	165	795	0
22	0	0	24	191	0	125	25	0	0	0
23	0	0	0	0	0	0	0	0	0	0
24	0	15	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0
30	0	22	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0
32	12	0	0	0	0	0	0	0	0	0
33	0	24	0	0	0	0	0	0	0	0
34	25	0	0	51	50	0	0	0	0	0
35	50	0	0	0	45	0	0	0	0	0

Landuse with Technical Advisory Committee Comments (Figure 2, Appendix B)

ZONE NO	Revised Base SFDU (Year 2000 to 2005)	Revised Base SFDU_Outer (2000 to 2005)	Revised BaseMFDU	Base MOTEL_ HOTEL	Base INDMANWH (2005)	Base RETAIL	Base FIRES_OF_ SERV	Base MEDICAL	Base EDUCATION	Base AG
36	145	0	45	50	0	498	235	150	850	0
37	0	0	0	0	47	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0
43	12	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0
45	15	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	15	0	0	0	0	0	0	0	0	0
48	16	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0
51	0	10	0	0	0	0	0	0	0	0
52	0	19	0	0	0	0	0	0	0	0
53	0	18	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0
57	0	7	0	0	0	0	0	0	0	0
58	0	6	0	0	0	0	0	0	0	0
59	0	45	0	0	0	0	0	0	0	0
60	0	15	0	0	0	0	0	0	0	0
61	0	26	0	0	0	0	0	0	0	0
62	15	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0
66	0	5	0	0	0	0	0	0	0	0
67	0	1	0	0	0	0	0	0	0	0
68	0	18	0	0	0	0	0	0	0	0

Landuse with Technical Advisory Committee Comments (Figure 2, Appendix B)

ZONE NO	Revised Base SFDU (Year 2000 to 2005)	Revised Base SFDU_Outer (2000 to 2005)	Revised BaseMFDU	Base MOTEL_ HOTEL	Base INDMANWH (2005)	Base RETAIL	Base FIRES_OF_ SERV	Base MEDICAL	Base EDUCATION	Base AG
69	0	7	0	0	0	0	0	0	0	0
70	0	25	0	0	0	0	0	0	0	0
71	0	20	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0
73	0	5	0	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0	0	0	0
76	0	44	0	0	0	0	0	0	0	0
77	0	45	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0	0	0
104	0	5	0	0	0	0	0	0	0	0
105	0	31	0	0	0	0	0	0	0	0
106	0	4	0	0	0	0	0	0	0	0
107	0	11	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0
111	0	3	0	0	0	0	0	0	0	0
112	250	0	45	45	0	300	100	168	1035	0
113	150	0	23	0	244	0	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0
121	250	0	24	0	232	0	0	0	0	0
122	280	0	24	0	147	0	0	0	0	0
123	265	0	24	0	50	0	0	0	0	0

Landuse with Technical Advisory Committee Comments (Figure 2, Appendix B)

ZONE NO	Revised Base SFDU (Year 2000 to 2005)	Revised Base SFDU_Outer (2000 to 2005)	Revised BaseMFDU	Base MOTEL_ HOTEL	Base INDMANWH (2005)	Base RETAIL	Base FIRES_OF_ SERV	Base MEDICAL	Base EDUCATION	Base AG
124	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0
126	0	2	0	0	0	0	0	0	0	0
127	0	4	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	0	3
129	0	11	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0
131	0	0	0	0	0	0	0	0	0	0
132	50	0	0	0	40	0	0	0	0	0
133	0	0	0	0	0	0	0	0	0	15
134	0	0	0	0	0	0	0	0	0	15
135	16	0	0	0	0	0	0	0	0	3
136	0	0	0	0	0	0	0	0	0	3
137	0	0	0	0	0	0	0	0	0	3
138	0	0	0	0	0	0	0	0	0	0
139	0	5	0	0	0	0	0	0	0	0
140	0	4	0	0	0	0	0	0	0	0
141	16	0	0	0	0	0	0	0	0	3
142	0	0	0	0	0	0	0	0	0	0
143	0	0	0	0	0	0	0	0	0	0
144	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	3
146	0	12	0	0	0	0	0	0	0	0
147	0	35	0	0	0	0	0	0	0	0
148	0	14	0	0	0	0	0	0	0	0
149	0	7	0	0	0	0	0	0	0	0
150	0	17	0	0	0	0	0	0	0	0
151	0	21	0	0	0	0	0	0	0	0
152	0	12	0	0	0	0	0	0	0	0
153	0	37	0	0	0	0	0	0	0	0
154	0	24	0	0	0	0	0	0	0	0
155	0	13	0	0	0	0	0	0	0	0
156	0	0	0	0	0	0	0	0	0	0

Landuse with Technical Advisory Committee Comments (Figure 2, Appendix B)

ZONE NO	Revised Base SFDU (Year 2000 to 2005)	Revised Base SFDU_Outer (2000 to 2005)	Revised BaseMFDU	Base MOTEL_ HOTEL	Base INDMANWH (2005)	Base RETAIL	Base FIRES_OF_ SERV	Base MEDICAL	Base EDUCATION	Base AG
157	0	28	0	0	0	0	0	0	0	0
158	0	0	0	0	0	0	0	0	0	0
159	0	5	0	0	0	0	0	0	0	0
160	0	44	0	0	0	0	0	0	0	0
161	0	11	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0	0	0
164	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0
166	0	22	0	0	0	0	0	0	0	0
167	0	0	0	0	0	0	0	0	0	0
168	16	0	0	0	0	0	0	0	0	0
169	0	0	0	0	0	0	0	0	0	0
170	15	0	0	0	0	0	0	0	0	0
171	0	47	0	0	0	0	0	0	0	0
172	0	16	0	0	0	0	0	0	0	0
173	0	23	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0
176	15	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0
178	0	0		0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0
180	15	0	0	0	0	0	0	0	0	0
181	15	0	0	20	0	0	0	0	0	0
182	0	0	0	0	0	0	0	0	0	0
183	17	0	0	0	0	0	0	0	0	0
184	17	0	0	0	0	0	0	0	0	0
185	0	0	0	0	0	0	0	0	0	0
186	0	0	0	0	0	0	0	0	0	0
187	0	0	0	0	0	0	0	0	0	0
188	17	0	0	0	0	0	0	0	0	0
189	17	0	0	0	0	0	0	0	0	0

Landuse with Technical Advisory Committee Comments (Figure 2, Appendix B)

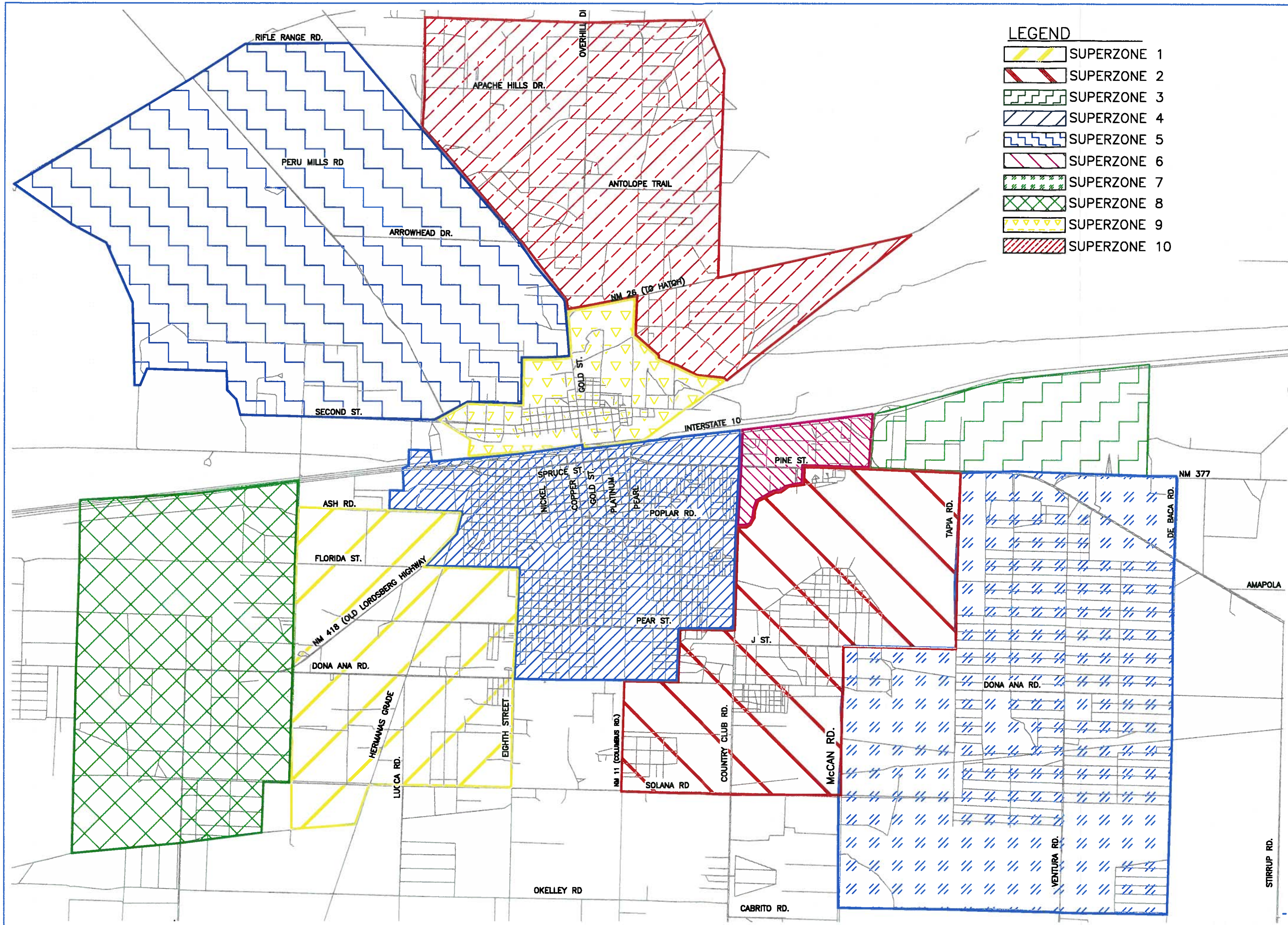
ZONE NO	Revised Base SFDU (Year 2000 to 2005)	Revised Base SFDU_Outer (2000 to 2005)	Revised BaseMFDU	Base MOTEL_ HOTEL	Base INDMANWH (2005)	Base RETAIL	Base FIRES_OF_ SERV	Base MEDICAL	Base EDUCATION	Base AG
190	12	0	0	0	0	0	0	0	0	0
191	12	0	0	0	0	0	0	0	0	0
192	60	0	24	110	0	100	10	0	0	0
193	0	0	0	0	0	0	0	0	0	0
194	0	0	0	0	0	0	0	0	0	0
195	0	0	0	0	0	0	0	0	0	0
196	0	0	0	0	0	0	0	0	0	0
197	10	0	0	0	0	0	0	0	0	0
198	10	0	0	0	0	0	0	0	0	0
199	197	0	24	75	0	100	10	0	0	0
200	0	0	24	75	0	65	25	0	0	0
201	0	0	24	75	0	75	10	0	0	0
202	0	0	0	25	0	0	0	0	0	0
203	0	0	0	25	0	0	0	0	0	0
204	10	0	0	15	0	0	0	0	0	0
205	0	0	0	15	0	0	0	0	0	0
206	0	0	0	0	0	0	0	0	0	0
207	125	0	0	0	0	0	0	0	0	0
208	0	0	45	45	0	409	175	187	780	0
209	75	0	0	0	0	0	0	0	0	0
210	20	0		0	0	0	0	0	0	0
211	12	0	0	0	50	0	0	0	0	0
212	175	0	0	0	0	0	0	0	0	142
213	132	0	0	0	0	0	0	0	0	75
214	35	0	0	0	0	0	0	0	0	125
215	55	0	0	0	0	0	0	0	0	155
216	280	0	30	25	0	25	7	0	0	0
217	125	0	0	0	0	0	0	0	0	0
218	175	0	0	0	0	5	0	0	0	0
219	10	0	0	0	0	0	0	0	0	0
220	10	0	0	0	0	0	0	0	0	0
221	12	0	0	0	0	0	0	0	0	7
222	0	0	0	0	0	0	0	0	0	7

Landuse with Technical Advisory Committee Comments (Figure 2, Appendix B)										
ZONE NO	Revised Base SFDU (Year 2000 to 2005)	Revised Base SFDU_Outer (2000 to 2005)	Revised BaseMFDU	Base MOTEL_HOTEL	Base INDMANWH (2005)	Base RETAIL	Base FIRES_OF_SERV	Base MEDICAL	Base EDUCATION	Base AG
223	0	0	0	0	0	0	0	0	0	7
224	45	0	20	20	0	25	7	0	0	0
225	85	0	20	20	0	0	7	0	0	0
226	0	0	0	0	0	0	0	0	0	0
227	0	2	0	75	0	0	0	0	0	0
228	12	0	0	0	0	0	0	0	0	0
229	12	0	0	0	0	0	0	0	0	0
230	95	0	10	0	0	47	0	0	0	0
231	73	0		0	0	0	0	0	0	0
232	0	0	0	0	0	0	0	0	0	0
233	0	0	0	0	0	0	0	0	0	0
234	0	0	0	0	50	0	0	0	0	11
235	130	0	0	20	0	0	0	25	25	0
236	55	0	0	0	0	0	0	10	25	0
237	20	0	0	0	0	0	0	0	0	0
238	0	0	0	0	76	0	0	0	0	0
239	30	0	30	0	0	0	0	24	250	0
240	150	0	30	0	0	0	0	25	254	0
	7776	**847**	**597**	**1324**	**1433**	**2309**	**763**	**839**	**5809**	**619**

Superzone	SFDU	MFDU	Hotel/Motel	Ind. /Man./ WH	Retail	FIRES /OF/ Service	MED	EDU.	AG
1	30%	-	-	-	-	5%	10%	30%	-
2	25%	20%	-	65%	-	-	-	-	-
3	10%	20%	25%	-	10%	5%	-	-	-
4	5%	30%	15%	-	70%	80%	80%	60%	-
5	2%	-	-	25%	-	-	-	-	-
6	3%	20%	50%	-	20%	10%	-	-	-
7	5%	-	-	-	-	-	-	-	-
8	5%	-	-	-	-	-	-	-	80%
9	5%	10%	-	-	-	-	10%	10%	-
10	5%	-	-	-	-	-	-	-	-
OTHER	5%	-	10%	10%		-	-	-	20%

Deming Transportation Zone Analysis - Superzone Areas

Superzone	TAZ Clusters	Expected Growth
1	1 ,2 ,5	Housing, Educational Services
2	7, 113, 121, 122, 123	IND and AG
3	4, 10, 216, 224, 225, 230	Educational Services
4	21, 36, 112, 208	IND and Educational Serivices, Vacant Land
5	18, 34, 35, 37, 132, 238	IND and AG, Vacant Platted
6	22, 192, 199, 200, 201	Educational Services, Vacant Land
7	3, 207, 209, 210	IND, Vacant Platted
8	212, 213, 214, 215	Educational Serivices, Vacant Platted
9	235, 236, 237, 239, 240	IND, Vacant Platted
10	217, 218, 231	Educational Services, Medical, Vacant Land
11	40, 124, 130	IND, Vacant Platted
12	162, 163, 221, 222, 223	Educational Services
13	6, 190, 193, 196	Housing, Vacant Land
14	8, 211	Housing, Vacant Land
15	9, 16, 17	Housing, Vacant Platted
16	32, 42, 167, 168, 169, 170	Housing, Vacant Land
17	15, 174, 175, 177, 179, 180, 181, 182, 184	IND, Retail, Vacant Land
18	183, 185, 168, 187, 188, 189, 191	IND, Retail, Vacant Land
19	197, 198	Educational Services
20	202, 203, 204, 205, 206, 229	Retail
21	19, 226, 229	Retail
22	35, 44, 45, 48, 49, 130, 131, 135	AG, Housing
23	43, 46, 47, 50, 141, 145	AG, Housing
24	41, 62, 63, 128, 133, 134, 136, 137, 138	AG, Housing
25	176, 234	Retail, IND, Educational Srivices, Housing
26	218, 219, 220, 232, 233	Retail, IND, Educational Srivices, Housing



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SHEET INFO	
DESIGNED	AEJ
DRAWN	AEJ
CHECKED	TS
APPROVED	####
LAST EDIT	6/3/2009
PLOT DATE	10/2/2009
SUBMITTAL	

SCALE 1" = 1300'

DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

SUPERZONES FROM TAC

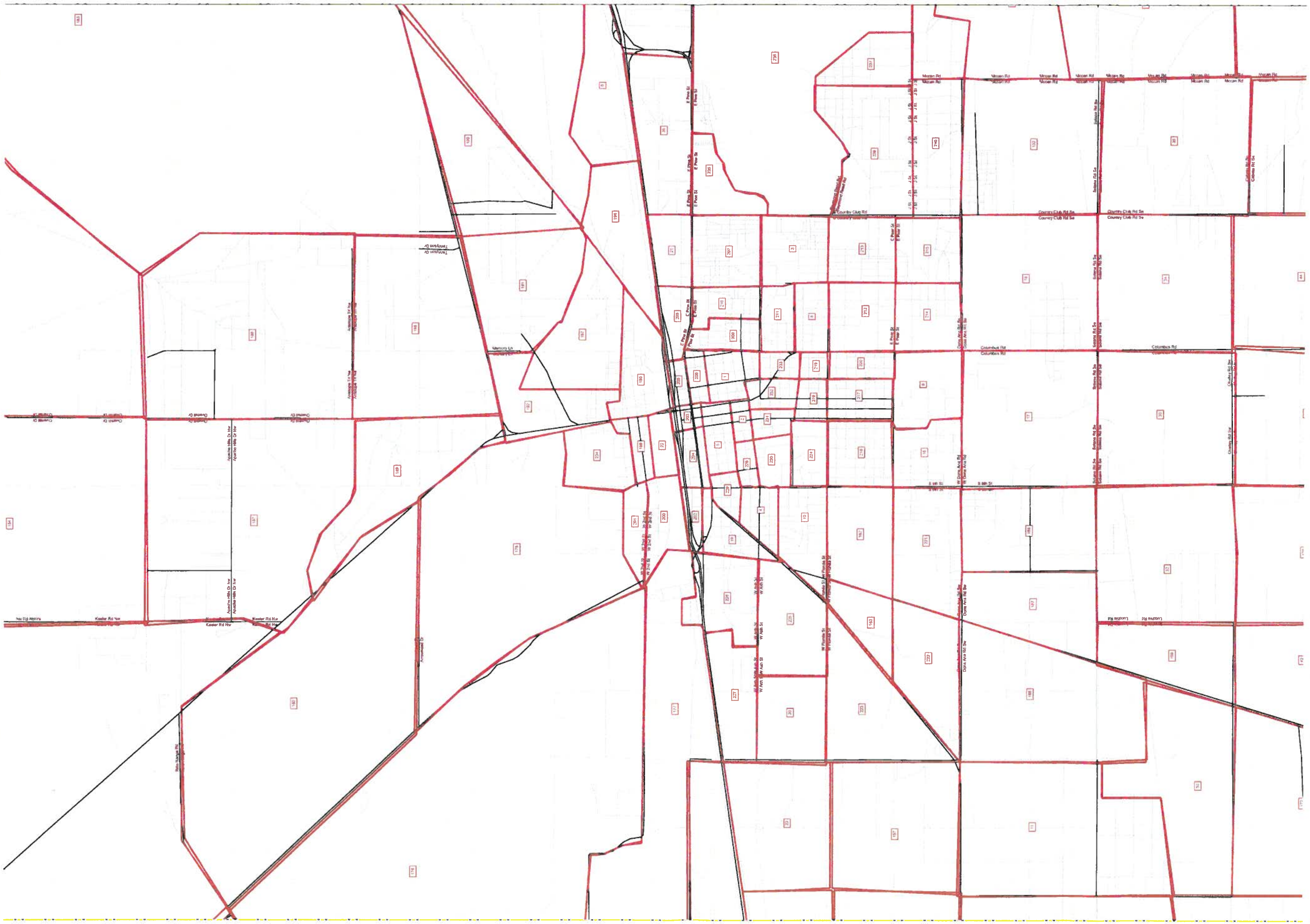
PROJECT NUMBER 209.209831

DRAWING FILE NAME SUPERZONES

SHEET NUMBER

FIGURE 3

APPENDIX B



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APPROVED	####
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SUBMITTAL	

DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

TAZ LOCATONS WITH NUMBERS CITY LIMITS

PROJECT NUMBER 209.209831

DRAWING FILE NAME SUPERZONES

SCALE 1" = 1300'

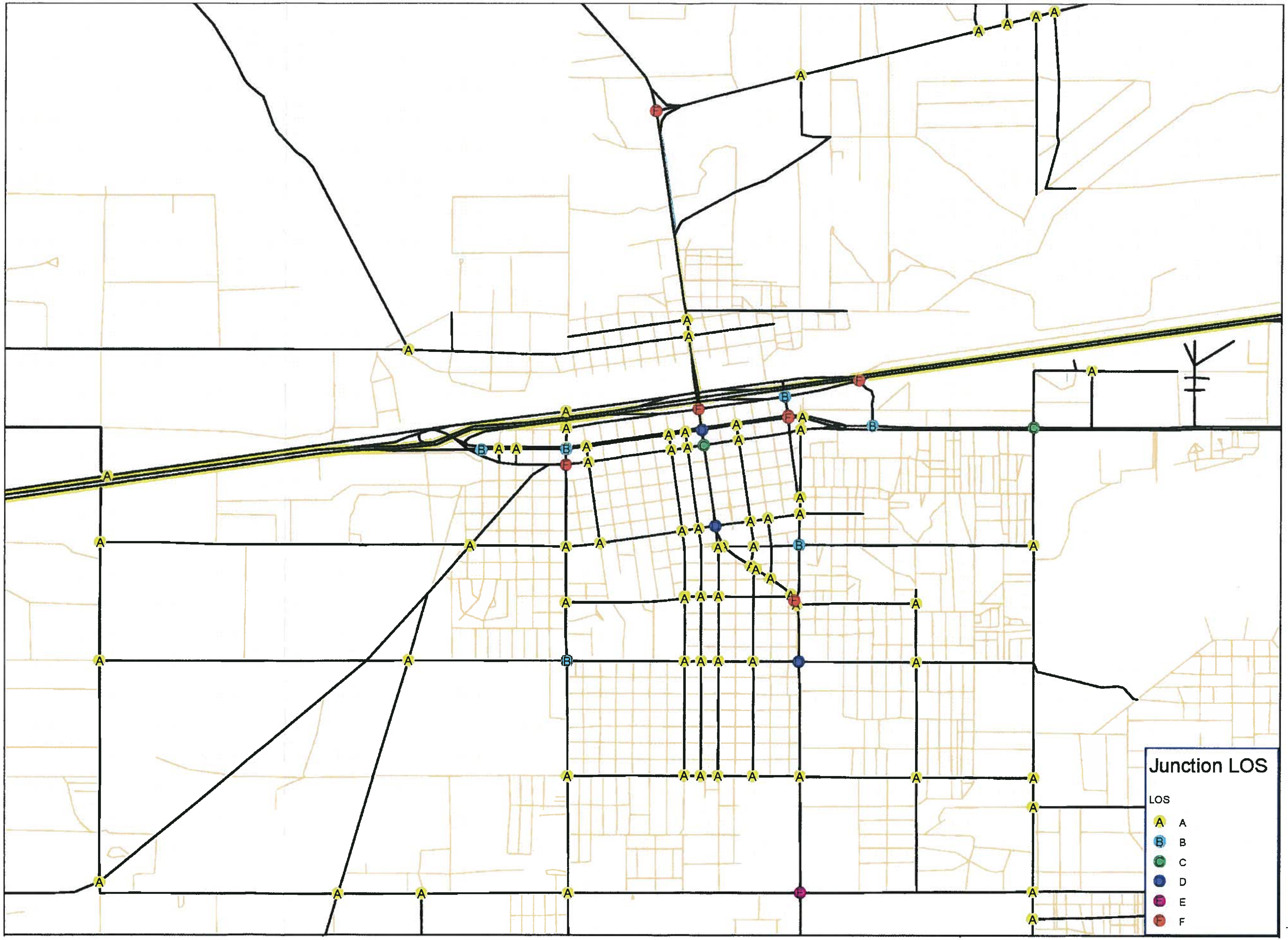
SHEET NUMBER

FIGURE 4

APPENDIX B

APPENDIX C

TRAFFIC FORECAST & ALTERNATIVES ANALYSIS RESULTS



DEMING / LUNA COUNTY
TRANSPORTATION MASTER PLAN
INTERSECTION LEVEL OF SERVICE (LOS)
BASE YEAR

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traffic mobility logistics.

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CHECKED	PTV
APPROVED	PTV
LAST EDIT	5/22/2009
PLOT DATE	9/29/2009
SUBMITTAL	

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SCALE: NTS

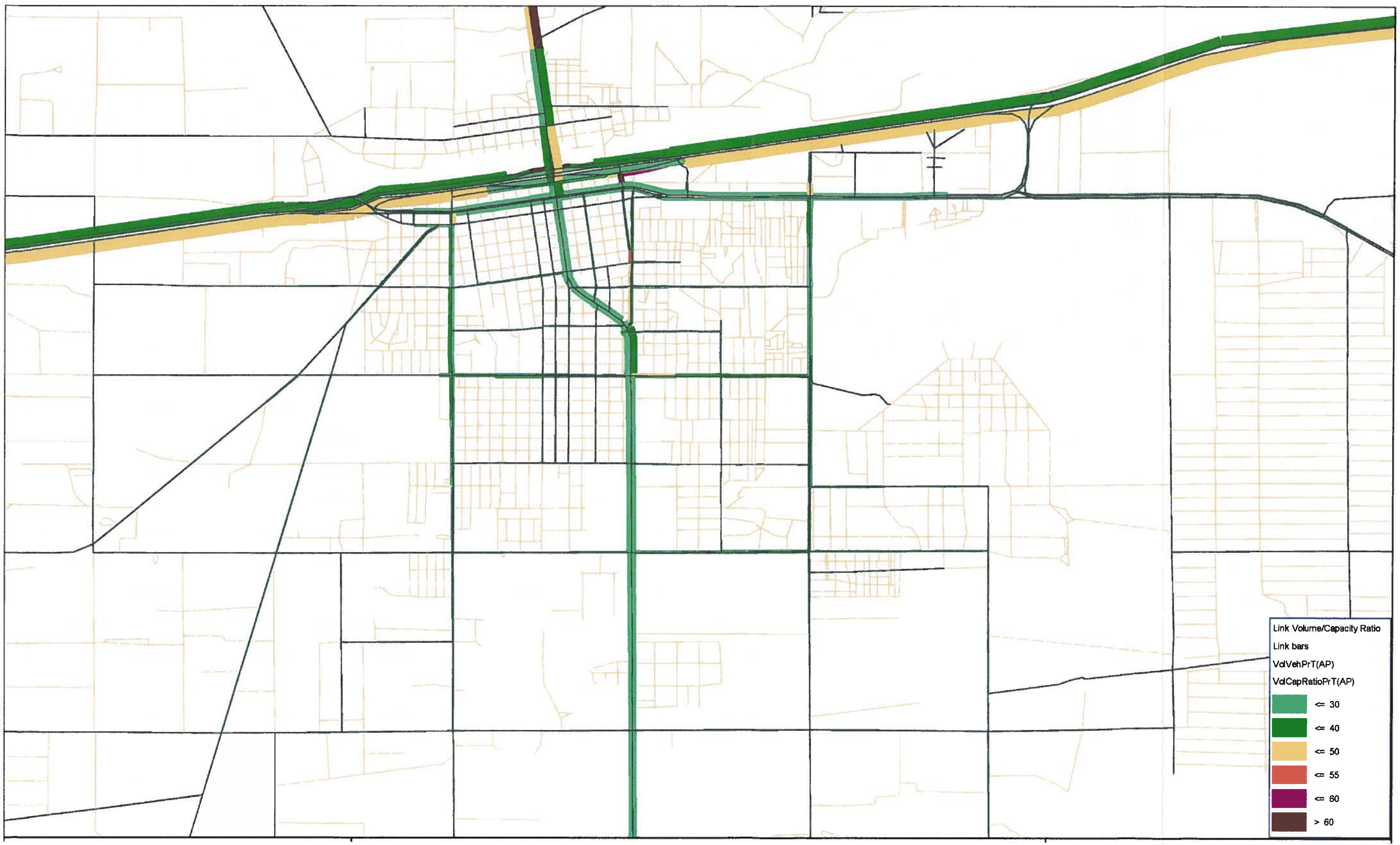
PROJECT NUMBER: 209.209831

DRAWING FILE NAME: BASE YEAR LOS

SHEET NUMBER

FIGURE 1

APPENDIX C



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APPROVED	PTV
LAST EDIT	5/22/2009
PLOT DATE	9/29/2009
SUBMITTAL	

DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

LINK VOLUME & V/C RATIO FOR BASE YEAR (COLOR CODED BY V/C RATIO)

PROJECT NUMBER 209.209831

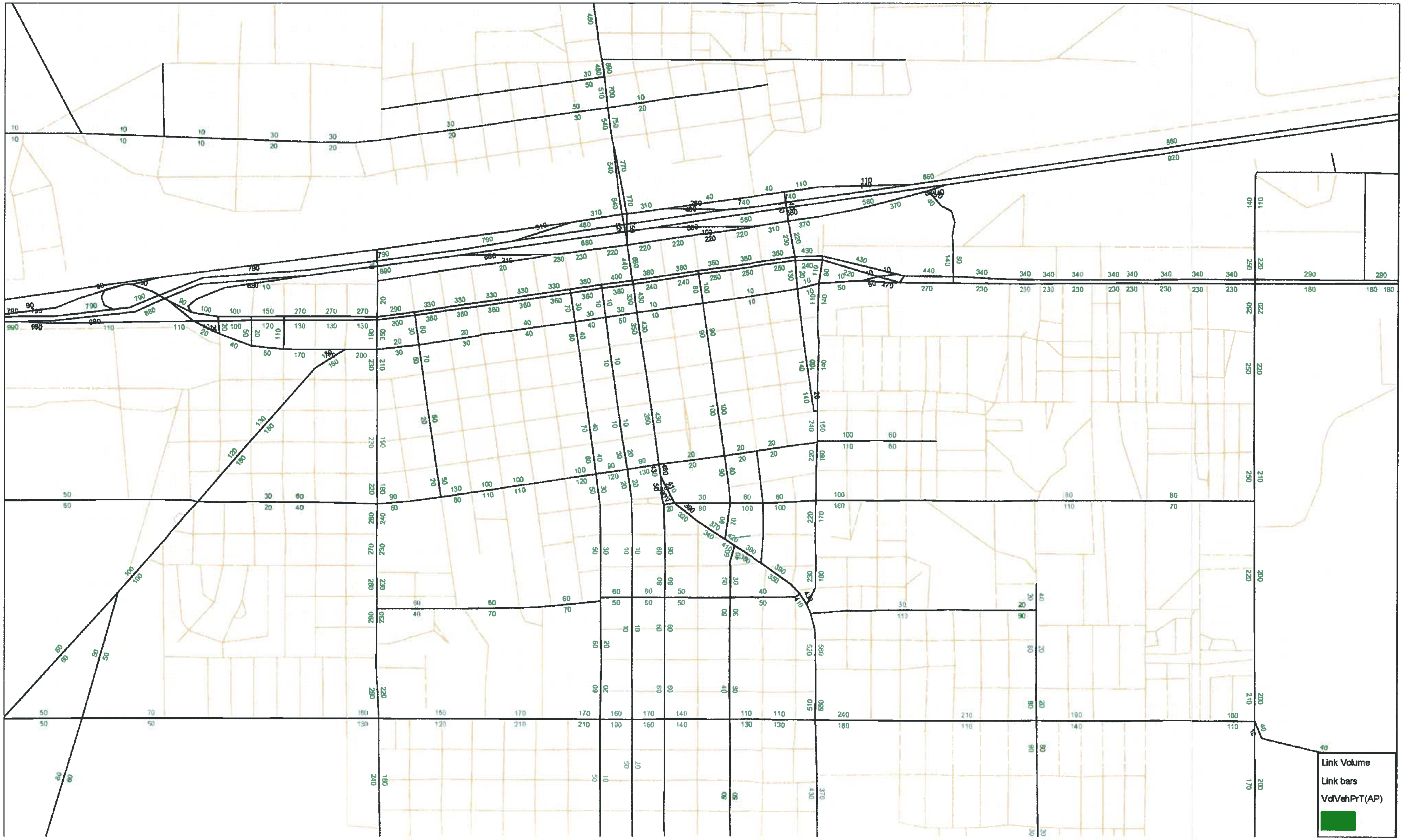
DRAWING FILE NAME BASE YEAR LINK AND V/C

SCALE NTS

SHEET NUMBER

FIGURE 2

APPENDIX C



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NETWORK VOLUME FOR BASE YEAR

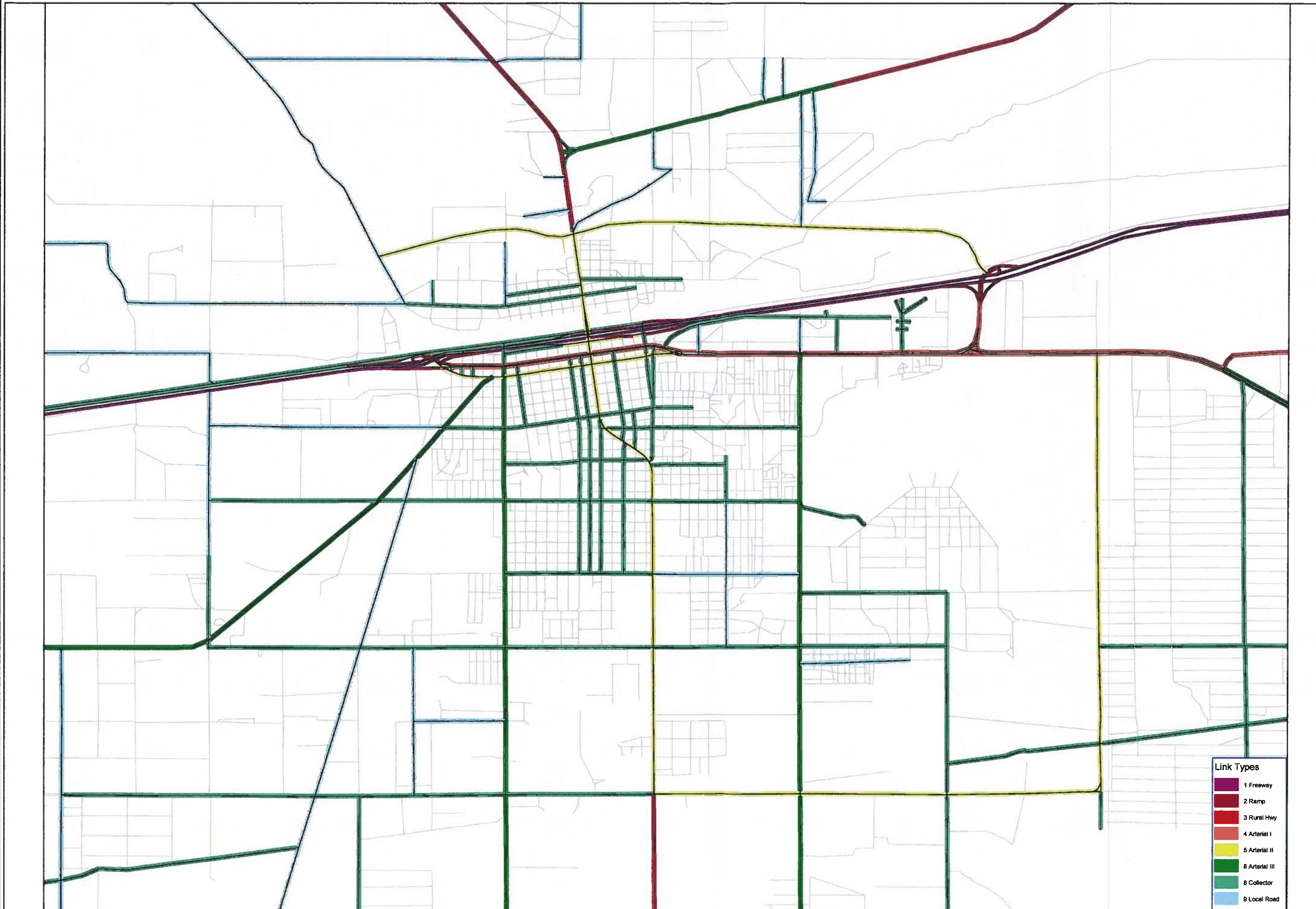
SCALE: NTS

PROJECT NUMBER: 209.209831

DRAWING FILE NAME: BASE YEAR VOLUMES

SHEET NUMBER: FIGURE 3

APPENDIX C



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DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

TRAVEL DEMAND MODEL

LINK TYPES ALTERNATIVE 1

SCALE: NTS

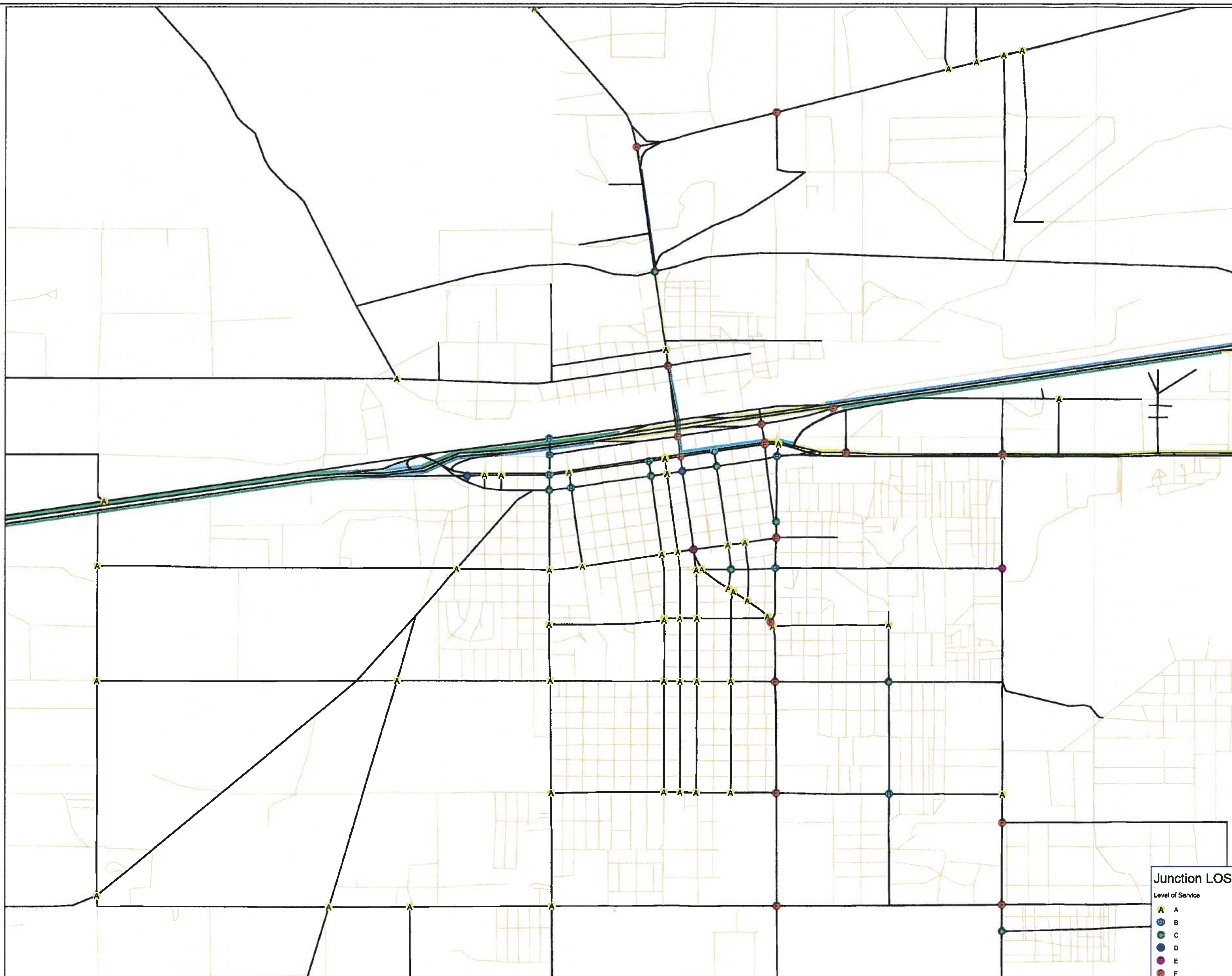
PROJECT NUMBER: 209.209831

DRAWING FILE NAME: ALT 1

SHEET NUMBER

FIGURE 4

APPENDIX C



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DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

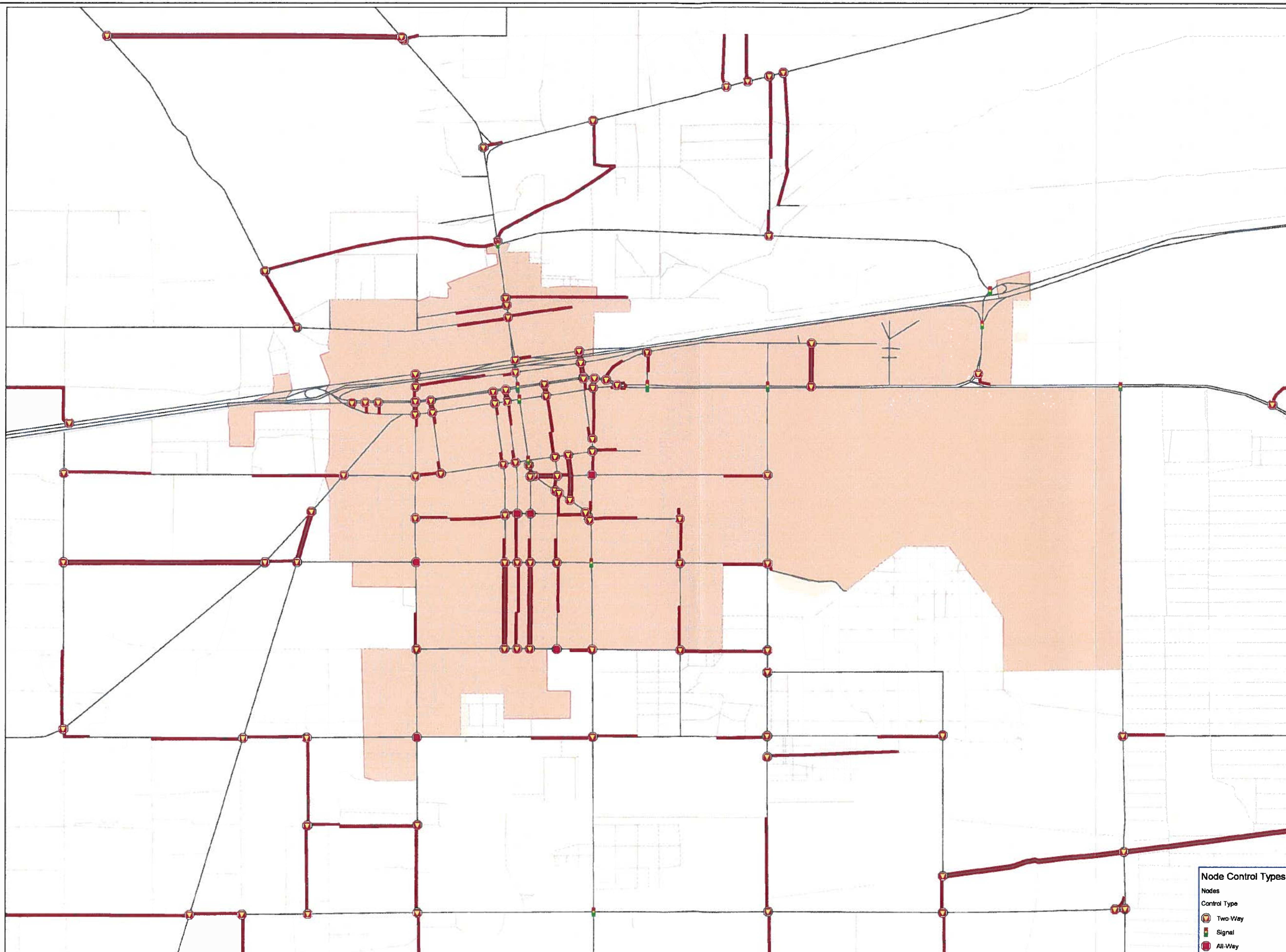
INTERSECTION LEVEL OF SERVICE (LOS) FORECAST YEAR 2030 ALTERNATIVE 1

PROJECT NUMBER	DRAWING FILE NAME	SCALE
209.209831	ALT 1	NTS

SHEET NUMBER

FIGURE 5

APPENDIX C



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DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

NODE CONTROL
ALTERNATIVE 1

SCALE: NTS

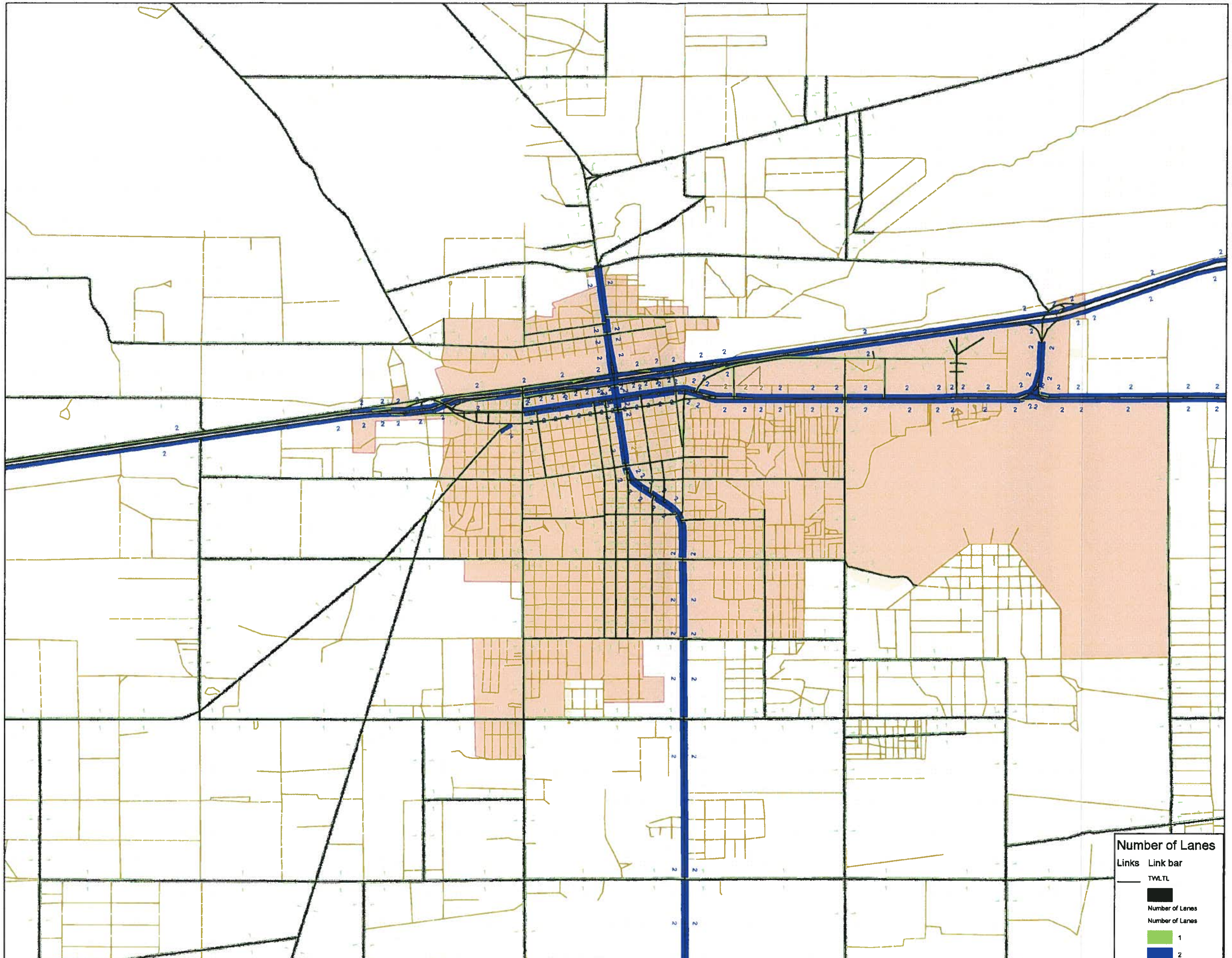
PROJECT NUMBER: 209.209831

DRAWING FILE NAME: ALT 1

SHEET NUMBER

FIGURE 6

APPENDIX C



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DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

NUMBER OF LANES WITH TWLTL
ALTERNATIVE 1

SCALE: NTS

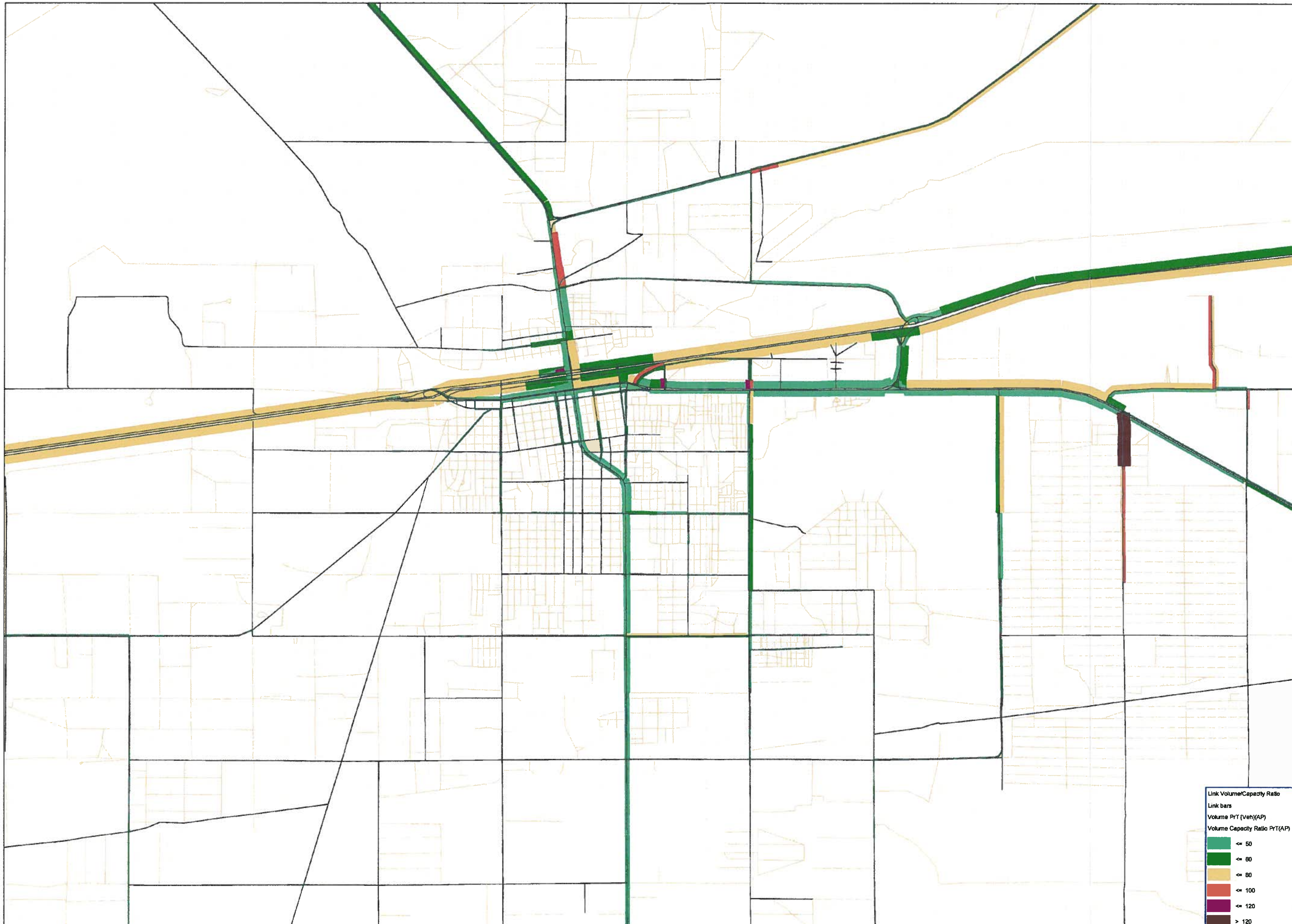
PROJECT NUMBER: 209.209831

DRAWING FILE NAME: ALT 1

SHEET NUMBER

FIGURE 7

APPENDIX C



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VOLUME-CAPACITY RATIO FOR BASE YEAR (COLOR CODED FOR V/C RATIO) ALTERNATIVE 1

PROJECT NUMBER	DRAWING FILE NAME	SCALE
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FIGURE 8

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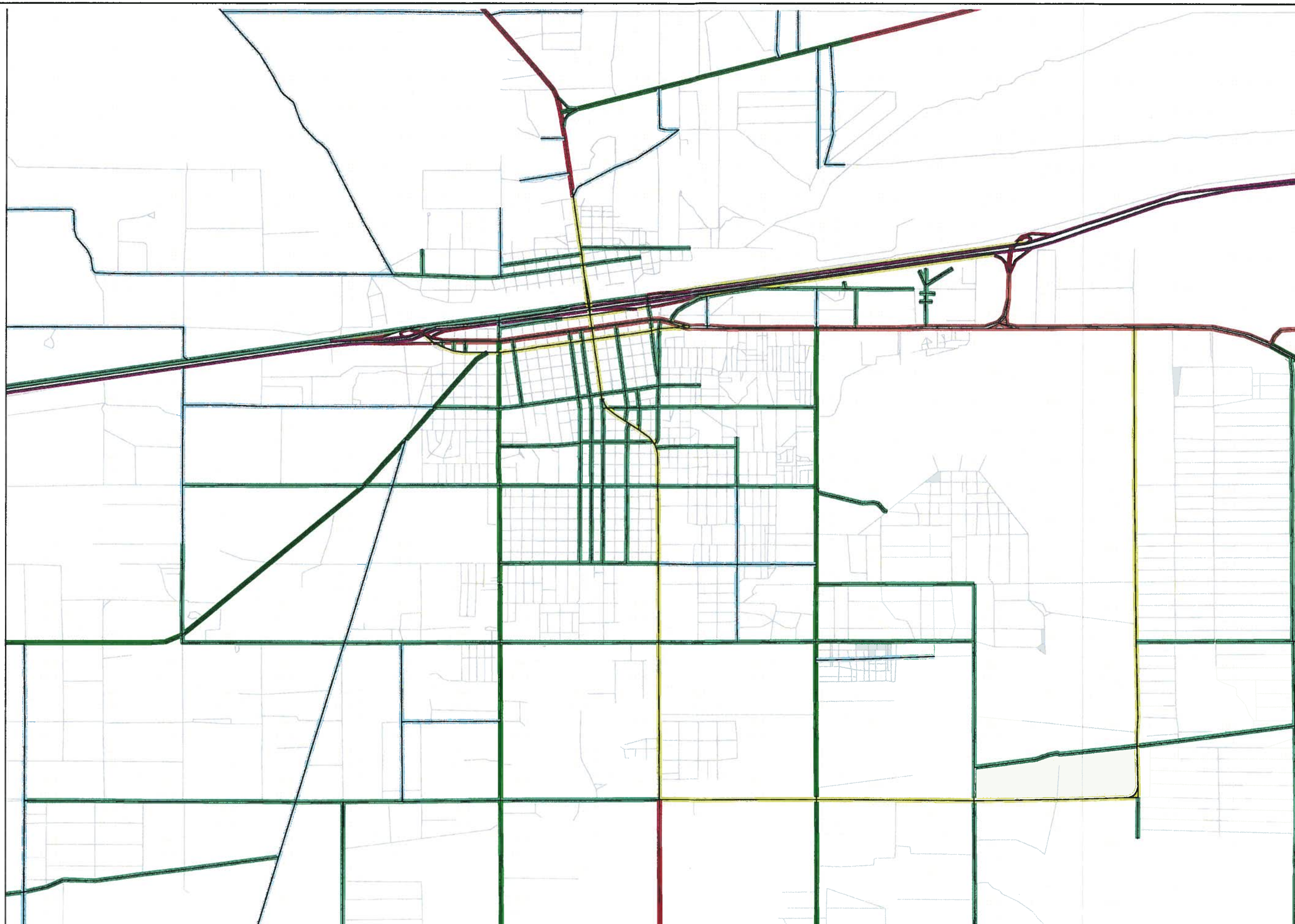
NETWORK VOLUMES
ALTERNATIVE 1

PROJECT NUMBER 209.209831
DRAWING FILE NAME ALT 1
SCALE NTS

SHEET NUMBER
FIGURE 9
APPENDIX C



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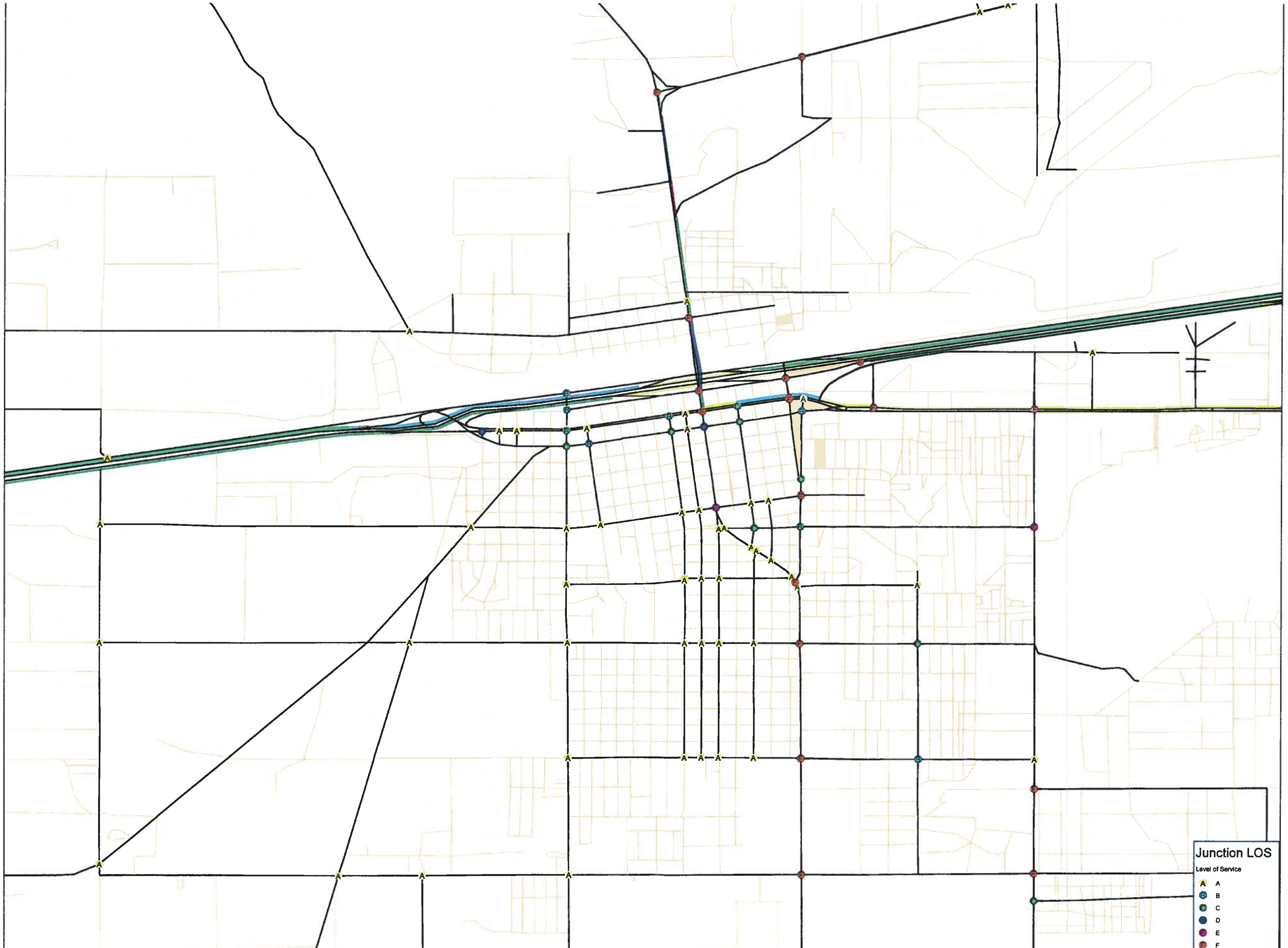
ALT. 2 TRAVEL DEMAND MODEL
LINK TYPES ALTERNATIVE 2

PROJECT NUMBER: 209.209831
DRAWING FILE NAME: ALT 2
SCALE: NTS

SHEET NUMBER
FIGURE 10
APPENDIX C



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INTERSECTION LEVEL OF SERVICE (LOS)
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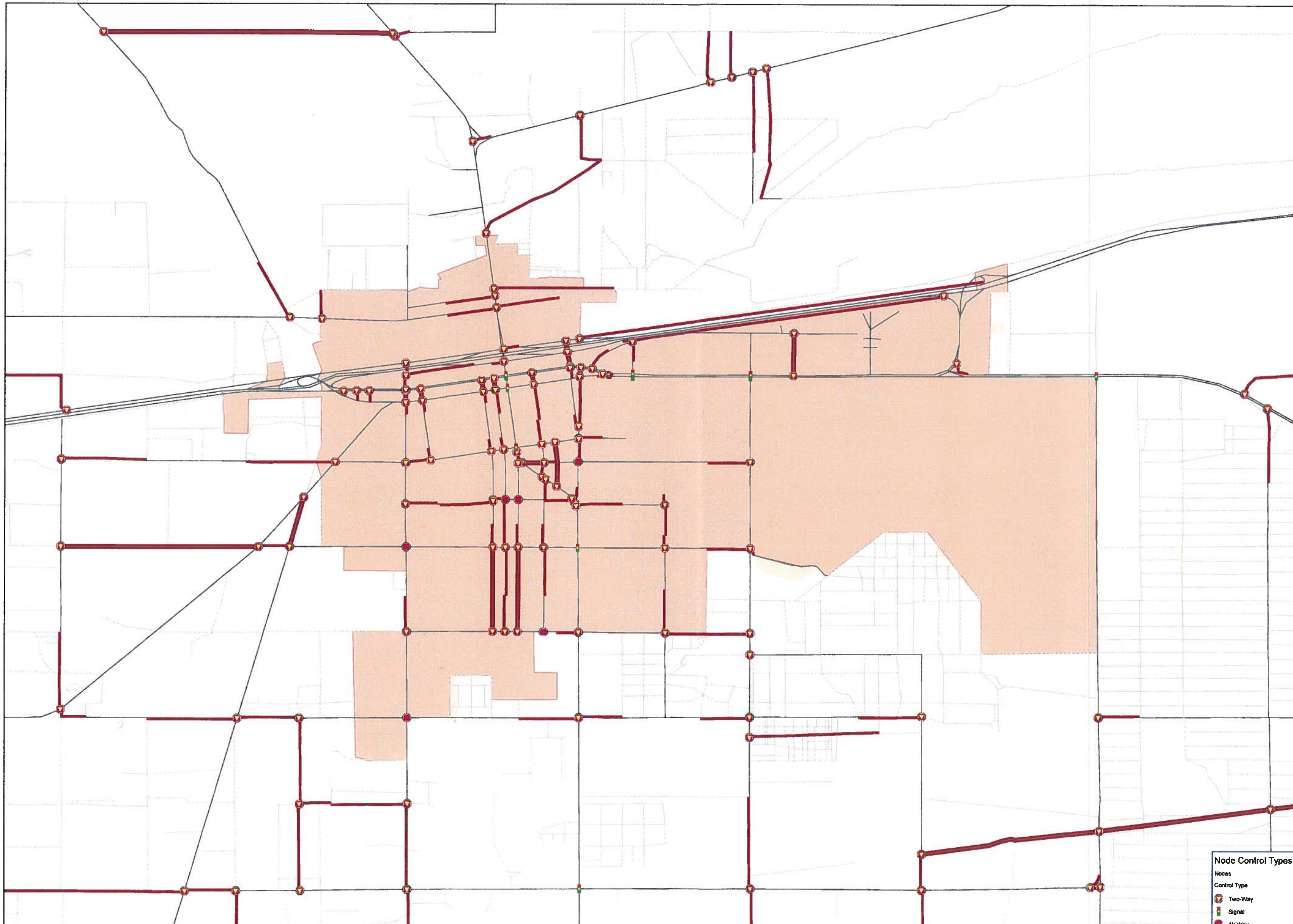
PROJECT NUMBER 209.209831
DRAWING FILE NAME ALT 2
SCALE NTS

SHEET NUMBER
FIGURE 11
APPENDIX C



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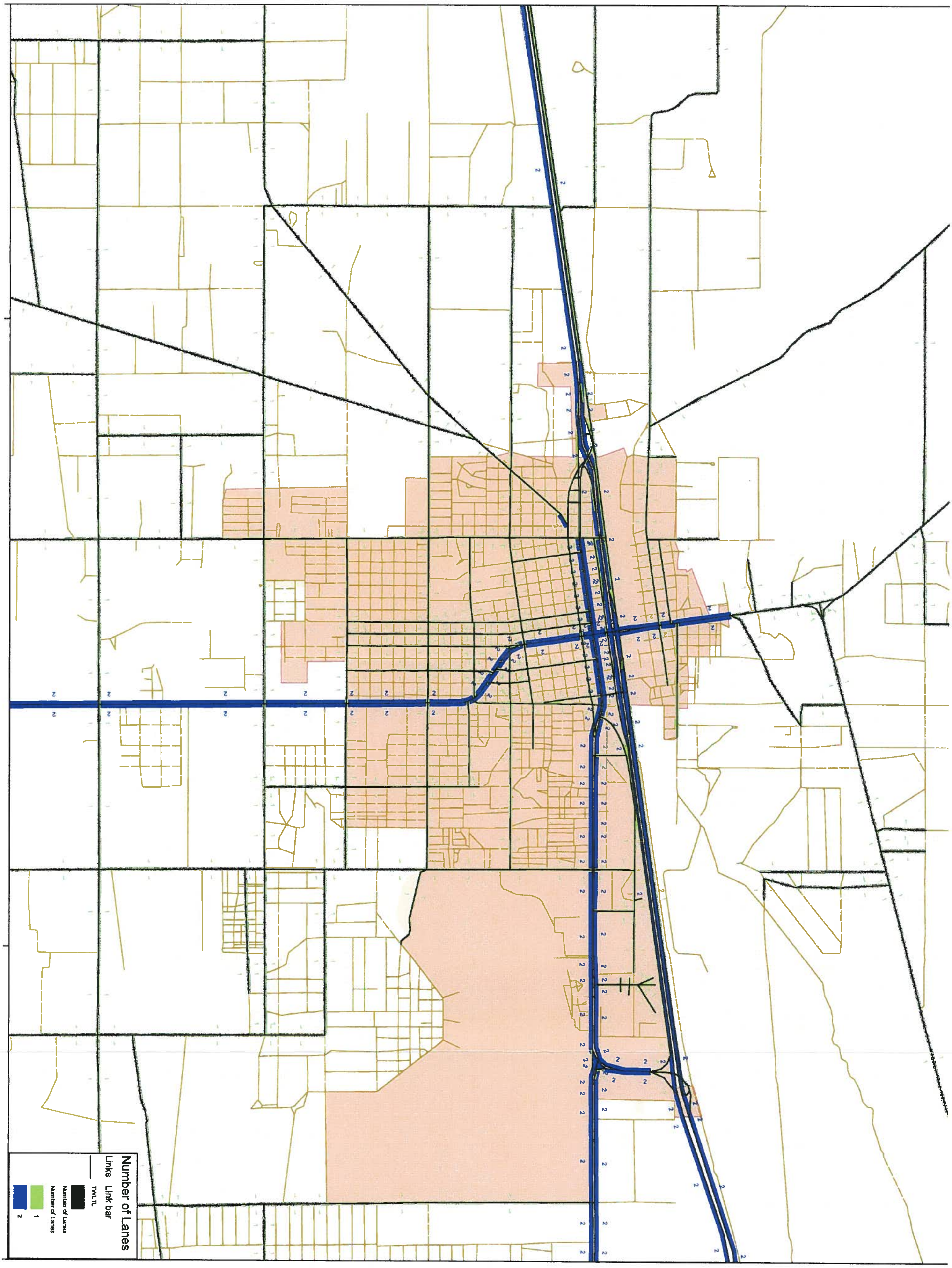
NODE CONTROL
ALTERNATIVE 2

PROJECT NUMBER	DRAWING FILE NAME	SCALE
209.209831	ALT 2	NTS

SHEET NUMBER

FIGURE 12

APPENDIX C



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NUMBER OF LANES WITH TWLTL
ALTERNATIVE 2

PROJECT NUMBER	DRAWING FILE NAME	SCALE
209.209831	ALT 2	NTS

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FIGURE 13
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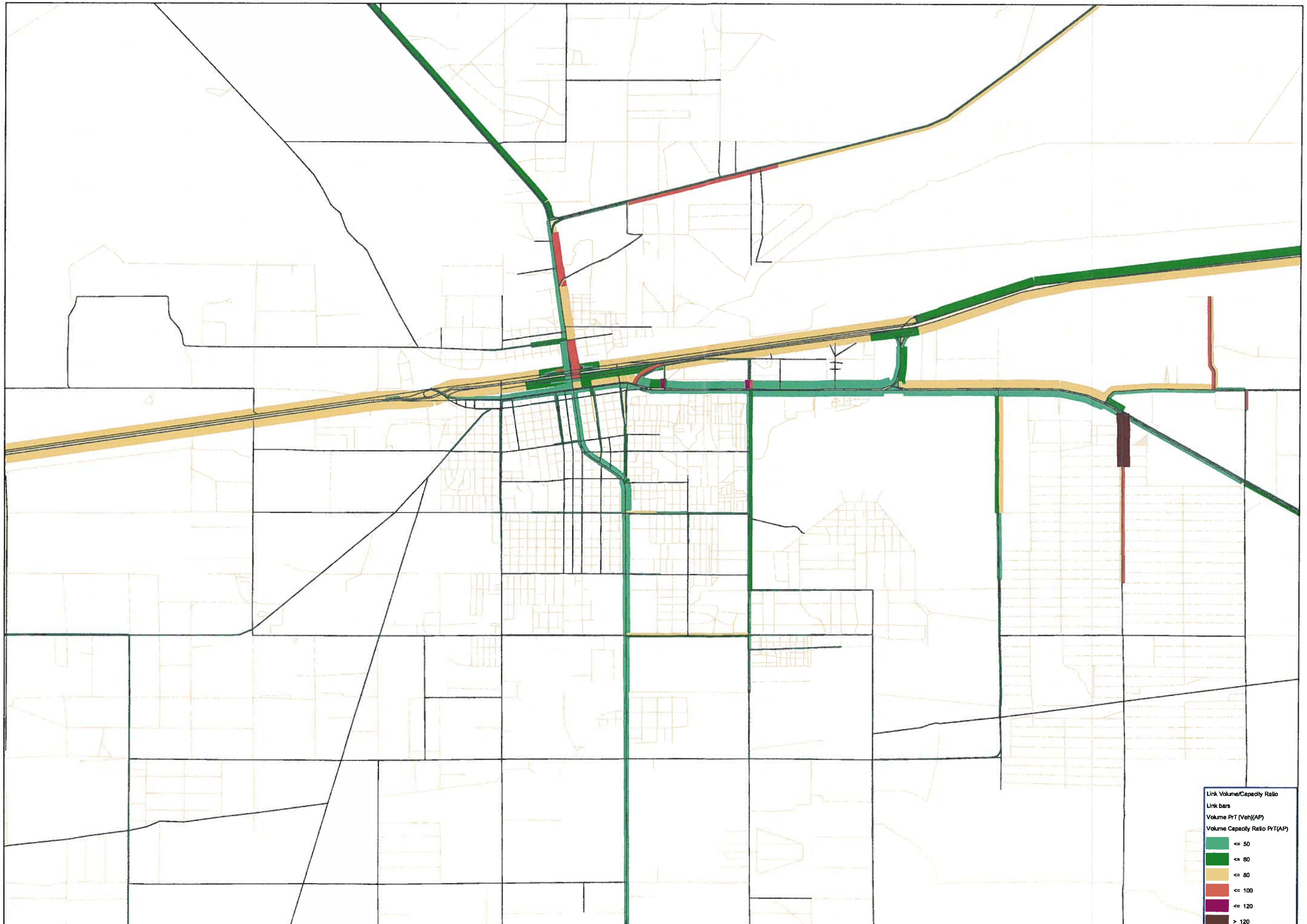

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VOLUME-CAPACITY RATIO FOR BASE YEAR (COLOR CODED FOR V/C RATIO) ALTERNATIVE 2

SCALE NTS

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FIGURE 14

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NETWORK VOLUMES 2
ALTERNATIVE 2

SCALE: NTS

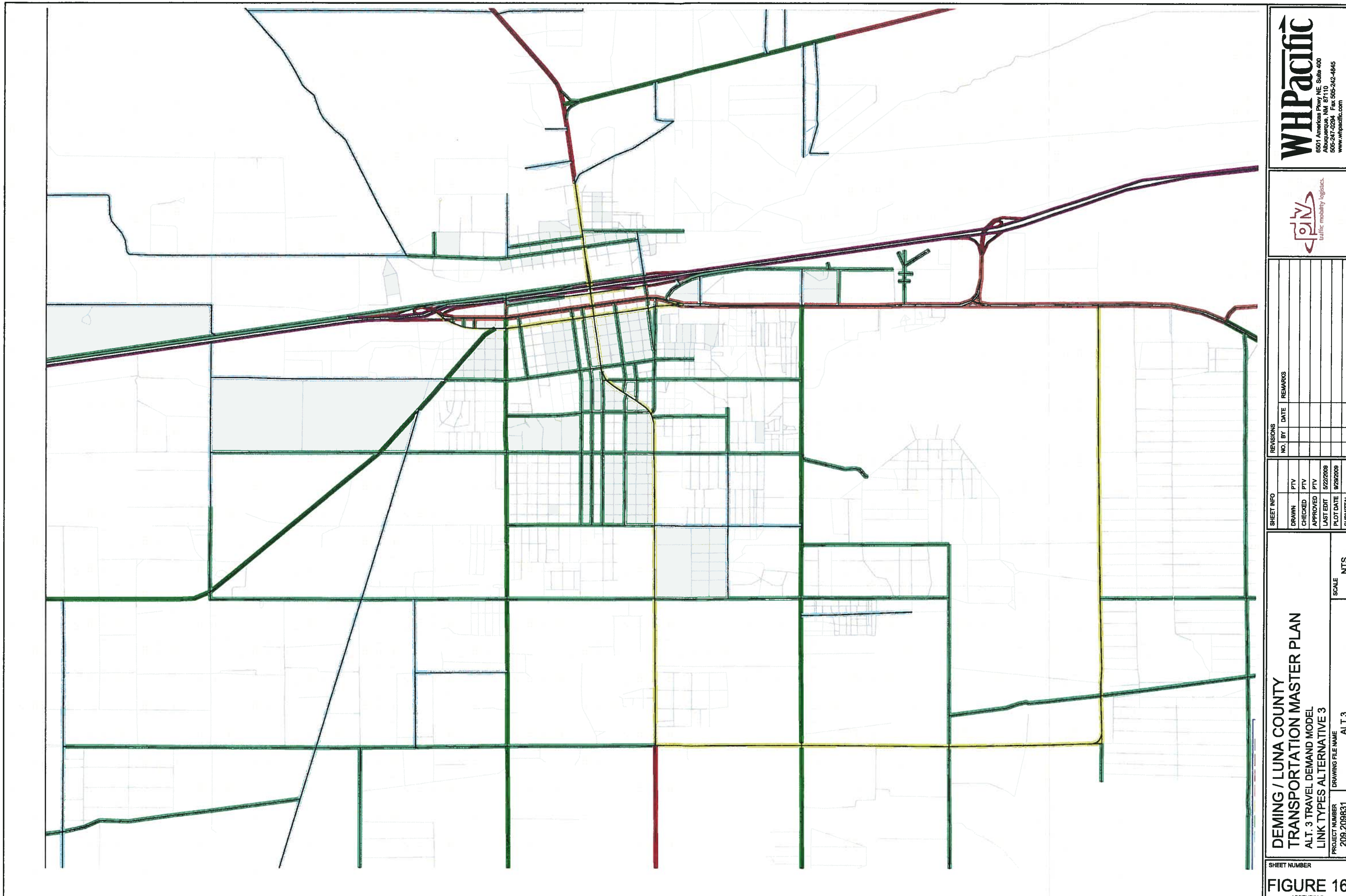
PROJECT NUMBER: 209.209831

DRAWING FILE NAME: ALT 2

SHEET NUMBER

FIGURE 15

APPENDIX C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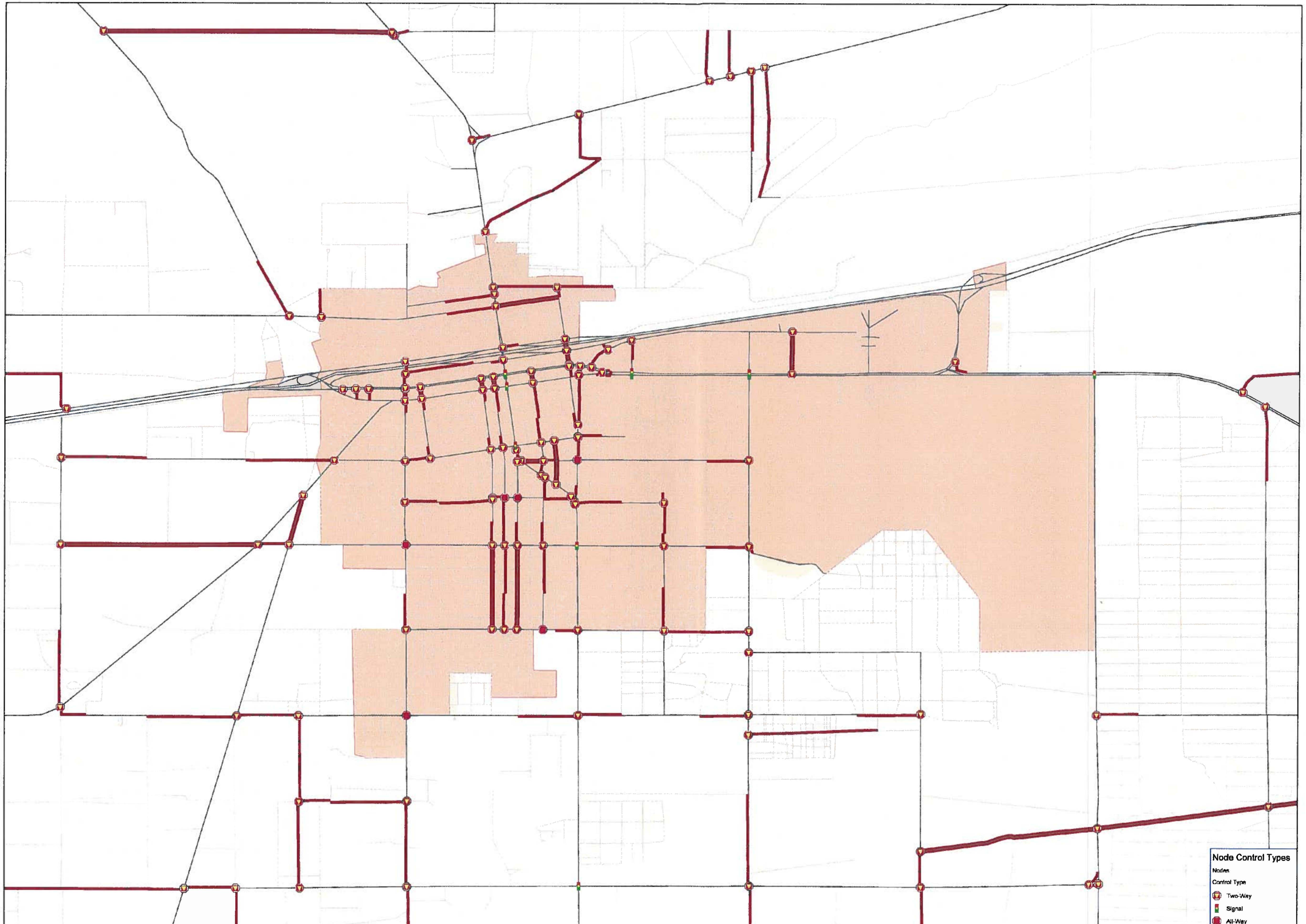
ALT. 3 TRAVEL DEMAND MODEL
LINK TYPES ALTERNATIVE 3
PROJECT NUMBER 209.209831
DRAWING FILE NAME ALT 3
SCALE NTS
SHEET NUMBER
FIGURE 16
APPENDIX C



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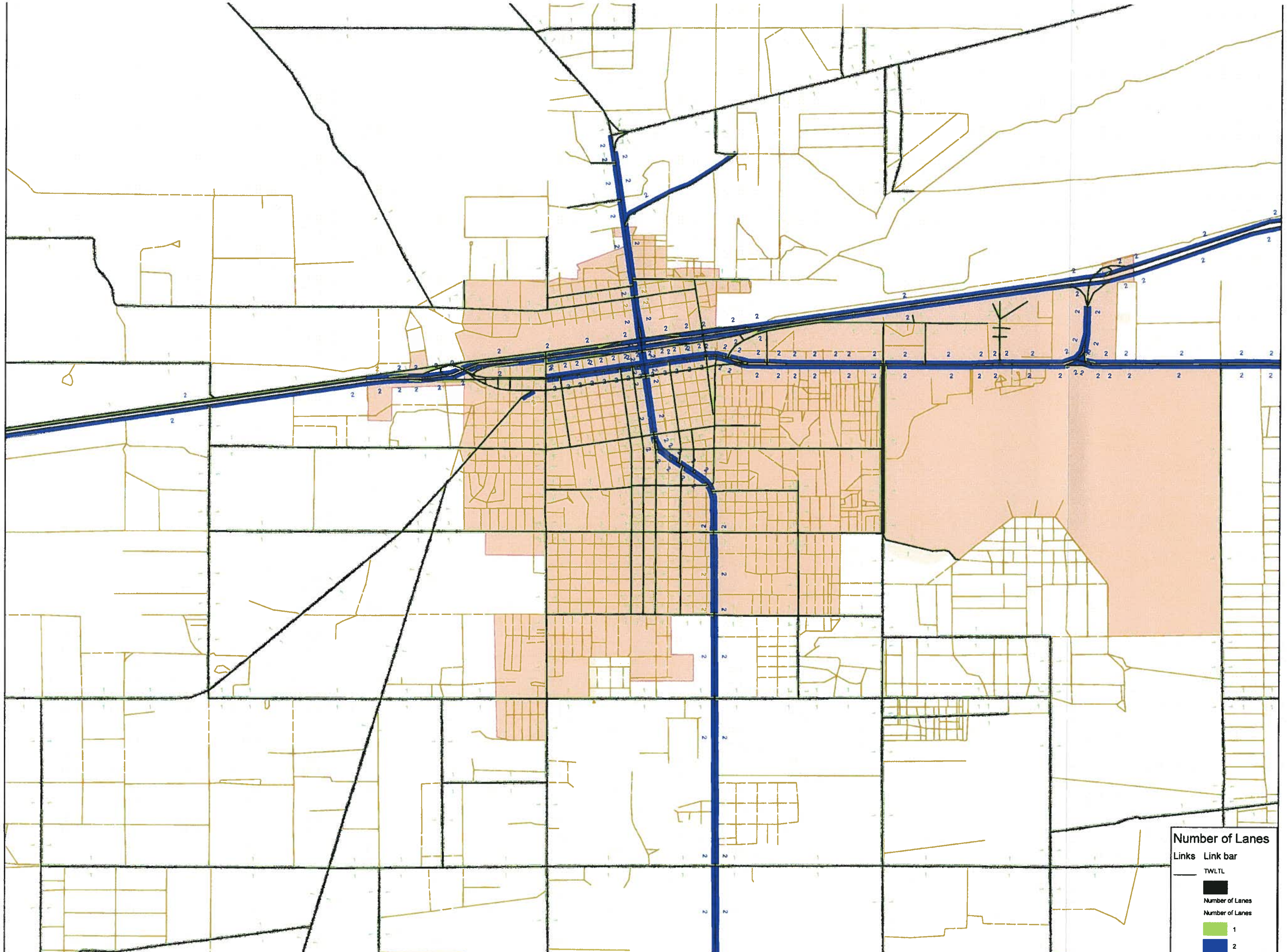
NODE CONTROL ALTERNATIVE 3

PROJECT NUMBER	DRAWING FILE NAME	SCALE
209.209831	ALT 3	NTS

SHEET NUMBER

FIGURE 17

APPENDIX C



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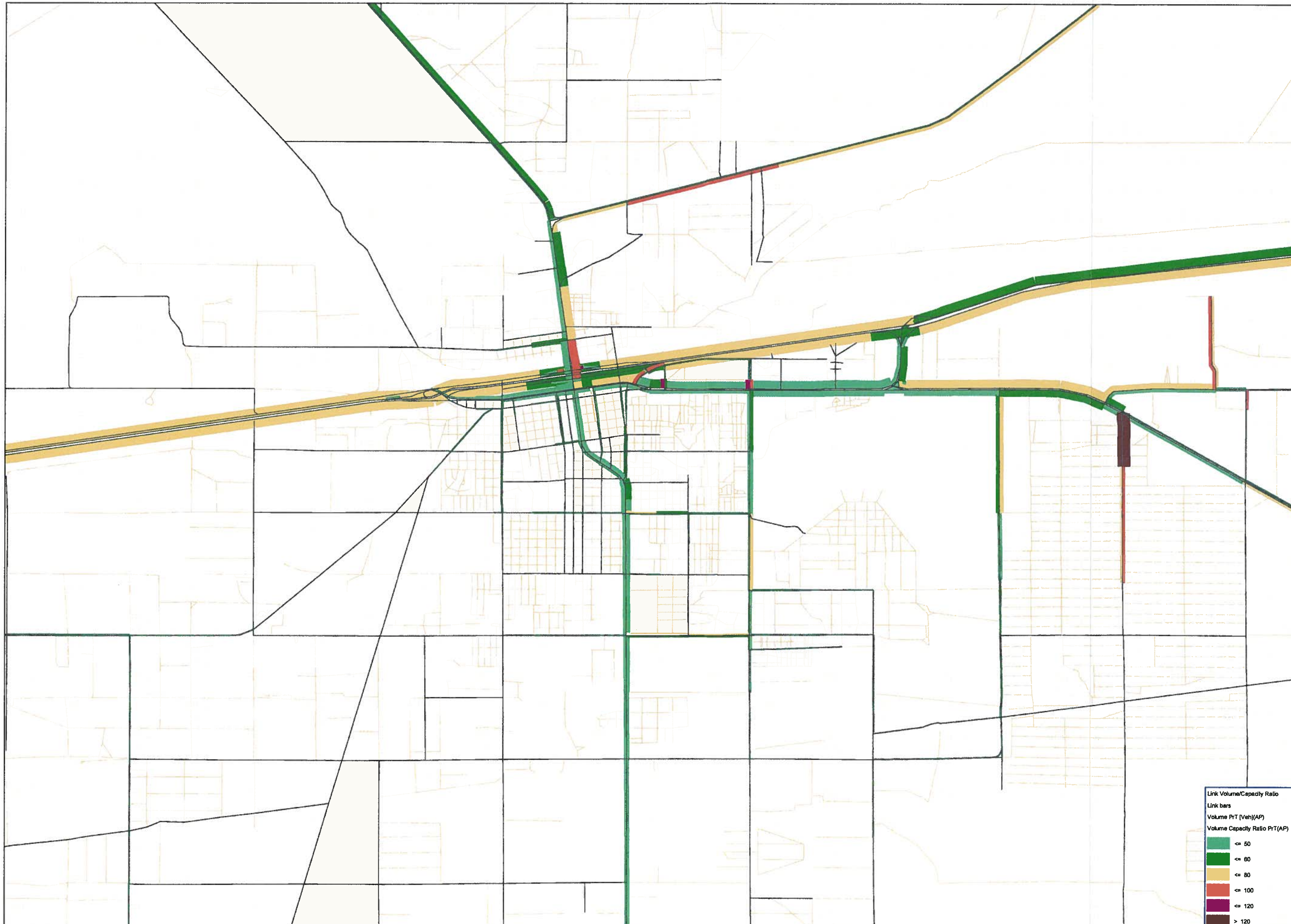
NUMBER OF LANES WITH TWLTL
ALTERNATIVE 3

PROJECT NUMBER 209.209831
DRAWING FILE NAME ALT 3
SCALE NTS

SHEET NUMBER
FIGURE 18
APPENDIX C



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VOLUME-CAPACITY RATIO FOR BASE YEAR (COLOR CODED FOR V/C RATIO) ALTERNATIVE 3

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FIGURE 19

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NETWORK VOLUMES
ALTERNATIVE 3

SCALE: NTS

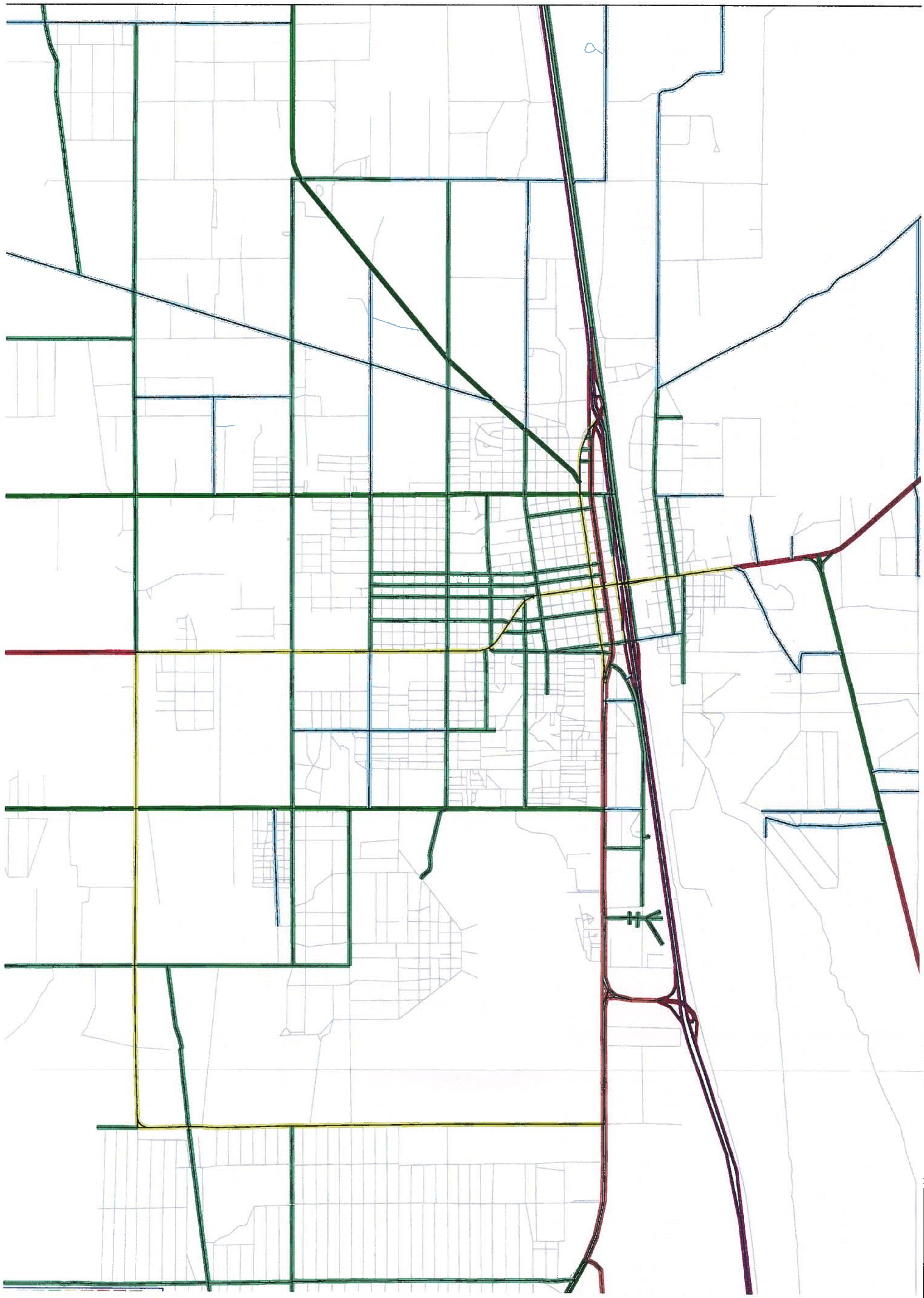
PROJECT NUMBER: 209.209831

DRAWING FILE NAME: ALT 3

SHEET NUMBER

FIGURE 20

APPENDIX C



DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN ALT. 4 TRAVEL DEMAND MODEL LINK TYPES ALTERNATIVE 4			SHEET INFO		REVISIONS
PROJECT NUMBER: 209.209831	DRAWING FILE NAME: ALT 4	SCALE: NTS	DRAWN	PTV	NO. / BY / DATE / REMARKS
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			APPROVED	PTV	
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FIGURE 21

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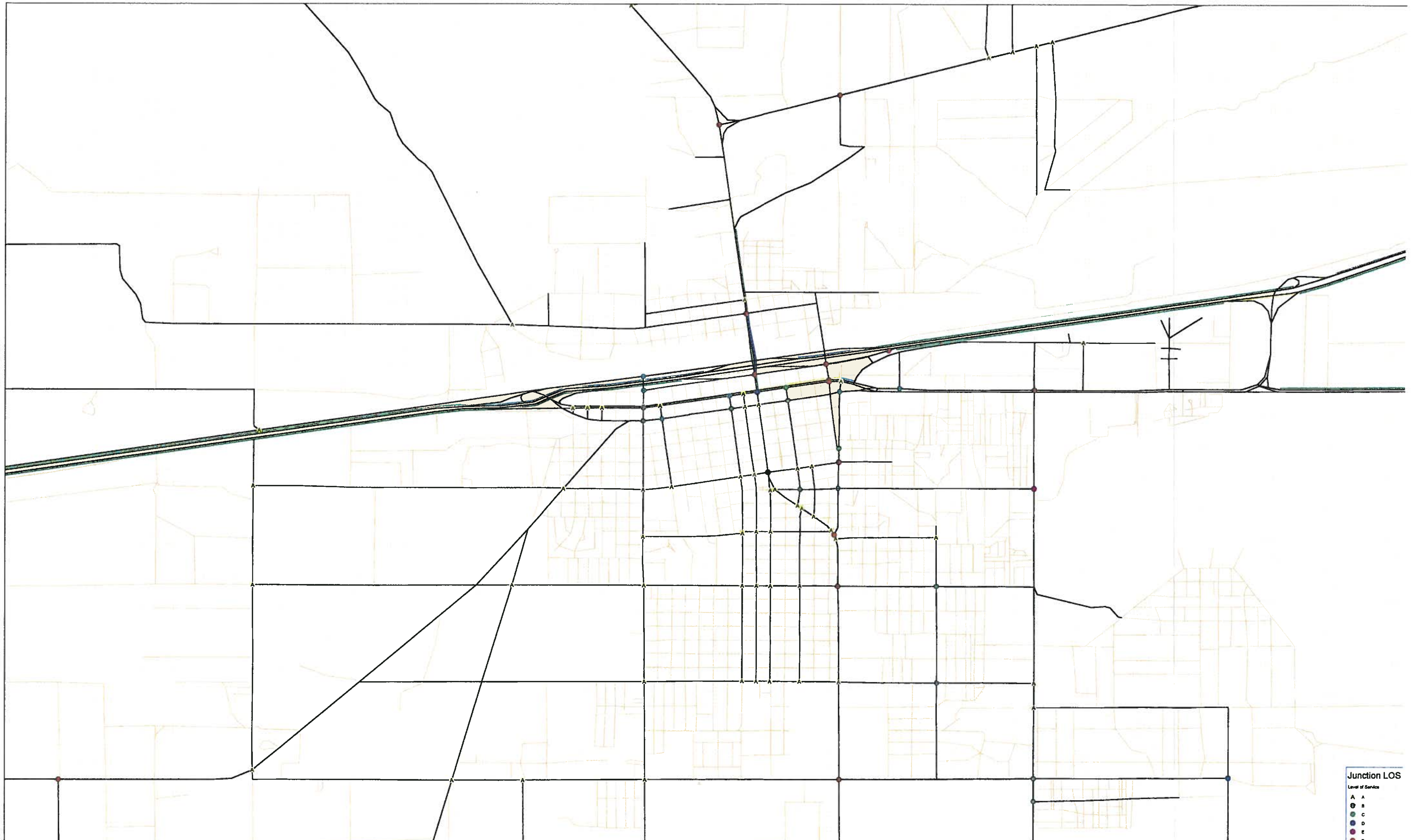

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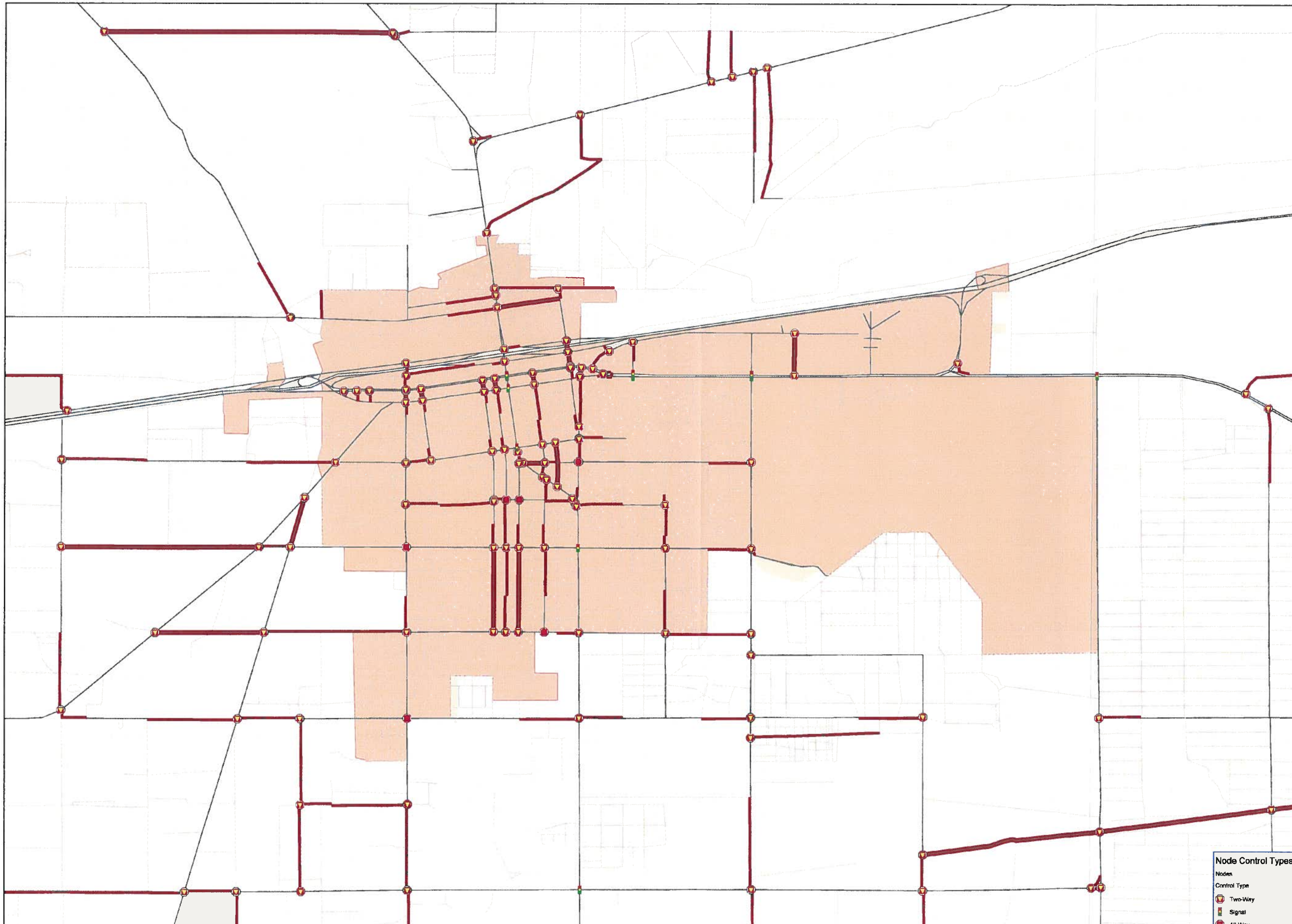
DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

ALT. 4 TRAVEL DEMAND MODEL
LINK TYPES ALTERNATIVE 4

PROJECT NUMBER: 209.209831
DRAWING FILE NAME: ALT 4
SCALE: NTS

SHEET NUMBER
FIGURE 22
APPENDIX C



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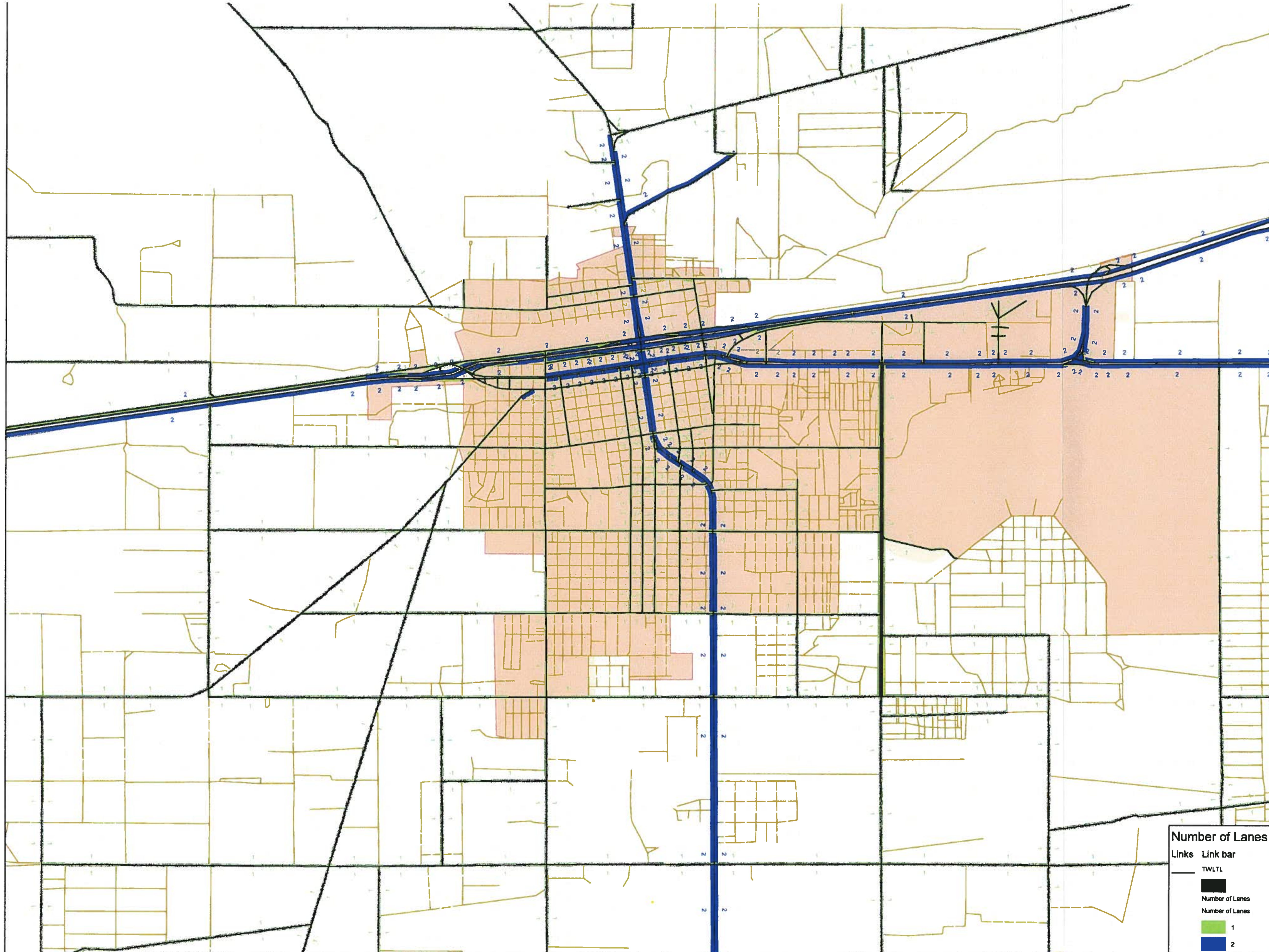
DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

NODE CONTROL
ALTERNATIVE 4

PROJECT NUMBER	DRAWING FILE NAME	SCALE
209.209831	ALT 4	NTS

SHEET NUMBER
FIGURE 23
APPENDIX C



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NUMBER OF LANES WITH TWLTL
ALTERNATIVE 4

PROJECT NUMBER	DRAWING FILE NAME	SCALE
209.209831	ALT 4	NTS

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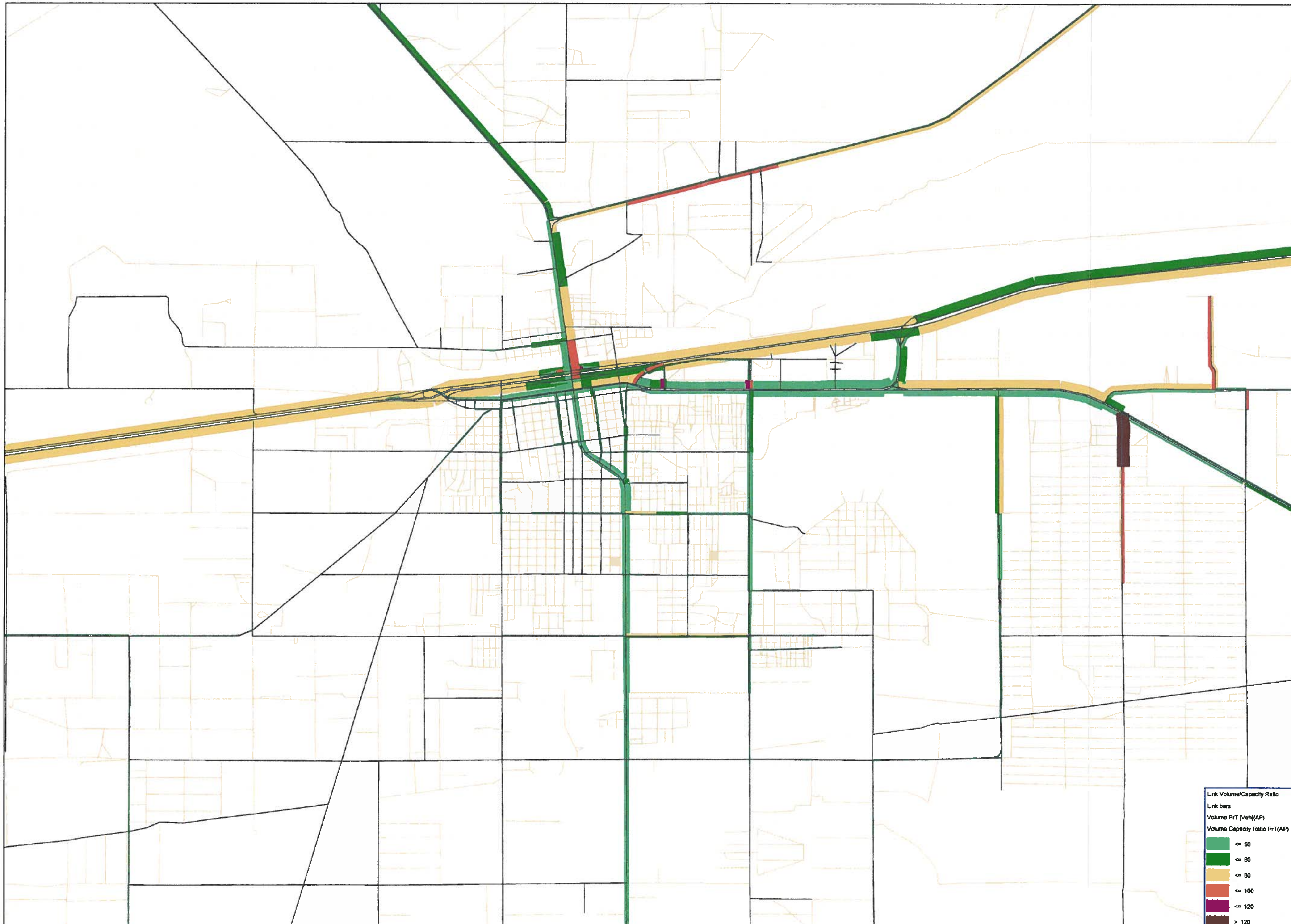
FIGURE 24
APPENDIX C



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VOLUME-CAPACITY RATIO FOR BASE YEAR
(COLOR CODED FOR V/C RATIO) ALTERNATIVE 4

PROJECT NUMBER 209.209831
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SCALE NTS

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FIGURE 25
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NETWORK VOLUMES ALTERNATIVE 4

PROJECT NUMBER	DRAWING FILE NAME	SCALE
209.209831	ALT 4	NTS

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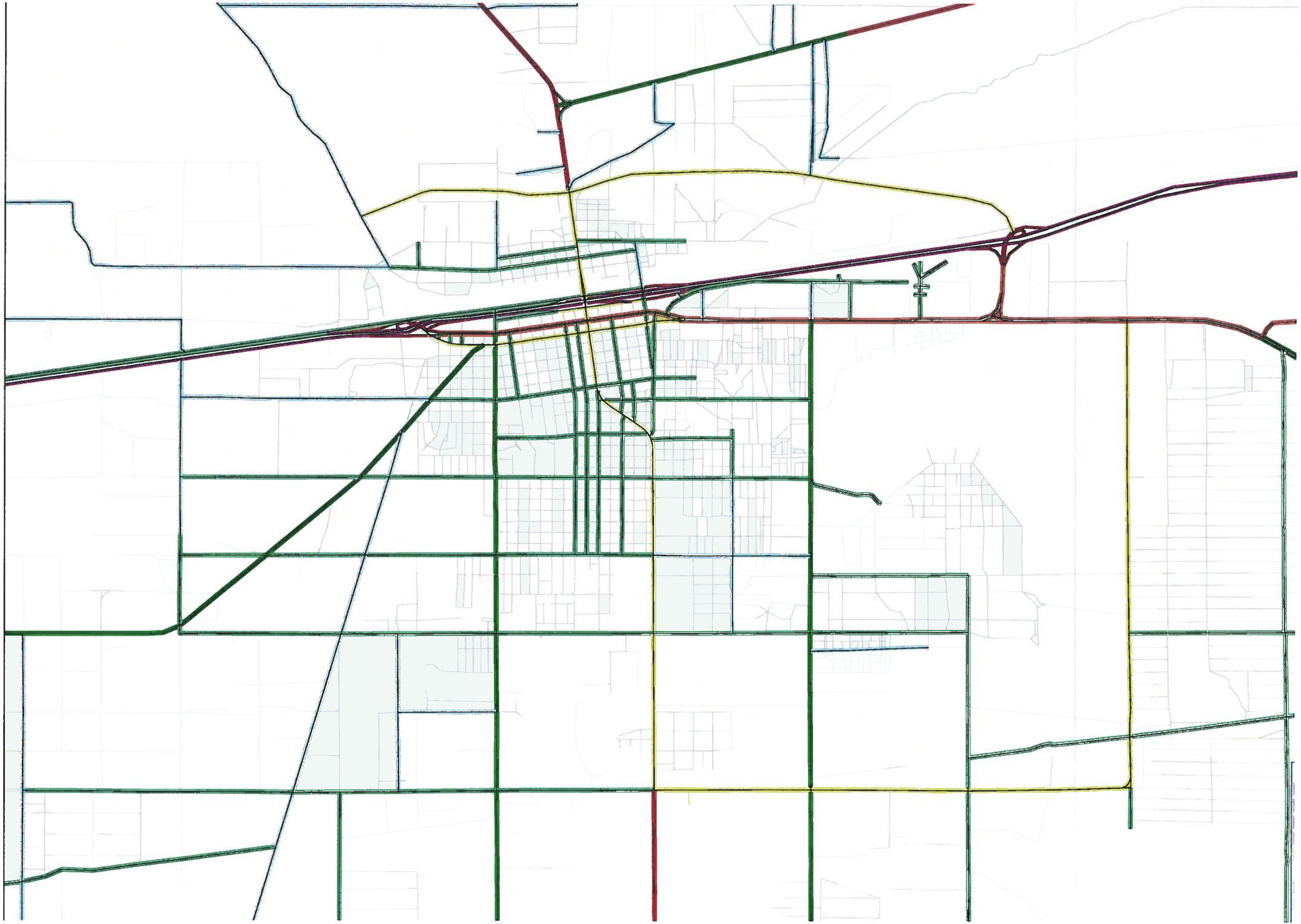
FIGURE 26

APPENDIX C



DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

ALT. 5 TRAVEL DEMAND MODEL
LINK TYPES ALTERNATIVE 5

PROJECT NUMBER	209.209831
DRAWING FILE NAME	ALT 5
SCALE	NTS

SHEET NUMBER
FIGURE 27
APPENDIX C

SHEET INFO	
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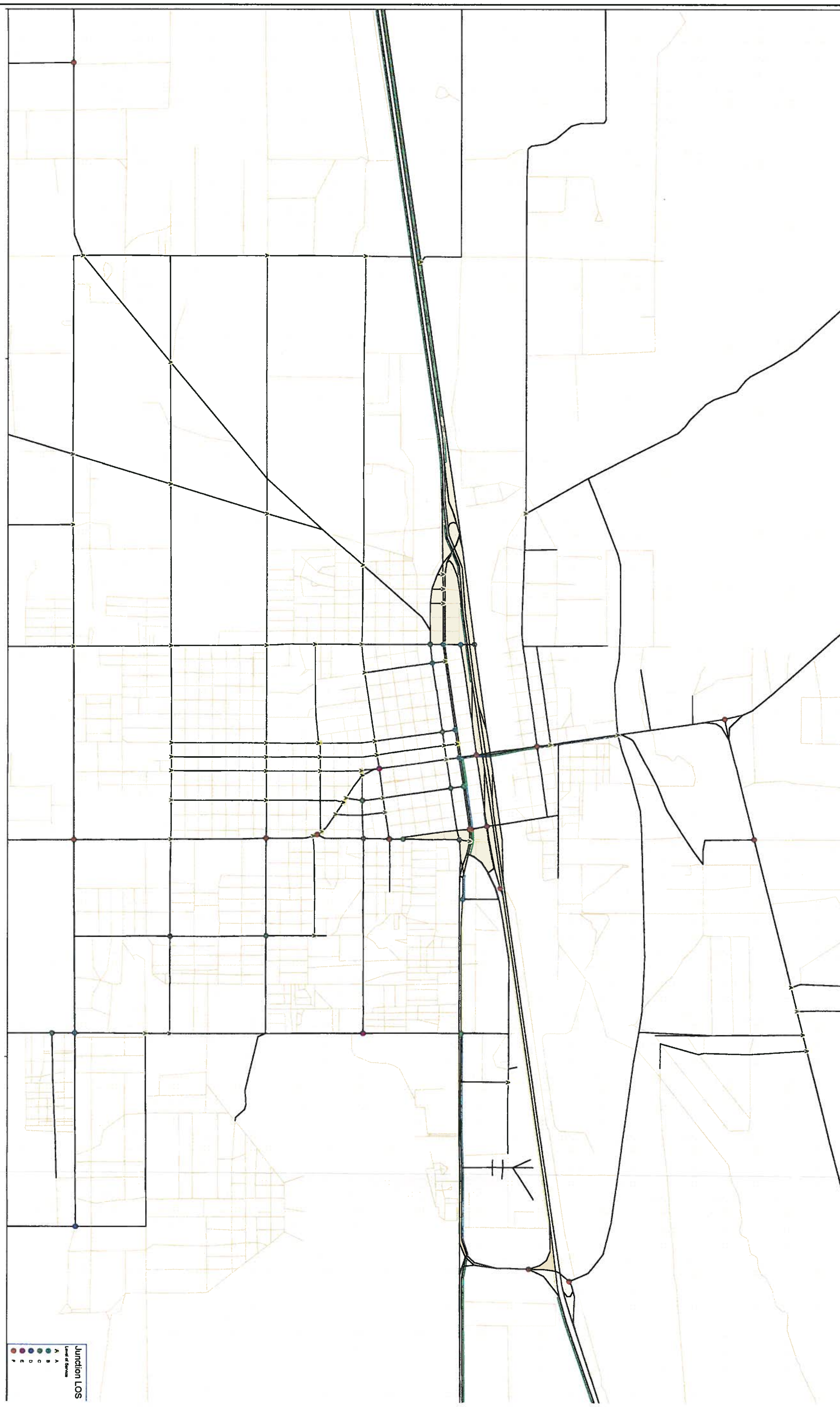

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TRANSPORTATION MASTER PLAN
NUMBER OF LANES WITH TWLTL
ALTERNATIVE 5

PROJECT NUMBER	DRAWING FILE NAME	SCALE
209.209831	ALT 5	NTS

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FIGURE 28
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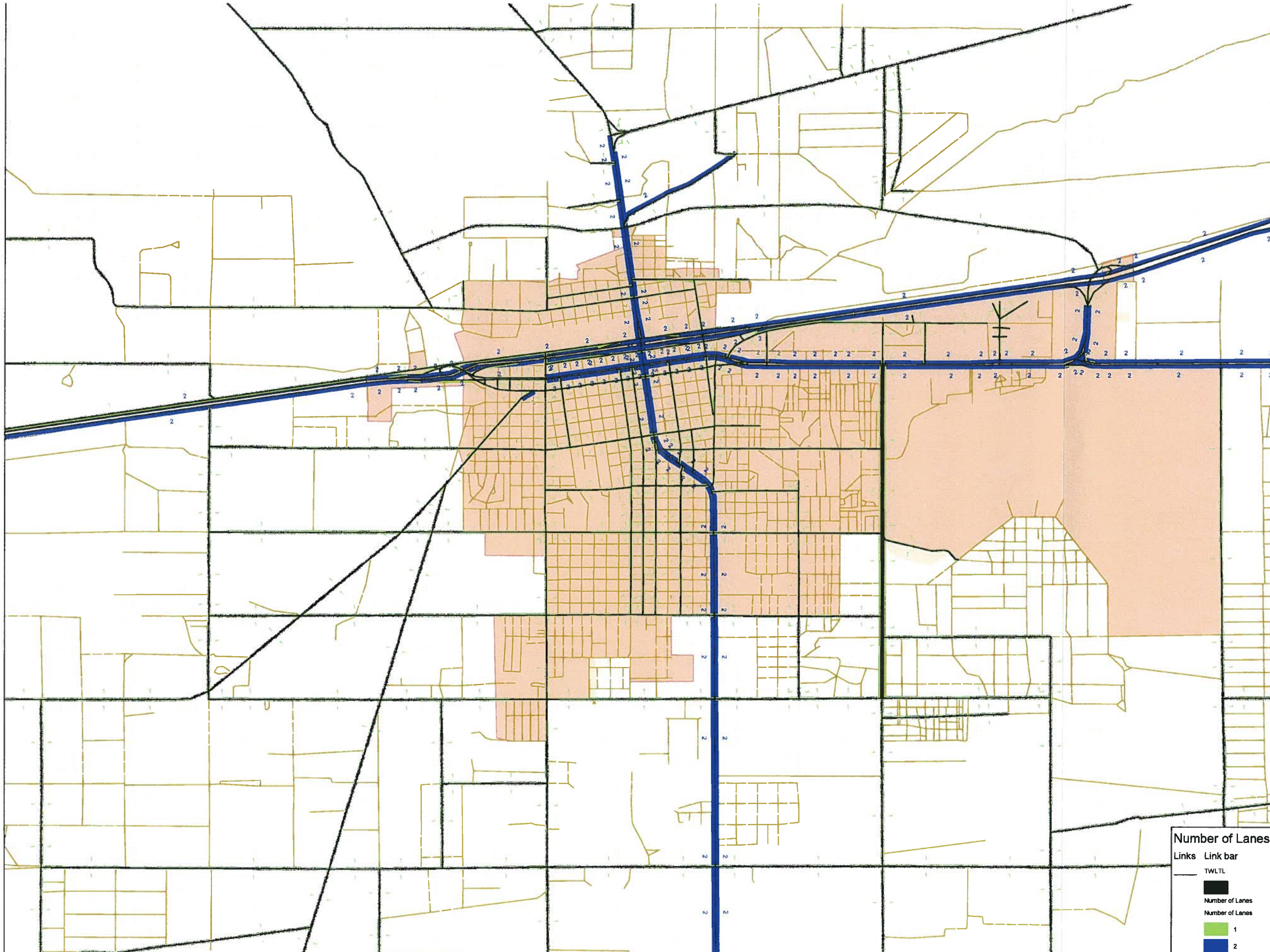

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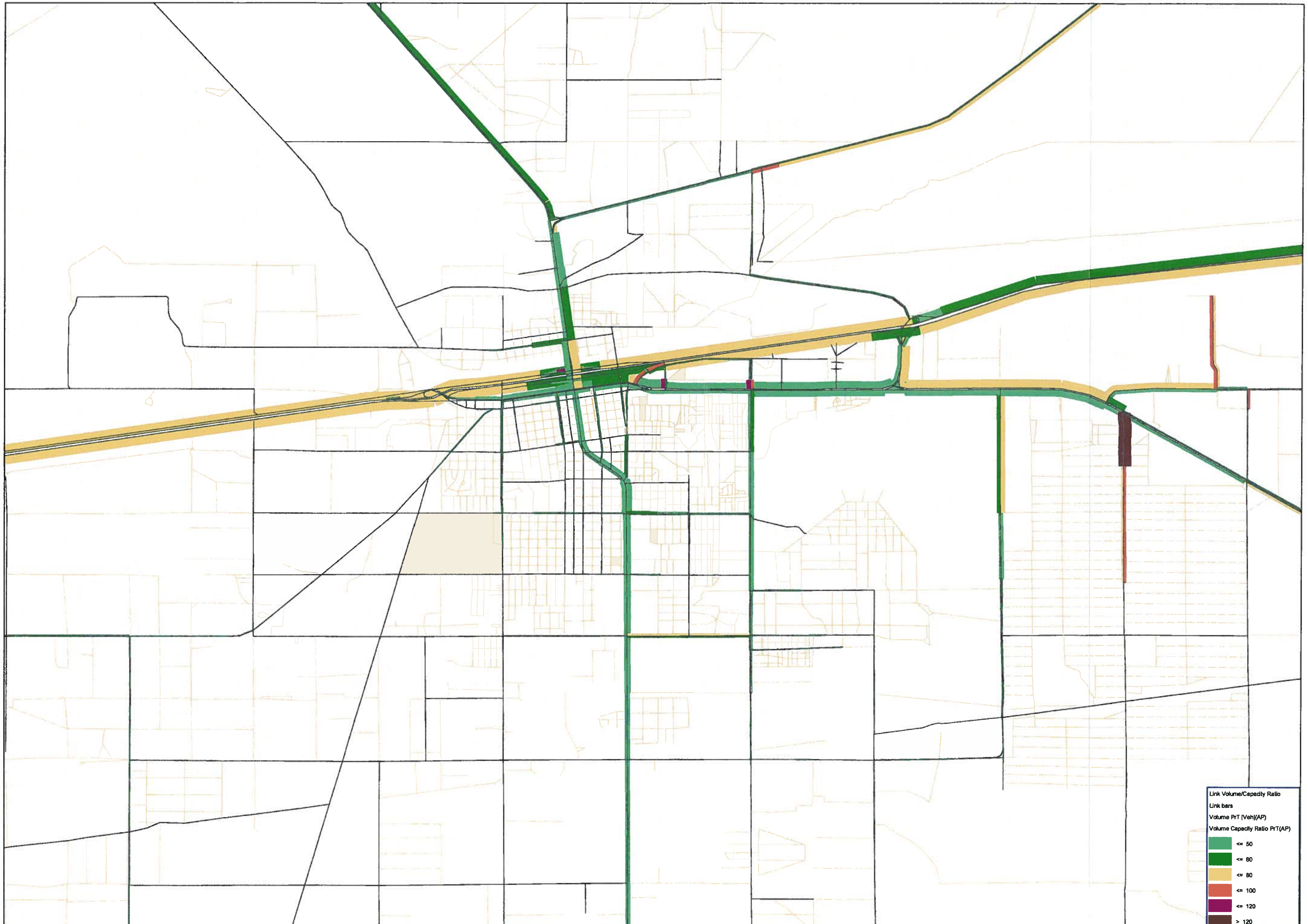
DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

NUMBER OF LANES WITH TWLTL
ALTERNATIVE 5

PROJECT NUMBER 209.209831
DRAWING FILE NAME ALT 5
SCALE NTS

SHEET NUMBER
FIGURE 29
APPENDIX C



WHPacific
6501 Americas Pkwy NE, Suite 400
Albuquerque, NM 87110
505-247-0294 Fax 505-242-4845
www.whpacific.com

PTV traffic mobility logistics.

REVISIONS

NO.	BY	DATE	REMARKS

SHEET INFO

DRAWN	PTV
CHECKED	PTV
APPROVED	PTV
LAST EDIT	5/21/2009
PLOT DATE	9/29/2009
SUBMITTAL	

DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

VOLUME-CAPACITY RATIO FOR BASE YEAR (COLOR CODED FOR V/C RATIO) ALTERNATIVE 5

SCALE: NTS

DRAWING FILE NAME: ALT 5

PROJECT NUMBER: 209.209831

SHEET NUMBER

FIGURE 30

APPENDIX C

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PTV traffic mobility logistics.

REVISIONS			
NO.	BY	DATE	REMARKS

SHEET INFO	
DRAWN	PTV
CHECKED	PTV
APPROVED	PTV
LAST EDIT	5/21/2009
PLOT DATE	8/28/2009
SUBMITTAL	

DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

NETWORK VOLUMES ALTERNATIVE 5

PROJECT NUMBER 209.209831

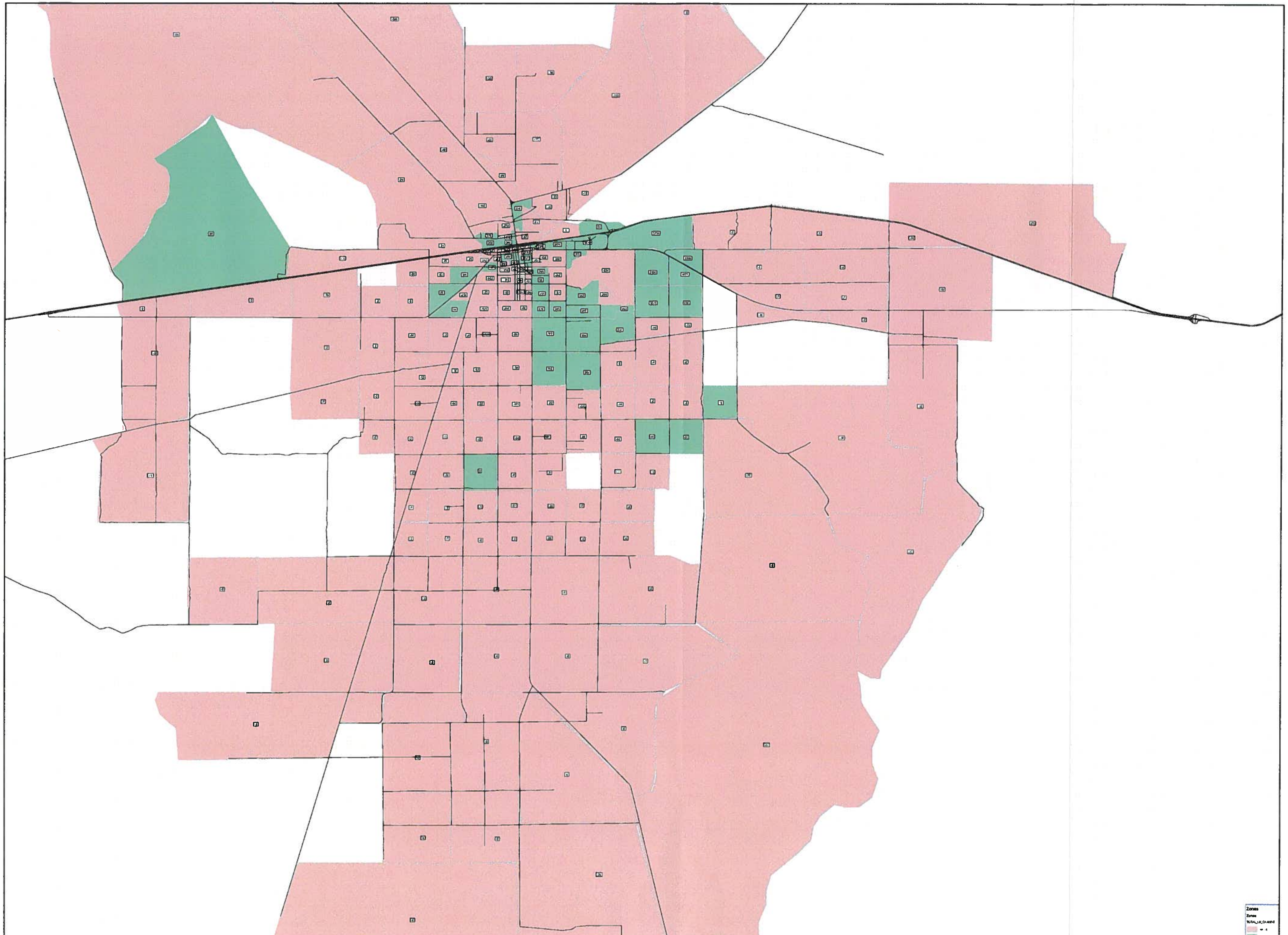
DRAWING FILE NAME ALT 5

SCALE NTS

SHEET NUMBER

FIGURE 31

APPENDIX C



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REVISIONS			
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SHEET INFO	
DRAWN	PTV
CHECKED	PTV
APPROVED	PTV
LAST EDIT	5/19/2009
PLOT DATE	9/29/2009
SUBMITTAL	

DEMING / LUNA COUNTY TRANSPORTATION MASTER PLAN

TOTAL LAND USE CHANGE FROM BASE YEAR TO FORECAST YEAR

PROJECT NUMBER 209.209831

DRAWING FILE NAME LAND USE CHANGE

SCALE NTS

SHEET NUMBER

FIGURE 32

APPENDIX C

APPENDIX D

PUBLIC INVOLVEMENT SUMMARY

SIGN-IN SHEET

PUBLIC OPEN HOUSE FOR THE
DEMING-LUNA COUNTY COMPREHENSIVE TRANSPORTATION STUDY
THURSDAY, JANUARY 24, 2008
MIMBRES VALLEY SPECIAL EVENTS CENTER – DEMING, NM

Name/Affiliation	Address	Phone Number	Fax Number	Email
Barbara Borden Deming Senior Center	800 S. Granite	546-8823	546-4076	demsrcnt@zianet.com
GENE PAULK City of Deming	309 S. Gold	546-8848	546-~~6~~442	gpaulk@cityofdeming.org.
Linda Enis City of Deming	311 S. Tin	546-4181	546-4243	lehcdem@qwest.net
RAY Trejo	501 W Florida	546-8841		Ray.Trejo@DemingPS.org
Susan Moseley SWNM Council of Govts	PO BOX 2157 Silver City NM	388-1509	388-1500	smoseley@gilanet.com
Rick McInturff	Box 706	546-8848	546-6442	rmcinturff@cityofdeming.org
Tom Bates	"	"	"	Tombates@cityofdeming.org.
Thomas F Ogas (Tom Bates) Southwest Regional Transit District	P.O. Box 1078 Deming NM 88031	(575) 544-9963	(575) 544-9033	ogast2@hotmail.com

SIGN-IN SHEET

PUBLIC OPEN HOUSE FOR THE

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THURSDAY, JANUARY 24, 2008

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ANTONIO JARAMILLO WHPACIFIC	6501 AMERICAS PARKWAY ALB. NM 87110	(505) 247-0294	(505) 242-4845	ajaramillo@whpacific.com
Don Darnell Resident	Deming NM 88030 2115 Lori Dr	544-4937		dondarnell@swnm[illegible]
Misty A. Jaime resident	1114 S. 9th St. Deming	(505) 694-5014		evrythinblu@yahoo.com
Peggy & Joel Chinkes	P.O.B. 720 Columbus	575-531-1717		
Brian Dunnikoo	501 W. FLORIDA Deming NM 88030	494-5921		brian.dunnikoo@demingnm.org
Rick Little	5375 Holstein Rd SE Deming NM 88030	546 8015		ricksrocks@swnm.com
DAVID Z Sanchez City Council Dist 1	409 S. Yucca DR	546 3155		dsanchez505@msn.com

COMMENT SHEET

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Transit needs to be included in "user friendly" transportation. When making road improvements/infrastructure planning, it needs to ~~be~~ include bus stops - acceleration/deceleration lanes as well as bus shelter planning.

Printed Name Thomas Ogas

Street Address ~~P.O. 1078~~ P.O Box 1078

City Deming State NM Zip 88031

Mailing Address (if different) ogastz@hotmail.com

Telephone/E-mail address: ↖

Please leave your comments with the project team, fax them to: (505) 348-4055, e-mail to Timothy.Simmons@wilsonco.com, or mail them to: Timothy Simmons, Wilson & Company, 4900 Lang Ave. N.E., Albuquerque, NM 87109. If you have questions, please call Tim Simmons at (800) 254-5345.

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My concern:

8th St. / Florida —— Columbus —— Country Club

Printed Name Misty A. Jaime

Street Address 1114 S. 9th St.

City Deming State NM Zip 88030

Mailing Address (if different)

Telephone/E-mail address: 5056945614 / evrythinblu@yahoo.com

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Ideas and Suggestions from Gov. Official Meeting

Gold Street
Spruce Street
Pine Street
Cedar Street at Intersection
Truck Bypass
Senior Center – Access at Grand
Intersection of 549 and E. Motel Road
549, Country Club, Florida – Increase to three lane section
Realignment of Raymond Reed
El Paso MPO, Possible relief route
New Subdivision at 549 / Tapia Subdivision (250 units)
Pedestrian access – trail near pit park and golf course and possibly extend to Dona Ana
A lot of pedestrian traffic on Dona Ana east and west of Highway 11
Multi Use trail off set from roadway
Pear / 8th street
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Bus Stops – Contact Claudia Jefferies for route from NMSU to Deming
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Concerns from Public Meeting

Signal operations and timing
Pedestrian Access / waking Paths
- Existing residential areas and new schools
- Pit Park
- High School Tack
- Both for Destination and recreation
- Along Florida

Truck bypass off of Highway 11
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Cedar to extend from Country Club road to near 'La Quinta'

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I-10 and 549 traffic congestion
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On Street parking is obstruction for turning downtown
Downtown street parking is a problem
Additional roads to hold truck traffic
Sign clutter on Pine and Gold

SIGN-IN SHEET

PUBLIC OPEN HOUSE FOR THE

DEMING-LUNA COUNTY COMPREHENSIVE TRANSPORTATION STUDY

THURSDAY, JANUARY 24, 2008

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RAY Trejo	501 W Florida	546-8841		Ray.Trejo@DemingPS.org
Susan Moseley SWNM Council of Govts	PO BOX 2157 Silver City NM	388-1509	388-1500	smoseley@gilanet.com
Rick McInturff	Box 706	546-8848	546-6142	rmcinturff@cityofdeming.org
Tom Bates	"	"	"	Tombates@cityofdeming.org
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Misty A. Jaime resident	1114 S. 9th St. Deming	(505) 694-5014		evrythinblu@yahoo.com
Peggy & Joel Chinkes	P.O.B. T20 Columbus	575-531-1717		
Brian Dunniko	501 W. FLORIDA Deming NM 88030	484-5981		brian.dunniko@[illegible]
Rick Little	5375 Holstein Rd SE Deming NM 88030	546 8015		ricksrocks@swnm.com
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City Deming State NM Zip 88631

Mailing Address (if different) Ogastz@hotmail.com

Telephone/E-mail address: ↙

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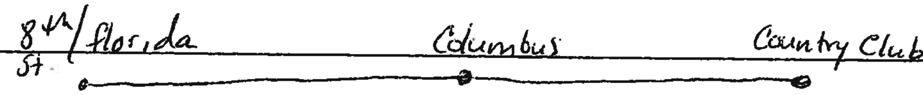

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