10 Transportation

This chapter considers a full complement of transportation components, including trails, pedestrian and bicycle facilities, transit, roads, railroads, airports and airfields. It describes a balanced local transportation system built upon LPlan 2040's vision.

1. Introduction

This Transportation chapter is a companion to the 2040 Lincoln Metropolitan Planning Organization (MPO) *Long Range Transportation Plan* (LRTP). Together these documents provide the blueprint for the area's transportation planning process over the next 30 years. The transportation planning process is a collaborative effort between the City of Lincoln, Lancaster County, the Nebraska Department of Roads (NDOR), StarTran transit and other agencies, where the multimodal transportation system was evaluated and a set of recommendations were made with extensive public input. The transportation plan meets federal requirements and addresses the goals, objectives, and strategies to meet the community's vision for the future and was developed as an integrated part of LPlan 2040. The LRTP provides additional detailed financial information to meet federal requirements.

While the LRTP update is federally required for all MPOs every five years, the regular update provides the community an opportunity to also update the Comprehensive Plan to identify what challenges and opportunities may lay ahead, to re-examine values as they relate to urban travel and development patterns and to communicate about what

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they think the transportation system should look like in the future. The Lincoln-Lancaster County Comprehensive Plan and MPO LRTP, in accordance with federal requirements, addresses transportation system needs and provides a set of methods, strategies, and actions for developing an integrated, fiscally constrained multimodal transportation system that supports the efficient movement of people and goods.

The Lincoln-Lancaster County Comprehensive Plan and MPO LRTP cover the transportation systems of the jurisdictions located within the Lincoln Metropolitan Planning Area (MPA). The LRTP considers the interdependent nature of the metropolitan area's multimodal transportation systems through addressing the region's roadway, transit, bicycle, and pedestrian modes in a combined effort. The study area is illustrated on Map 10.3: Existing Functional Classification in section 2.

Vision for Transportation

The Vision for Transportation in Lincoln and Lancaster County is a safe, efficient and sustainable transportation system that enhances the quality of life, livability, and economic vitality of the community. The following four principles guide the plan toward that goal:

A Connected City. In Lincoln and Lancaster County, the unifying qualities of transportation will be emphasized. Neighborhoods, activity and employment centers, rural communities, and open lands should be connected by a continuous network of public ways. The transportation network needs to sustain the One Community concept by linking neighborhoods and rural communities together.

A Balanced Transportation System. Transportation planning in Lincoln will be guided by the principle of balancing needs and expectations. It will recognize that transportation is a means to the goal of a unified, livable, and economically strong community. The system needs to effectively move people and goods around the community, while minimizing impacts on established neighborhoods and investments. The concept of balance also applies to modes of transportation. While the system must function well for motor vehicles, it should also promote public transportation, bicycling, and walking as viable alternatives now and into the future.

Transportation as a Formative System. Transportation and land use are linked systems that are subject to change by growth and development. The land use plan, which includes projections of future development, determines the character of the transportation plan. On the other hand, transportation has a major impact on the form of developing areas. Lincoln and Lancaster County will use transportation improvements to reinforce desirable land use development patterns.

Planning as a Process. Transportation planning is a dynamic process, responding to such factors as community growth, development directions, and social and lifestyle changes. Therefore, the Comprehensive Plan and LRTP employ an ongoing process that responds to these changes.

Reason for Planning

LPlan 2040 anticipates many changes over the 30 year planning period. Changing demographics and employment patterns will create challenges for provision of transportation services and facilities. LPlan 2040 strengthens the connection between land use decisions and transportation needs. At the same time, Lincoln and Lancaster County face significant financial challenges in the construction of new transportation facilities and the care and maintenance of an expanding and aging system.

LPlan 2040 proposes a new way of looking at growth and land use in the City and County. A new emphasis on mixed use redevelopment and infill within the existing City will serve to increase the overall density of the City, concentrating it in areas along major transportation and utility corridors. While the density increases proposed in this plan are modest, developing a community that provides housing options in a variety of neighborhood settings, an array of well maintained transportation choices is a key goal and is anticipated to continue to be a focus as the plan is updated over the next several decades.

SAFETEA-LU Compliance

It is the role of the Lincoln MPO as the transportation planning agency for Lincoln and Lancaster County to ensure that the planning process is consistent with Federal law. The current Federal surface transportation legislation is the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

SAFETEA-LU is the most recent authorization for surface transportation investment in the United States. This builds upon the two previous national transportation bills, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century of 1998 (TEA-21) which together established a new agenda for maintaining and investing in the nation's transportation infrastructure. SAFETEA-LU carries forward many of the principles and accomplishments of previous legislation and builds on and refines many existing efforts. This legislation also introduces new measures to meet the many challenges facing our transportation system which include improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. A list of the SAFETEA-LU factors can be found in the Technical Report. In addition to SAFETEA-LU, the Clean Air Act Amendment (CAAA) of 1990 requires communities to explore modes of travel other than single occupant vehicles to improve air quality while meeting the population's mobility needs.

There are eight planning factors included in SAFETEA-LU, which are specified areas that need to be considered for all metropolitan planning activities. The eight SAFETEA-LU planning factors are incorporated in the Transportation Plan goals and further detailed the LRTP Technical Report. Other SAFETEA-LU emphasis areas that were addressed include:

Strategic Highway Safety Plan (SHSP). NDOR published the *Strategic Highway Safety Plan, 2007-2011*. It includes five Critical Emphasis Areas, most of which are outside of the scope of an LRTP. However, two particular emphasis areas are relevant to a metropolitan transportation plan, to "Improve Intersection Safety" and "Improvements to Address Lane Departure Crashes". The transportation planning process includes an on-going traffic safety evaluation, looking at the crash data available from the City of Lincoln and NDOR for the planning area. High crash rate locations were identified, the types of crashes were evaluated and then improvements were evaluated where feasible. The crash information was used as part of the 2040 LRTP project selection process.

Existing Transportation Facilities. It is now required that the LRTP include a discussion of strategies to improve the performance of existing facilities. In addition to including a planning goal and associated objectives dedicated to preserving the existing system, many of the recommendations in this plan include projects / programs focused on improving the current system, and providing new connections to the existing multimodal system that will improve its performance. Furthermore, maintenance of the current system was a key element addressed in the LRTP funding approach. This is discussed further in the Safety and Security portion of section 2.

Agency Consultation. SAFETEA-LU states that the MPO must document in the LRTP how the agencies in the following areas are consulted within the

transportation planning process: environmental protection, wildlife management, land management and historic preservation. The process for consulting with agencies is described in section 7 and further discussed in the Technical Report.

Environmental Mitigation. The LRTP must include discussion of potential environmental mitigation activities to be developed in consultation with federal, state and tribal wildlife, land management, and regulatory agencies. Potential environmental impacts and mitigation measures were included in the evaluation of multimodal alternatives. A more complete discussion is included in the section 7 and further discussed in the LRTP Technical Report.

This transportation plan is to meet or exceed the principles of SAFETEA-LU planning provisions in addressing the changing transportation needs and many challenges facing the Lincoln Metropolitan Planning Area.

Lincoln Metropolitan Planning Organization

Transportation planning in Lincoln and Lancaster County is the responsibility of the Lincoln Metropolitan Planning Organization, or *Lincoln MPO*. This group is a policy-making board comprised of representatives from local government and transportation authorities that review transportation issues and develop transportation plans and programs for the metropolitan area. The MPO works to ensure the directives of SAFETEA-LU are incorporated into transportation planning and operations in the County. This organization is a forum for cooperative decision making and provides for the involvement of principal elected officials from the City and County. Although these individuals come to the table with multiple, and sometimes conflicting perspectives, they work together to establish local and regional priorities for the transportation improvements that are eligible for state and federal funding.

To assist them in their decision-making process, the *MPO Officials Committee* relies upon other committees and support staff, such as the MPO Technical Committee, as well as active participation from interested citizens, concerned business representatives, interest groups and other voices in the community. Aside from the LRTP, the MPO also has responsibility for preparation of the *Transportation Improvement Plan (TIP)* and the *Unified Planning Work Program (UPWP)*. These two documents are short term planning tools that help implement the goals of the LRTP.

While the Lincoln MPO plans and develops programs for the all of Lancaster County, separate and defined funding sources are used to fund the respective urban and rural transportation programs. Urban sources of funding are generally planned to be used within the "Urban Area Boundary" as shown on Map 10.3: Existing Functional Classification. Rural sources of funding are generally planned to be used outside of this identified boundary. There are, however, programs such as the Rural to Urban Transition for Streets (RUTS) program where both urban and rural programs are used to develop the transportation system in a more efficient manner within the Urban Area Boundary.

2. Existing Conditions and Issues

The City of Lincoln serves as both the capital for the State of Nebraska and the seat of government for Lancaster County. The County's 285,407 residents comprise the second largest metropolitan area in the State. The Lincoln Metropolitan Statistical Area includes Lancaster and Seward counties and 302,157 people. The broad southeastern Nebraska region is home to over one million people, including the greater Omaha urban area to the northeast.

As discussed in *""The Community""* chapter of LPlan 2040, the population over the next 30 years is expected to grow at an average annual rate of 1.2%. By the year 2040, the population of Lancaster County is anticipated to reach about 412,000, with

about 90% of those people living in the City of Lincoln. Like much of the country, a large segment of Lancaster County's population was born during the "Baby Boom" of 1946 – 1964. These residents are now beginning to enter retirement years. At the same time, Lancaster County has experienced a change in racial and ethnic demographics, with the number of those indicating they are Hispanic or other than white quadrupling in the last 20 years. Household size in Lancaster County has continued to decline over the past 50 years, from 3.5 people per household in 1960 to 2.4 in 2010. These factors may cause a shift in demand of transportation choices.

Population density in Lincoln still tends to be rather low at about 3.0 dwelling units per acre in the City as a whole. There are, of course, parts of Lincoln, particularly in the downtown area and in the older neighborhoods, where this figure rises significantly, as there are areas on the edge where large lots prevail. During the development of LPlan 2040 there was significant discussion of the benefits of an urban growth pattern with a higher degree of density than what is generally seen in Lincoln today. Some of Lincoln's most livable neighborhoods are in the older parts of the City where densities of seven or more units per acre are common. These neighborhoods often include parks, schools, small retail and service centers, and transit service within an easy walking distance of homes. Indeed, services such as transit are not viable when density is significantly lower. The public and the advisory committee have expressed support for development that reflects some of those more traditional neighborhoods.

Housing preference is one area that could be heavily influenced by these demographic factors. A desire for smaller homes, and homes with lower maintenance requirements, is commonly expressed among older adults. The proximity to goods and services that are used on a daily basis is also important. New immigrants also often seek out neighborhoods where the language, retail items such as groceries, and services provided in their native language are available. These factors indicate a future need for neighborhoods that are able to serve the people that live within them. This type of neighborhood pattern would indicate greater need for pedestrian and bicycle facilities. It may also mean that some residents in those areas would choose public transit and other alternative modes over automobile ownership.

Since the 1950s the majority of development has been on the edges of the City, progressing multi-directionally with strong growth to the south and east. Suburban style development with separation of land uses prevails, although in recent years more creative development patterns have been seen in some new projects. Lincoln has a long tradition of a clear differentiation between the urban and rural areas and "leapfrog" development has not been seen in the community. The existing transportation system has focused on the personal vehicle since the mid-20th Century. The older part of Lincoln maintains a strong grid street system, which has been continued in the new growth areas along mile-line arterial streets. Newer local streets have developed in more curvilinear patterns with cul-de-sacs being common in some neighborhoods.

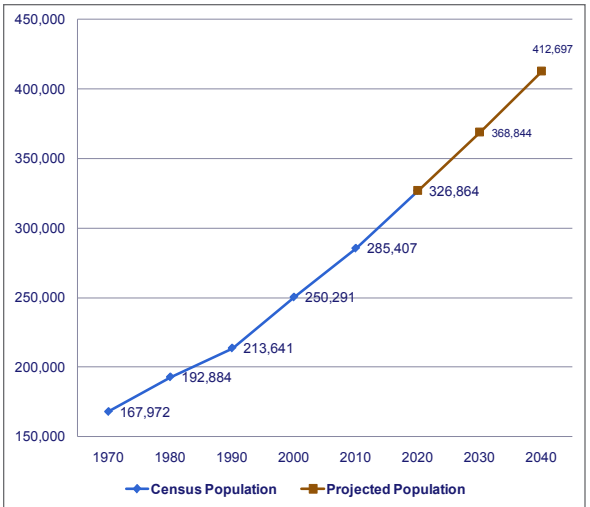


Figure 10.1: Lancaster County Population

As fuel costs continue to rise, the need for more transportation options, as well as lifestyle options, becomes more urgent. It is likely that the personal vehicle will continue to be the dominant form of transportation for the foreseeable future. However, as fuel costs rise, the option of using alternate

modes such as transit, bicycles and walking for some trips becomes more important to everyone. Telecommuting is one concept that has been discussed over the years, and some cities in the U.S. have made progress toward policies and tools to make this work style possible.

At this time, most cities in the U.S. are concerned with the costs associated with the operation and maintenance of transportation facilities. Lincoln and Lancaster County have not escaped from this challenge. The cost of new construction also continues to rise at a rate that outpaces the increase in revenues. These financial challenges demand a closer look at the priorities of the community. Maintenance costs can be significantly reduced if maintenance is done when streets and other transportation infrastructure are in relatively good condition. As maintenance is deferred, condition continues to decline and the costs of repairs rise dramatically. Techniques for reducing traffic demands by deferring trips to alternate modes or minimizing peak demands can reduce the need for projects that increase capacity on roads, resulting in a reduction in the cost for new projects.

Environmental stewardship is a priority for LPlan 2040 and for the LRTP. As part of the transportation alternatives analysis, extensive effort was made to identify possible environmental impacts and to gather input from both public and private environmental agencies and groups. Three primary areas of concern are closely tied to transportation: air quality, land conservation, and stormwater quality. All three of these areas can be best addressed by reducing the amount of paved area needed to serve transportation needs. If trips are shorter (i.e. destinations are closer) fewer miles are traveled and fewer emissions created. Shorter trips also make alternative modes such as bicycling and walking more attractive. Generally, shorter trips are accomplished by a more compact growth pattern which has the added benefits of fewer acres of land used for development, and more land, with the associated streams, trees, agricultural fields, and floodplains, left in a natural state.

Of primary importance in this and every plan is the equitable distribution of the community investment in transportation. It is important that no segment of the community receives less benefit or assumes a greater negative impact than any other. The LRTP process included an evaluation of the community according to the *Environmental Justice Action Strategy*. This strategy identified areas in the County that include a greater than average percentage of the population that identified themselves, through Census responses, as either belonging to a minority racial or ethnic group or meeting the definition of low income as defined by the U.S. Department of Housing and Urban Development. These areas were evaluated in a manner similar to that used for the environmental impact evaluation; impacts were identified and agencies and interest groups were contacted for their input. Responses were sent to agencies and groups that provided input and their comments were considered in the development of the plan. No adverse impacts were identified as a result of the proposed Plan during the Environmental Justice analysis. A full report of the findings can be found in the LRTP Technical Report.

Existing Pedestrian and Bicycle Facilities

Walking is an essential part of our daily activities, whether it be trips to work, shop, or play. Lincoln's greatest pedestrian asset is the long standing policy of requiring sidewalks on both sides of all City streets and connectivity between subdivisions. Because of this policy, the vast majority of homes and businesses are served by Lincoln's 1,500 miles of sidewalks. However, rehabilitation of sidewalks, particularly in older residential and commercial areas, has proven to be a challenge.

The responsibility for rehabilitation of sidewalks was passed from the adjoining property owner to the City in two separate votes during the early 1990s. The sidewalk rehabilitation program has been underfunded in the recent past. In order to continue this program at an appropriate level, serious consideration of increased funding must be taken.

There is currently not a single clearinghouse for pedestrian planning, design, and engineering in the Lincoln MPO. Instead, a number of departments address pedestrian mobility and sidewalks with varying perspectives as part of other job assignments. This results in pedestrian needs not being a primary focus of a coordinated program.

The current bike route network for the Lincoln MPO is tied closely to the streets and trails network. It includes existing paved and unpaved routes, proposed trails and trail easements, on-street routes, bicycle lanes on 11th and 14th streets in the Downtown area, and a shared lane facility on G Street from Capital Parkway to 4th Street. Riding bicycles is not allowed on the sidewalk in the following commercial areas because of the large number of pedestrians:

- Downtown
- Havelock
- College View
- Bethany

Bicycles can play an important role in the community by providing a healthy alternative to the automobile, reducing traffic congestion, improving air quality, and creating a more balanced transportation system.

While Lincoln has some on-street bicycle facilities, these are not common and there is no formal plan for a citywide system, nor is there a dedicated funding source for its accomplishment.

Improvement of existing street and trail facilities that are presently suitable for bicycles and other users, and the development of an expanded system of bicycle-friendly roads and trails for the City of Lincoln and Lancaster County's future have been expressed as strong community goals.

Bicycle Facilities Planning Lingo

Multi-Use Trail: Bikeway or trail that is physically separated from motor vehicle traffic by open space or a barrier. May be within the road right-of-way or have its own right-of-way. Also referred to as a "shared use" or "multi-use path," "recreational trail," or Class I bikeway.

Bicycle Lane: Bikeway on a street designated for preferential or exclusive use of bicycles by striping, signage, and pavement markings.

Bicycle Route: Streets with "Bike Route" signs installed along them. Intended for the shared use of automobiles and bicyclists without striping or pavement markings.

Sharrow: On-street facility that includes pavement markings with chevrons and a bicycle symbol. Usually on streets with sufficient existing width and low traffic volume.

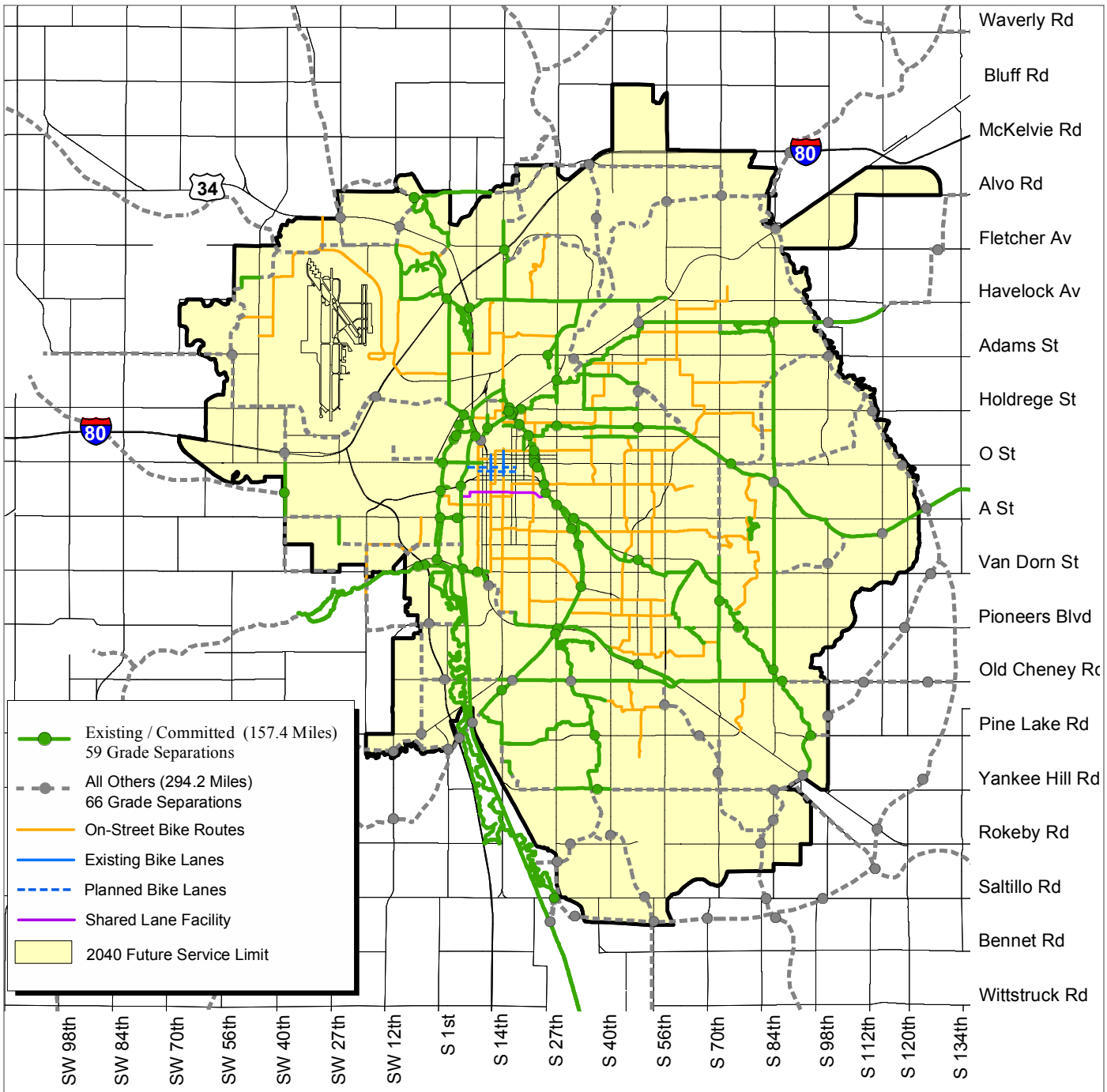
Trail Head: Major entry point onto a trail system often providing public facilities, such as parking, water fountains, bicycle racks, picnic facilities, and restrooms. A trail head is not necessarily at the beginning or end of a trail.

Existing Multi-Use Trails System

The community has an existing system of multi-use trails that currently provides a trail within one mile of 93% of dwelling units in the City. The system serves users such as bicyclists, pedestrians, roller-bladers, and parents with strollers and wagons. The present system serves both commuter bicyclists and pedestrians who use the trails daily for work and shopping trips and tend to travel from point to point, and recreational bicyclists and pedestrians

who tend to use the trails on a more occasional basis, seeking attractive and safe routes, as shown on Map 10.1: Existing and Committed Trails.

Much of the current trail system is built in the right-of-way of abandoned railroad corridors. Others are built along streams in the floodplain, along one side of major arterial streets, or as part of residential development. Maintenance of the system includes litter pick-up, mowing, trail clearing and signage. The Lincoln Parks and Recreation Department, Public Works and Utilities Department, and the Lower Platte South Natural Resource District are primarily responsible for trail development in Lancaster County. Lincoln Parks and Recreation, along with Lincoln Public Works & Utilities, maintain trails in the City and all of Wilderness Park while the Lower Platte South NRD maintains County trails.



Map 10:1: Existing & Committed Trails

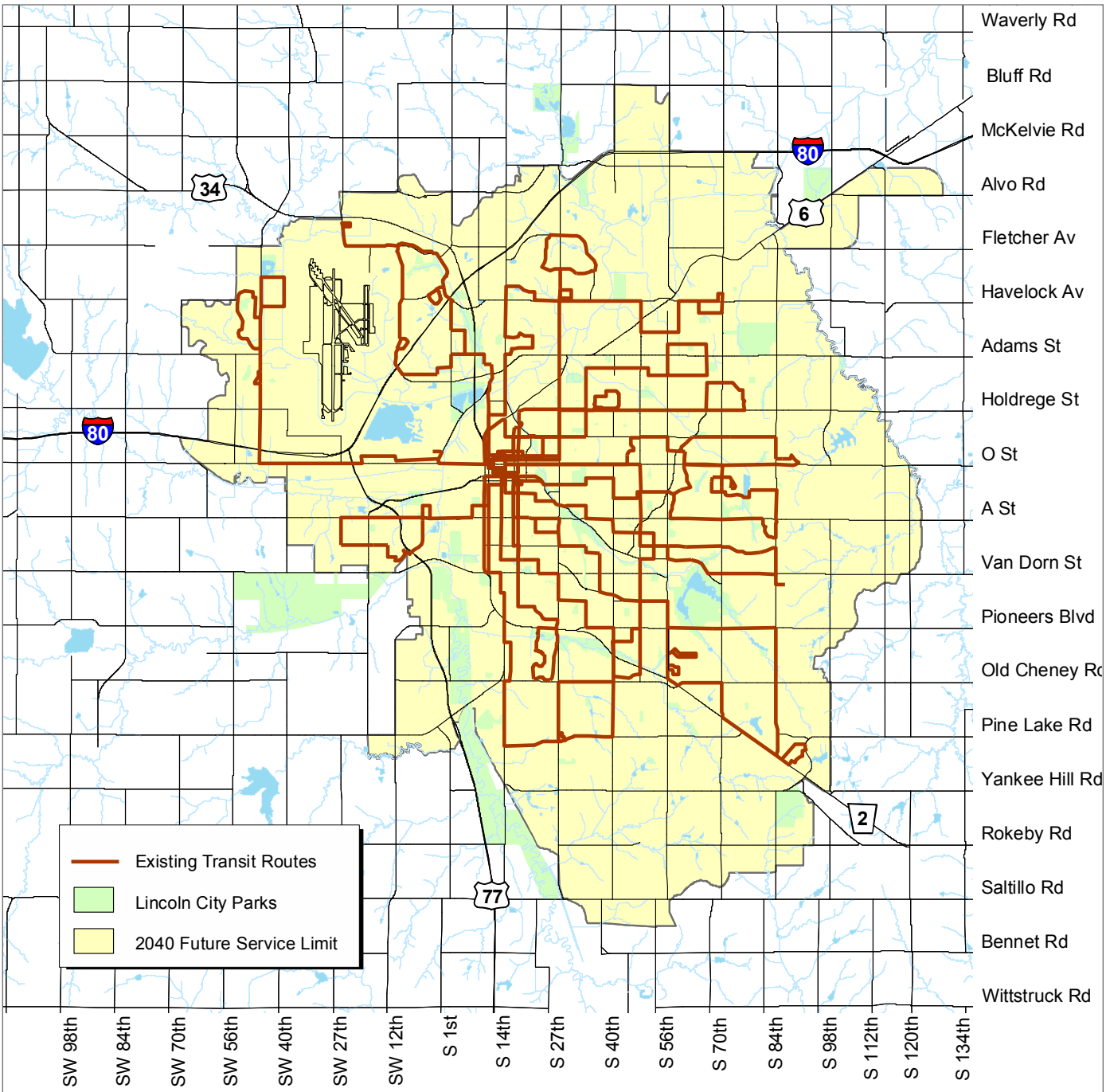
Volunteer organizations also assist in maintenance as well as donating significant funds for trail development.

Most of the existing trail system has been built over the last 30 years and some of the oldest trails are beginning to require rehabilitation, either because of declining pavement condition or because use has risen to a level that a wider trail is required.

Rehabilitation is currently funded at about $175,000 annually but costs are anticipated to rise as the system grows and ages.

Existing Transit System

Public transit is an essential component of the transportation system and should be integrated with all other transportation modes. StarTran - the



Map 10.2: Existing Transit Routes

City operated transit system - provides fixed-route service, para-transit (Handi-Van), and brokerage or contracted transportation service that is a door-to-door demand-responsive disability service. These public services are critical to those persons that are dependent on public transit services, and the service is provided in compliance with the Federal Americans with Disabilities Act. In addition to providing services for the transit dependent, StarTran also offers services as an alternative to the automobile for the non-transit dependent or choice riders.

The regular fixed route transit system runs Monday through Friday from 5:15 am to 7:20 pm and Saturday from 6:30 am to 6:30 pm with 17 routes and a Downtown shuttle. In 2010, over 1.8 million trips were provided by this service. The fixed route system operates based upon a Downtown hub and is a coverage system, meaning it attempts to provide service to all areas of the City. In 2010, nearly 82% of Lincoln households were within ¼ mile of a StarTran bus route.

Lancaster County does provide transportation for individuals in rural Lancaster County that is wheelchair accessible through the Lancaster County Public Rural Transit program. Service is provided Monday through Thursday, 8:00 a.m. to 4:00 p.m. The northern half of the County is served on Mondays and Wednesdays, and the southern half of the County is served on Tuesdays and Thursdays.

As a public service, StarTran transit should be funded and supported similar to any other public service. Transit service, whether a fixed-route or demand-responsive service, is linked to the larger transportation system and is affected by land use decisions. Providing fixed-route transit service relies on good pedestrian connections at the beginning and the end of the trip. Transit service is influenced by the density, community policy, transportation corridors and activity centers, as well as to the design of activities along those corridors and centers it serves. Other factors such as abundant supply and low cost parking, low travel time, gas prices and minimal congestion also affect transit demand. High travel corridors and activity centers with a mix of uses provide the demand that can effectively support higher levels of transit service.

Existing Roadway System

The Lincoln MPA is served today by an extensive system of streets and highways. This system ranges from roads capable of safely carrying thousands of vehicles each hour, down to local residential streets that help form the character of neighborhoods. The street system further plays a vital role in commerce by carrying products to all portions of the City and County. The rural road network also links the agricultural community to key transportation centers, allowing their commodities to be shipped around the world.

Section line roads form the basic layout for the City's and County's existing street system. Spaced approximately one mile apart, these roads create the underlying grid pattern found throughout the County. This roadway pattern was established nearly 150 years ago by the United States government. Surveyors were sent west to the Plains states to create a patchwork of one mile squares. These squares became the building blocks upon which the earliest settlements and agricultural communities were formed.

The section line roads are used today as Lincoln's main system of arterial streets. In the newer areas of the City, section line roads are ultimately built with four through lanes, with turning lanes added to improve safety and operations along these corridors. However, two lanes with some turn lanes where needed are often built to carry lower levels of traffic and then expanded to four lanes when growth occurs and as traffic warrants. The grid pattern has also been accentuated in the older

areas of Lincoln through the use of arterial streets at the half section (or half mile) line. This has created a more extensive street grid pattern in the older areas of the community.

To aid in moving traffic through and across the community, other routes have been layered on top of the County's underlying one mile grid pattern. From the Federal Interstates (such as I-80 and I-180), to State highways (Highway 2, 33, 34, and 79), U.S. Highways 6, 34, and 77, and to local facilities (such as Capital Parkway, Cotner Boulevard, and Sheridan Boulevard), diagonal roads have helped expand the community's street capacity. These facilities often offer more direct movement between major centers of activity than are provided by the grid system.

Bridges and overpasses have also been added over the years to make travel safer and easier. Separating cars and trains reduces the potential for crashes, as well as reducing the time spent by motorists waiting for passing trains. Even the spanning of the region's numerous creeks and streams with permanent structures have allowed people and vehicles to move more easily.

Today there are an estimated 2,808 miles of streets and highways serving the Lincoln MPO. This includes approximately 30 miles of Interstate, 158 miles of U.S. and State Highways, 565 miles of major arterials and collector streets, and 2,055 miles of local streets.

System Operation and Management

The Street Operations program is the day-to-day work that is necessary to keep the street system functioning at a level that reasonably serves the community's travel needs. Efforts conducted as part of Street Operations include street sweeping, snow removal, crack sealing, pothole repair, signs, striping, signal operations, storm watch, record keeping (i.e. traffic counts, crash database), and engineering and safety studies. Currently the budget for the Street Operations program is $13 million annually.

Rehabilitation Program

The Rehabilitation program includes the repair of arterial and residential roads when the pavement conditions deteriorate to an unacceptable level. A pavement condition rating system is used to determine which road surfaces are in most need of repair. Also included in the Rehabilitation program is bridge rehabilitation and signal replacements. It is important to note that money invested today in the ongoing maintenance and repair of the street system saves a significant amount of money in the future by avoiding the costs associated with full reconstruction of roadways. Currently the arterial and residential street rehabilitation program is funded at $3.2 million annually. The bridge rehabilitation program is funded at $1.9 million annually, and the signal program is funded at $1.8 million. This funding is not adequate to meet the needs of the rehabilitation program, and the costs associated with this program will increase as the street system ages and expands as the community grows.

Safety and Security

An important part of the Lincoln MPO's urban transportation planning process involves the collection of transportation related crash data. The City's annual *Crash Study* provides a source of information through which local and state officials examine and respond to changing transportation conditions. During 2008, approximately 7,900 crashes were reported within the City limits, involving pedestrians, bicyclists, buses, trucks, trains, motorcycles and automobiles. The estimated monetary loss from those crashes is $196 million. These total crashes resulted in a vehicle crash rate of 4.94 crashes per million vehicle miles traveled. The crash rate has experienced an average annual decline of 3.26 percent per year since 1985. This crash information was used as part of the 2040 LRTP project selection process.

> The City's goal is to reduce the overall number of crashes, fatalities and injury crashes during and beyond the planning period.

The City's goal is to reduce the overall number of crashes, fatalities and injury crashes during and beyond the planning period. To achieve these fundamental goals, it is important that national, state and local standards along with education, enforcement, engineering and evaluations continue to be pursued. Nationally, the Federal Highway Administration (FHWA) continues to emphasize transportation safety. As a result, the primary focus of highway planning and investment is on improving the safety of the transportation system. In accordance with the provisions in SAFETEA-LU, each state is required to develop, prepare, submit and implement a comprehensive safety plan. The Nebraska Safety Plan, developed in collaboration with public and private agencies, has identified the following Critical Emphasis Areas that will require the continuation of existing or implementation of new programs:

- Increasing safety belt usage.
- Keeping vehicles on the roadway, minimizing the consequences of leaving the road, & reducing head-on and across-median crashes.
- Reducing impaired driving.
- Improving the design and operation of highway intersections.
- Addressing the impact of distractions for of young drivers.

Lincoln and Lancaster County have been involved in several different efforts to address these emphasis areas. Several of these programs are further described in this section and in the section entitled Planning for the Transportation Needs of 2040. Other programs are part of local and national private and non-profit efforts.

- Implementing an annual intersection capacity improvement program that will address safety concerns.
- Funding an annual program to match project costs from the State's safety program.
- Continuation of a regular crash study to identify locations needing further study and safety improvements.
- Advancing the two plus center turn lane program to ease traffic flow on internal streets and to improve safety conditions.
- Employing the ITS program to use the latest technology to assist in traffic flow monitoring and incident management efforts.
- Annual programs to improve and maintain signing, striping, and signal timing as part of the regular operations efforts.
- Implementing a signal replacement program as part of the heightened rehabilitation effort that will allow for improved signal systems with latest technology.
- Local driver education programs and school safety programs.
- Heightened vehicle safety standards at the national level, such as anti-lock brakes and daytime headlights.

Congestion Management

One of the main components of the LRTP is an analysis of congested roadways in the Urban Area and the Management Process to address these congested areas. The Lincoln MPO Congestion Management Process (September 2009) is a guideline for the identification and development of capacity improvement projects. Because of the limited financial resources available to Lincoln and Lancaster County to address roadway congestion, the MPO carefully reviews projects to determine their suitability for widening and selects only the most critical areas recommended by transportation agencies to become part of the list of capacity

improvement projects in the Lincoln-Lancaster County LRTP. The Congestion Management Process is a tool used by local transportation agencies to determine what level of capacity improvement is most suitable for a corridor and uses data from the Lincoln MPO Travel Demand Model to analyze the submitted capacity improvement projects included in this Plan and was used as part of the 2040 LRTP project selection process. This is discussed further in the Streets and Roads portion of Section 5 and in greater detail in the Technical Report.

Congestion management is one of the primary responsibilities of the Department of Public Works and Utilities. A combination of road and intersection design, road condition, Intelligent Transportation Systems, a well connected system and a strong tradition of linking transportation to land use serve to reduce traffic congestion within the urban area. The Congestion Management Process includes the use of congestion data to support transportation decision making and is reported on annually.

Transportation System Monitoring & Management

Effectively managing the metropolitan area's transportation system requires an ongoing program of monitoring and data collection. Over the past several years, the measures used to monitor, evaluate, and manage the MPO's transportation system have been the subject of considerable dialogue within the community, beginning with the Congestion Management Task Force in the mid-1990s. A variety of parameters are used to judge system performance including travel time, average speed, intersection delay, vehicle occupancy, traffic volumes, crash rates and other relevant measures. These measures remain an important statistical foundation upon which to build a valid process to evaluate and manage the overall transportation system.

Intelligent Transportation Systems

Intelligent Transportation Systems, or ITS, can be simply defined as "people using technology in transportation to save lives, time and money." ITS integrates computers, electronics, sensors, communications, and management practices into the daily operations of a community's transportation system.

The Public Works and Utilities department currently manages a Travel and Traffic Management System that includes approximately 430 traffic signals, 90 miles of communication lines, 26 portable and 15 fixed dynamic messaging signs, 55 traffic monitoring cameras, 7 roadway and weather monitoring sites, and about 169 intersections with fire pre-emption and 9 railroad pre-emption units.

Two Plus Center Turn Lane Program

One of the challenges of providing efficient transportation services to a growing community is the possibility of negative impacts to existing neighborhoods. Widening an older roadway in an established neighborhood can significantly impact the quality of life for those living there. At the same time, highly congested roads where traffic moves slowly during peak hours can cause noise, air quality and safety concerns. To help meet this challenge, Lincoln has implemented the Two Plus Center Turn Lane Program, often called the "2 Plus 1" program.

Under this concept, designated arterial streets in existing neighborhoods are improved with a street design that includes two through travel lanes and a single common center turn lane. This approach increases the street's efficiency to move traffic and improves safety, while minimizing the impacts on the adjacent neighborhood. This design can usually be accommodated within the existing right of way; however, small portions of right of way may need

to be acquired in order to complete this program's objectives.

While all arterial rehabilitation projects should be done to a width that can accommodate two lanes plus a center turn lane, actual striping varies depending on the particular neighborhood circumstance.

Street and Highway System

The street and highway system is the primary backbone of the Lincoln-Lancaster transportation system. In 2010, approximately 90 percent of work trips in the planning area were made by automobile on the street and highway network. The street and highway system provides connections within the region, connections to other cities and regions and connections between various modes of travel within the metropolitan area. This section provides an overview of the various components of the street and highway system.

Functional Classification

Functional classification is a hierarchical grouping of roadways into various categories according to the level of traffic service that they are intended to provide. The MPO has developed a functional classification system for roadways within the transportation planning area that includes urban and rural categories. The various functional classifications define the roadway's general role, which can be summarized by the degree to which it provides access to adjacent properties or provides travel mobility from one part of the region to another.

Urban/Rural Interstates, Freeways and Expressways are at the top of the classification hierarchy. These are roads capable of carrying large numbers of vehicles at higher rates of speed over long distances. Access to these roadways is strictly controlled. Vehicles can only get on or off these facilities at a few designated locations — typically at an interchange.

Principal Arterials and **Minor Arterials** are at the next level of roadway classification. Arterials carry traffic between major activity and population centers. They may run for many miles across the City and County. Posted speed limits are generally in the 35 to 45 miles per hour range in urban areas, (higher in rural areas) with access provided at grade. Traffic signals as well as roundabouts are often used to regulate the flow of traffic at major intersections along arterials. Access is managed, although movement to and from adjacent property is sometimes allowed depending upon the character of the area and the uses being served.

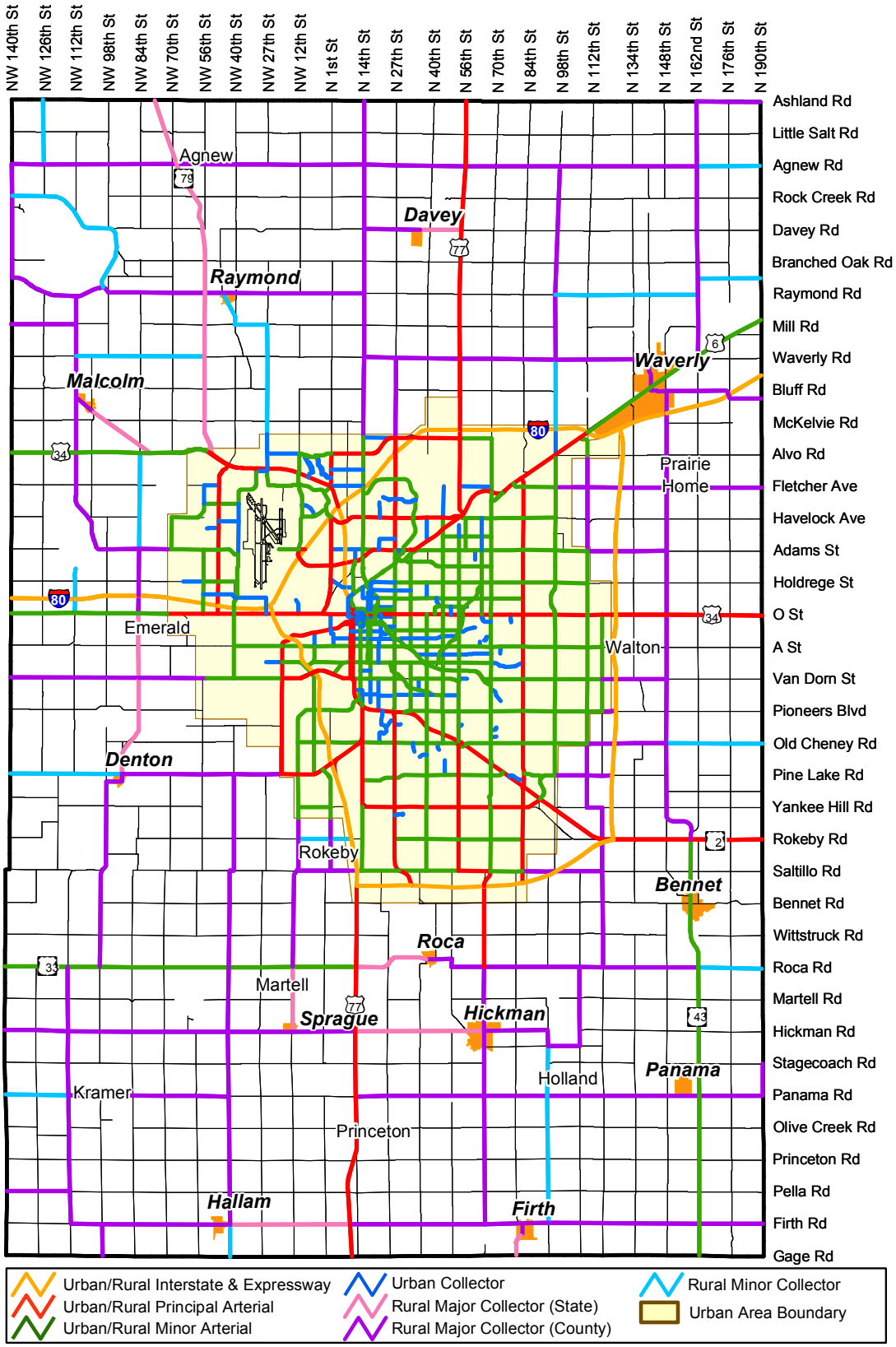
Collector Streets offer motorists a safe and convenient way to move from a neighborhood to the arterial street system. This next level of street classification is intended to "collect" traffic from residential or other destinations and move it to the higher order streets. Speeds are generally lower than arterial streets with direct access more liberally granted.

Local or **residential** streets provide the greatest access. These streets provide very limited opportunities for through traffic; their primary function is to provide access to adjacent properties.

Rural Roadway System

There are 1,486 miles of rural roadways in Lancaster County that are managed by the State of Nebraska and Lancaster County. The state manages all Interstate, U.S. and State Highways which make up more than 170 miles of rural highways. The County Engineer manages approximately 1,316 miles of roads in the rural road system of which approximately 1,028 miles are gravel surfaced, 239 miles are paved or asphalt, and about 49 miles remain unimproved dirt roads.

Most County roads in Lancaster County are developed along section line corridors, giving the County a general 1-mile grid pattern of roadways. Safety is always a major concern. Population growth and increased recreational demands in the rural areas add to the volume of traffic. Grain



Map 10.3: Existing Functional Classification

trucks and other commercial vehicles are carrying heavier loads than ever before and create additional problems as roads experience greater transport weights.

These pressures lead to increased maintenance demands and demand for improved pavement and modifications to road foundations. The decision to make improvements to the road surface is based on several factors including:

- Role of the road in the overall system
- Number of vehicles traveling the road daily
- Increased maintenance or decreased driver safety
- Type of traffic and weight of vehicles on the roadway
- Spacing or proximity to other paved roads

Existing Freight System

The movement of goods and freight into and out of the metropolitan area is critical to the economic health of the community. Goods and freight are currently transported throughout the City and County by road, rail, air, and pipeline. In 2005, 188 freight operations employed nearly 6,000 employees in Lancaster County. The total payroll for these establishments approached $240 million per year. Trucking comprised the bulk of the freight movement services in the County in terms of employees, payroll, and number of establishments.

Truck Freight

Truck freight is the most visible, and most common, form of delivering goods to customers in Lincoln and Lancaster County. Activities generating high truck traffic— especially grain elevators and warehousing operations — were historically located on the periphery of the City. Many, if not most of these, have been absorbed into Lincoln as the City's corporate limits have been pushed out by growth. Today I-80, I-180, US-34, NE-2, NE-33, US-77, and US-6 all exhibit high commercial truck traffic.

A number of roadways have been designated as "Truck Routes." These roadways are built to a higher weight standard to accommodate heavy trucks. Turn radii and the heights of bridges and signs and other overhangs are designed to allow easy movement of large vehicles. They also provide identifying signage and direct routes through town or to commercial and/or industrial centers. Some truck routes may have special features, such as restricting trucks to the right lane to allow other vehicles to use the left lane to accelerate from stop lights on Highway 2, that assists with the smooth flow of traffic and improve safety.

Rail Freight

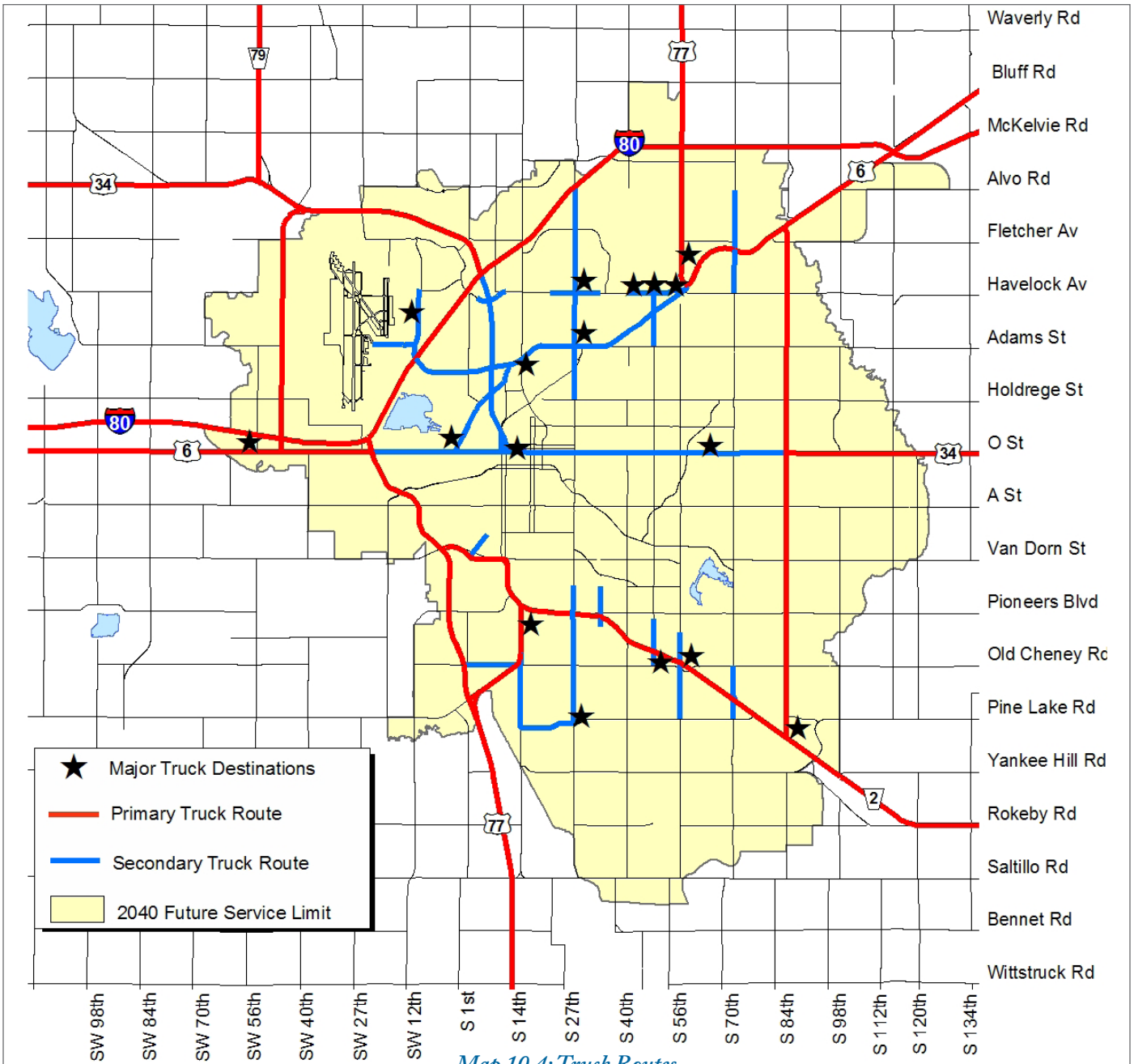
The majority of rail freight originating in Lancaster County is heavy, bulky agricultural product. Grain elevators and mills within Lincoln and throughout Lancaster County serve as the primary customers of railroad transportation services. Nine grain elevators throughout Lancaster County and five in Lincoln are served by the BNSF Railway. Much of the other freight entering or passing through the County is coal headed for power plants.

Air Freight

While the Lincoln Airport is the County's major air facility, Omaha's Eppley Airfield currently serves much of the air freight needs for Lincoln and Lancaster County. Air freight entering Lincoln Airport arrives through passenger service in small loads. United States Postal Service (USPS) mail is delivered to Lincoln through passenger service. USPS mail is not regularly shipped out of the Lincoln Airport, but rather it is trucked to Omaha's Eppley Airfield for processing. The majority of private parcel delivery service is also handled through Omaha's Eppley Airfield.

Pipeline Freight

There are 17 major pipelines in Lincoln and Lancaster County. The majority transport petroleum or natural gas products. One of the lines transports anhydrous ammonia, which is a product used in agricultural production. All of the pipelines are managed by four firms in Lancaster County.



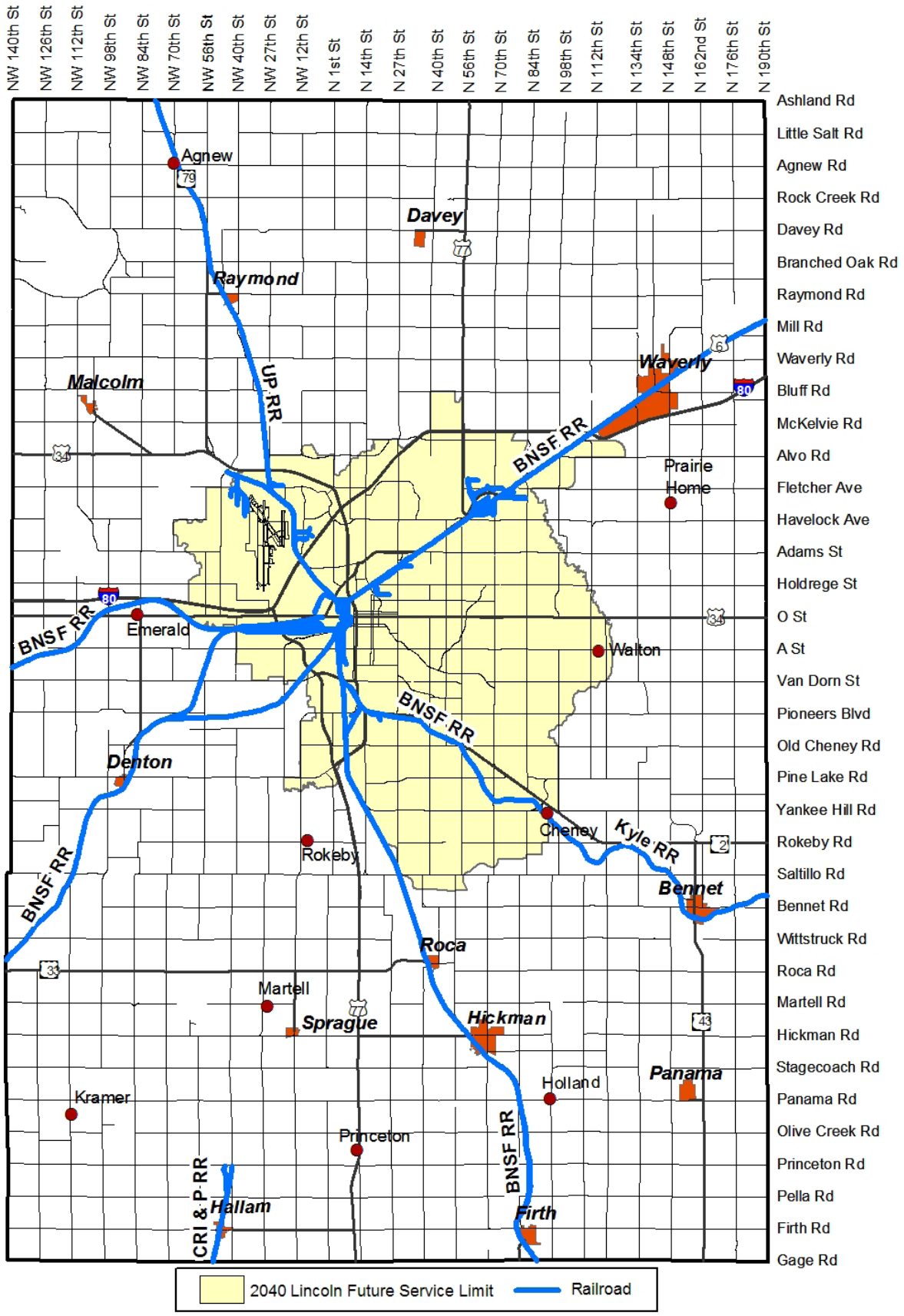
Map 10.4: Truck Routes

Existing Rail System

The City and County are currently served by two Class I railroads and two Class III railroads - the mainline of BNSF Railway (Class I), a secondary branch line of the Union Pacific Railroad (Class I), Lincoln Lumber Railroad (Class III) and the Kyle Railroad (Class III) which operates a rail line in southeast Lancaster County via the Omaha Public Power District (OPPD) track from southeast Lincoln to Nebraska City.

Both freight and passenger rail services are offered in Lincoln and Lancaster County. Currently up to 80 trains a day travel east-west through the County. In recent years, railroads in Lincoln and Lancaster County have been affected by changes in the railroad industry and growth within the City.

The Railroad Transportation Safety District (RTSD), a countywide entity, was established in 1971 to fund transportation and safety improvements at railroad



Map 10.5: Existing Rail Lines

crossings. The funding mechanism provided by the RTSD allows for grade separation project to be built.

Eliminating at-grade vehicular-train conflicts is a primary objective of LPlan 2040 through the RTSD. Removal of such conflicts will enhance safety, reduce delays, and improve emergency access to the surrounding neighborhoods. Current and recently completed safety projects include:

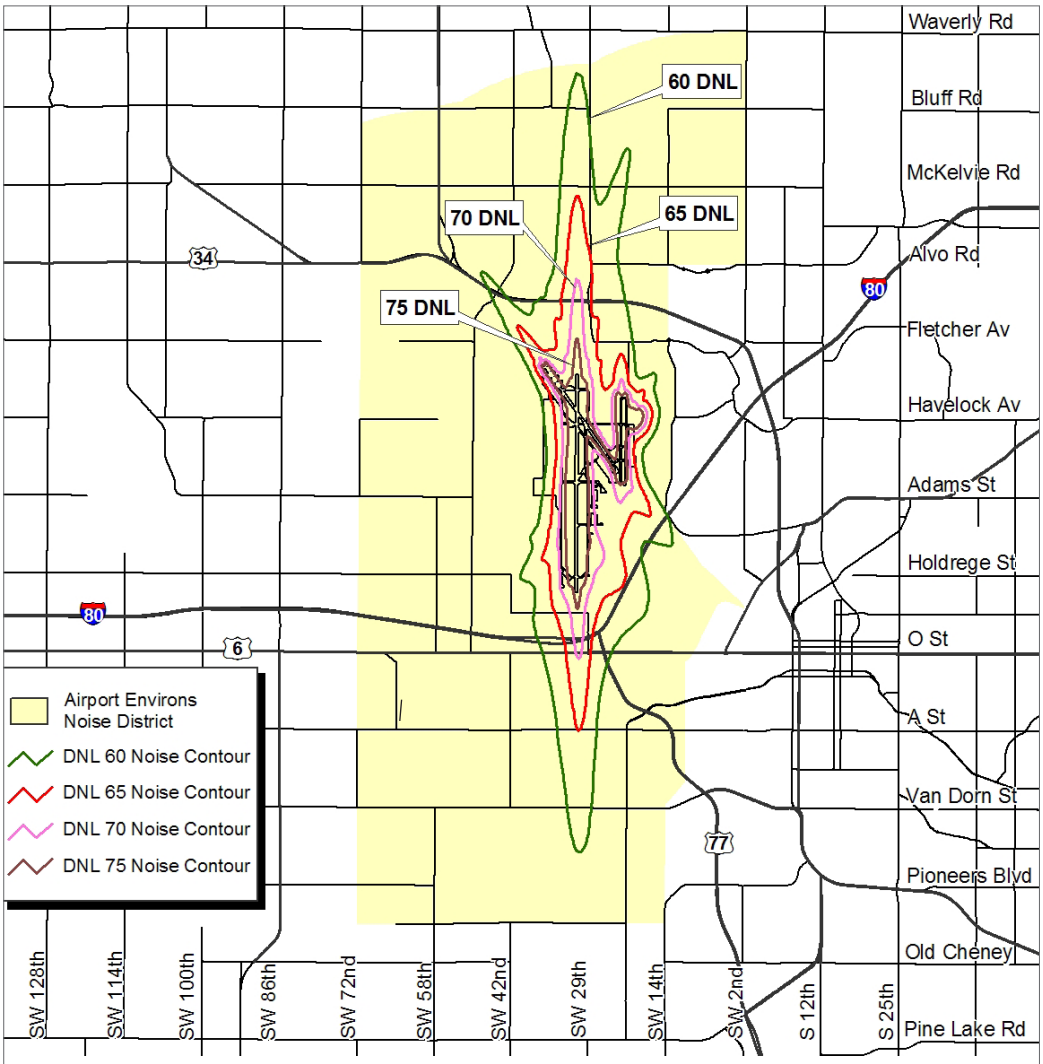
- The Antelope Valley roadway elevated intersection in the vicinity of N. 18th Street and State Fair Road (completed)
- SW 40th St Viaduct (committed project)
- South 68th St, south of Hickman (under construction)
- Quiet Zones in the South Salt Creek neighborhood from 1st and J St to 3rd and D St, and at 3rd and South St to 27th and Saltillo Rd. The City of Waverly is also designing a quiet zone from 141st St to 148th St.

Existing Airports and Airfields

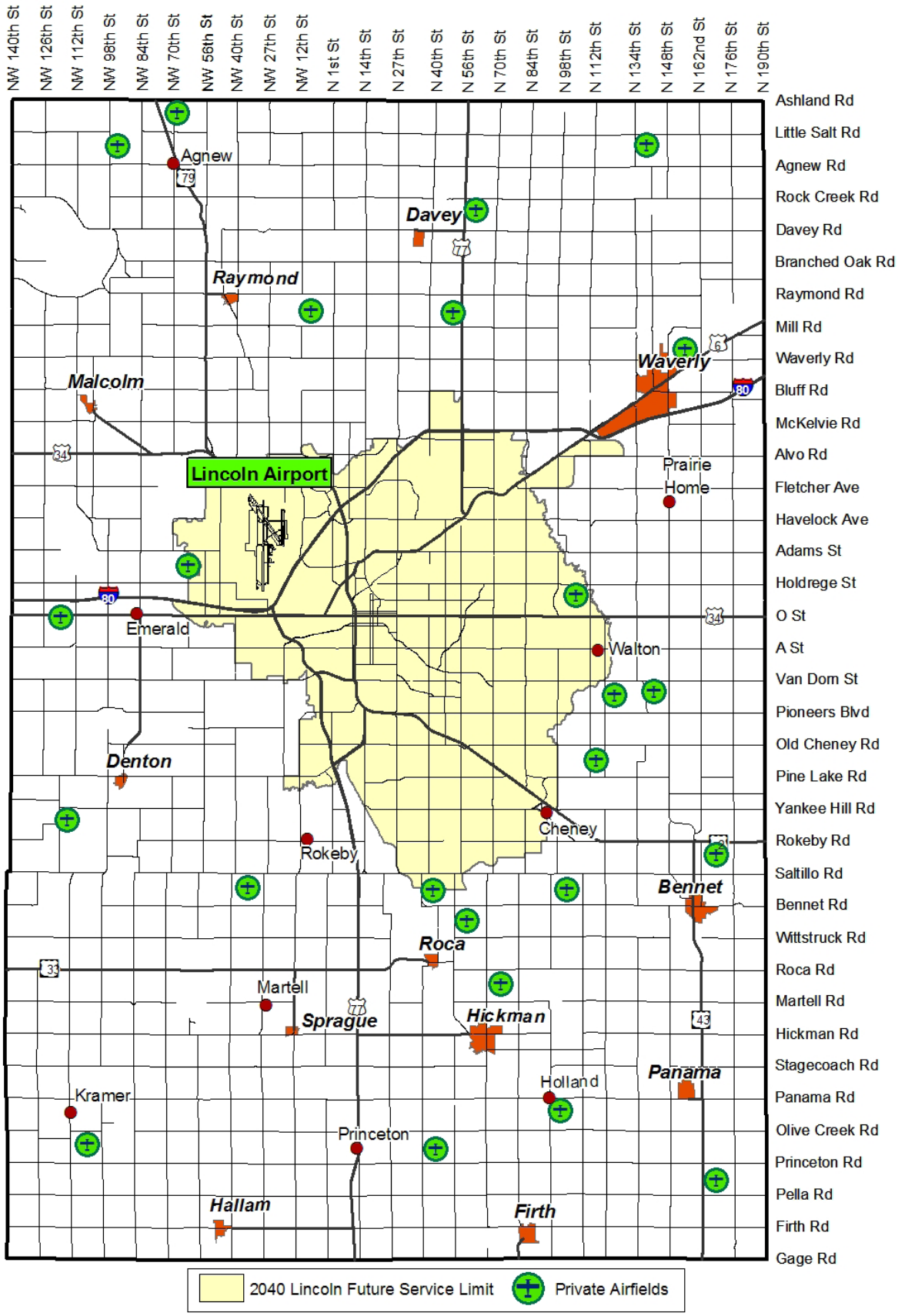
The Lincoln Airport is the major air facility servicing Lincoln, Lancaster County and the region. It provides an important transportation link to national and international markets. It is located in the northwestern part of Lincoln, with access provided by Interstate and State highways.

The City of Lincoln's Airport Environs Noise District and Airport Zoning Regulations have been established to ensure a balance between airport operations and the surrounding land uses. These regulations govern uses and structural characteristics compatible to the airport operations and minimize negative impacts on surrounding residents.

Smaller private airports and airfields are also located throughout the County. The distinction between an airport and an airfield is generally the number of planes using the facility and who is allowed to use them. "Airfields" are limited to use by the residents of a single family home with not more than one plane. All other air facilities, including single family airfields which accommodate guest planes or house more than one plane, are termed "airports." Within Lancaster County, airports and airfields are discouraged within close proximity to homes, schools, hospitals or other areas potentially sensitive to noise and restricted by zoning.



Map 10.6: Airports Environs Noise District



Map 10.7: Airports & Airfields

3. Outreach and Public Participation

As part of the development of LPlan 2040 and the 2040 Long Range Transportation Plan update, a public involvement and engagement effort was undertaken to guide the process of disseminating information and gathering input from the public. The public involvement process was developed from and consistent with the adopted MPO *Public Participation Plan*.

Many individuals and groups participated in the process through open houses, newsletters, workshops, websites, surveys, informational materials at libraries and community centers and comment boards. Online tools proved to be the most effective in soliciting input in several different campaigns. Multi-media and social networking software were also utilized in this planning effort.

The LPlan 2040 Advisory Committee (LPAC):
The LPAC was appointed by the Mayor of Lincoln, with input from the Lancaster County Board. LPAC members included the nine Planning Commission members and eleven other community representatives representing a broad range of interests in the community. A list of the LPAC members can be found at the front of this document and in the LRTP Technical Report.

The LPAC operated under the Nebraska Open Meetings Law with posted agendas, public notice, open, accessible meetings, and minutes or other records of the discussions. The LPAC was an advisory body to the Director and the Planning Department as the Plan was drafted, supplementing but not supplanting the statutory duty of the Planning Commission to review and advise elected officials once the Plan was developed. The LPAC did not take votes on elements of the Plan, but rather studied, analyzed, questioned and discussed the data, assumptions, and recommendations that make up the draft Plan.

The following is a list of groups and organizations to whom presentations were made or who were given information as part of their meetings:

Elected, Appointed Officials, and Advisory Boards.
The City Council and County Board received several updates on LPlan 2040 activities during their regular staff briefings or monthly Commons meeting. Several advisory boards such as the StarTran Advisory Board, Mayor's Pedestrian Bicycle Advisory Committee, Mayor's Environmental Task Force, County Ecological Advisory Board, Historic Preservation Committee, Urban Design Committee, Nebraska Capitol Environs Commission, and others were also regularly updated.

Business Groups.
Various business groups such as the Chamber of Commerce, Lincoln Independent Business Association, Home Builders Association of Lincoln, and Lincoln Board of Realtors received special briefings or presentations at their meetings. A special committee of freight industry representatives was also formed to advise on freight issues.

Neighborhood, Community and Interest Groups.
Several community organizations were directly contacted by email and by telephone multiple times throughout the process in order to more fully engage traditionally under-represented populations such as racial and ethnic minorities and low income households. The Mayor's Neighborhood Roundtable and several neighborhood associations requested presentations at their regular meetings and others regularly sent representation to the LPAC meetings. Interest groups such as Leadership Lincoln, Friends of Wilderness Park, and the Great Plains Trails Network also received briefings and participated in other ways.

All groups that received presentations and/or direct contact are listed in the Process Overview section of the Technical Report.

Major Public Outreach Efforts

Throughout the planning process, materials were made available both in print and electronic format.

The website created for the development of LPlan 2040 was a major source of information for the public, with all materials from workshops, open houses, and advisory committee meetings posted. Flyers were translated into Russian, Vietnamese, Spanish and Arabic. Newsletters were translated into Spanish. Several social networking tools such as Facebook, YouTube, and Twitter were employed for outreach. An additional social networking site called Mind-Mixer (Virtual Town Hall) was also used to engage the public in initial conversations about ideas they may have and to assist in the selection of a preferred growth scenario. There were several points in the process where major effort was made to conduct specific public outreach activities.

Plan Launch

In June of 2010, the LPlan 2040 process was launched with a press conference, newsletter, press release and several workshops: Complete Streets, Living and Working in 2040, Plan-it-Yourself, and Sustainability Workshops. A special online campaign titled Bright Ideas was also launched. This campaign lasted four weeks with the public being asked to submit, comment upon and vote for ideas for 2040. One of the topic areas was Bright Ideas for "Getting Around," which garnered 25 ideas and 1,657 total visits. The purpose of this effort was primarily to inform the public of the upcoming process and opportunities to participate.

Decision Point 1: Future Growth and Land Use

In October of 2010, the public was asked to share their thoughts on three potential future growth scenarios for the City of Lincoln and Lancaster County. Newsletters, a workshop called Plan-it-Yourself, several newspaper articles, email contact and information stations set up at libraries and community centers were used to engage the public. Five open houses were held in locations throughout the City and County. An online forum called Virtual Town Hall was used to solicit input and allowed participants to select a preferred scenario. The LPAC also played a large part in this process. The resulting recommended Future Growth Scenario was used to develop the 2040 Priority Growth Areas and the Future Land Use map that the transportation plan is based on, which are described fully in the *"Plan Realization"* chapter of LPlan 2040.

Decision Point 2: Goals and Objectives

One of the major activities that expressly addressed transportation was a community conversation on Transportation Goals and Objectives. The public was asked to share their priorities for seven pre-defined transportation goals through a paper and electronic survey. (For a description of the process used to formulate these goals, see next section on Goals, Objectives and Evaluation Criteria). A newsletter, information stations at libraries and community centers, email and a press release were used to engage the public. The LPAC made the final decision on priorities through a weighting activity. The results are displayed in the next section of this chapter.

Decision Point 3: Alternative Evaluation and Selection of a Preferred Plan

Three Transportation Alternatives were developed for public and agency evaluation. A newsletter, open houses, email, newspaper articles, information

stations set up at libraries and community centers, and advertisement on community bulletin boards (television) were used to inform the public of this opportunity for input. (Note: Special effort was made to solicit specific input from environmental agencies and interest groups and from groups with special interest in minority populations through a process described in the Impact Measures and Environmental Analysis section of the Technical Report). Online and paper surveys were used to get specific input. The LPAC conducted an activity that helped to select a proposed transportation plan.

4. Goals, Objectives and Evaluation Criteria

Federal Planning Requirements

Several laws, regulations, and other documents at the federal level affect the development of the Long Range Transportation Plan by specifying regulations and guidance to be considered in the planning process or to be contained in the plan. These include SAFETEA-LU, existing and proposed metropolitan planning regulations, management and monitoring system regulations, Executive Order 12898 on Environmental Justice, the Americans with Disabilities Act, and a variety of others.

There are many environmental, funding, infrastructure, modal, safety, and other transportation-related provisions in this legislation. These provisions also require that the process for developing transportation plans provide for consideration of all modes, and is "continuing, cooperative, and comprehensive" to the degree appropriate.

Goals, Objectives, And Evaluation Criteria

The seven goals developed for the Comprehensive Plan and 2040 Long Range Transportation Plan are primarily based upon the SAFETEA-LU Planning Factors. These goals were presented to the public for input regarding their relative importance. The LPAC then used that input and developed a weighting system for the goals, which were used as a multiplier in the initial evaluation of each project.

The correlation between these goals and the SAFETEA-LU Planning Factors is further explained in the Technical Report. Included in this comparison are the planning objectives from the currently proposed Federal Transportation Bill. Although this bill has not yet been passed, it is likely that it will be before the next update of the LRTP in 2016. For this reason, they have been included to show that they were considered and addressed in the planning and evaluation of projects for the 2040 LRTP.

Objectives and Evaluation Criteria

The transportation goals listed below were used in the evaluation of projects during the prioritization process, which is explained in more detail in the section on the Financially Constrained Transportation Plan in the LRTP. During the public process, in order to more fully explain the intention of each goal, more descriptive objectives were developed and provided. Evaluation criteria were then developed that defined parameters for a high (3), medium (2), or low (1) rating. Using these parameters, project evaluations were conducted by technical staff to develop evaluation scores. The goal weights described earlier were then multiplied by the evaluation score and a total project score was calculated. Projects were sorted from highest to lowest project score to form an initial list of prioritized projects for further analysis.

Below is a list of each Goal with an explanation of the intent. For a complete description of the seven goals, including objectives and evaluation criteria used, see the Technical Report of the LRTP.

Goal 1: Maintain the existing transportation system to maximize the value of these assets. (Weight 18.3)

As the transportation system ages, increased funding is required for maintenance. There is often competition between funding for new projects and funding for the maintenance and operation of the existing system. Reductions in maintenance funding today lead to higher costs in the future. Constructing new roads increases future maintenance costs as the new facilities age.

Goal 2: Improve the efficiency, performance and connectivity of a balanced transportation system. (Weight 18)

Efficiency, performance and connectivity of the transportation system imply multiple benefits to all users. An efficient system allows people to move from place to place in as direct a route as possible, allowing them to reduce the amount of time spent in travel, the distance that must be traveled, and the amount of time spent in congested traffic. Connectivity allows people to make route decisions based on current traffic conditions, road access, or desired stopping points. A transportation system that performs well allows users to choose multiple transportation modes and to move through those modes in an efficient and safe manner.

Transportation Goals

Goal 1: Maintain the existing transportation system to maximize the value of these assets.

Goal 2: Improve the efficiency, performance and connectivity of a balanced transportation system.

Goal 3: Promote consistency between land use and transportation plans to enhance mobility and accessibility.

Goal 4: Provide a safe and secure transportation system.

Goal 5: Support economic vitality of the community.

Goal 6: Protect and enhance environmental sustainability, provide opportunities for active lifestyles, and conserve natural and cultural resources.

Goal 7: Maximize the cost effectiveness of transportation.

Goal 3: Promote consistency between land use and transportation plans to enhance mobility and accessibility. (Weight 10.1)

A major objective of the 2040 City of Lincoln and Lancaster County Future Land Use Plan is to create a future vision of a more compact, livable urban environment that minimizes vehicle miles traveled and promotes alternative transportation modes. This plan also addresses the changing demographics of an aging population and the increased number of single person households requiring alternative choices in housing and transportation. A goal of the transportation plan is to demonstrate an integration of the land use plan and transportation plan by supporting transportation improvements that target mixed use development nodes, redevelopment and infill projects, and multimodal corridors that connect these activity nodes.

Goal 4: Provide a safe and secure transportation system. (Weight 9.8)

All transportation improvements should be designed to be safe and secure. Visibility, access control, and separation of incompatible modes, either through buffers or grade separations, are some of the methods that can be employed to decrease conflicts and increase comfort. Security devices at key facilities, such as bus stops and trail head facilities, increase the safety and security of users. Educational programs that help travelers understand the particular safety concerns associated with various modes can help all users travel with increased confidence and security. Access to technology that helps identify and clear safe and rapid routes to incident sites is vital for first responders. The ability to ensure alternative routes in times of weather emergencies, crashes, and other emergency incidents helps to secure the continued access of responders and regular users.

Goal 5: Support economic vitality of the community. (Weight 14.6)

Economic vitality requires that many characteristics beyond transportation facilities be present, including a low cost of doing business, availability and access to technology, an educated and skilled workforce, choice of housing types, high quality schools, low municipal and state debt, and other less tangible qualities. A good transportation system, which includes transit, vehicle, freight, air, non-motorized and rail modes all integrated with land use, can help contribute to these factors.

Goal 6: Protect and enhance environmental sustainability, provide opportunities for active lifestyles, and conserve natural and cultural resources. (Weight 17.7)

This goal is one that should be part of many different planning elements. The SAFETEA-LU Planning Factors and the proposed Transportation Bill both stress the need for transportation planning to more seriously take these factors into account than they have before. The LRTP process requires a review of environmental, cultural and social effects of transportation plans. Protection of quality of life factors such as clean air and water, the promotion of healthy lifestyles, and the preservation of natural, historic and cultural resources are priorities of LPlan 2040.

Goal 7: Maximize the cost effectiveness of transportation. (Weight 11.6)

Transportation costs can be viewed on an individual, organizational, or municipal scale. Costs can also be viewed as the cost of building structures, powering vehicles, or the time spent in travel. Transportation facilities that expand the travel options available, reduce the time spent traveling, reduce the fuel consumed in travel, and make the best use of public funding in their construction and maintenance are most desirable.

5. Planning for the Transportation Needs of 2040

The Future Land Use Plan is the basis for transportation planning in the County. This plan defines the extent of the urban area that is expected by the year 2040, and what land uses are anticipated with the new growth area. It also defines the number of expected new dwelling units and where those units will be located. The purpose of the Transportation Plan, then, is to support these land uses and provide transportation alternatives that will increase the mobility, safety and livability of the community.

Future Land Use Plan — Urban Area and County

Lincoln and Lancaster County share a single land use plan, shown in two separate views in the *"Vision & Plan"* chapter to allow more detail to be visible within the urban area. The Plan displays the generalized location of future land uses to be used as a guide in making zoning decisions as land is developed. It is also used in determining the need for transportation facilities in the future. Transportation Analysis Zone data, directly based on the land use plan, is used to model and provide data for transportation decision making.

A significant change in LPlan 2040, and therefore a potential long-term impact on transportation demands, is the shift toward increased density within the existing urban area. It is anticipated that as the population ages, and as the children of the Baby Boomers, "Generation Y", move into adulthood, there will be a demand for a wider variety of housing types than what is currently offered in Lincoln. Smaller homes on smaller lots, accessory dwelling units, downtown condominiums, and mixed use residential units are all housing types that could see higher demand. Trend watchers predict an increased desire to live closer to services and goods for daily needs, and for housing that requires less time be spent on maintenance, many

of the characteristics shared by the traditional pattern of pre- WWII neighborhoods. If such a shift in demand occurs, an impact on travel such as shorter trips lengths and higher use of non-auto modes may result.

The 2040 Needs Based Plan

The Needs Based Plan identifies the programs, projects, and funding necessary to address the transportation needs of Lincoln and Lancaster County through 2040. This proposal is based on the 2040 Future Land Use, and it provides information on how to attain a balanced transportation system with all modes of travel funded adequately. By proposing a balanced transportation system that provides choice of multiple modes of travel, by basing the transportation needs of the community on the Future Land Use that calls for more opportunities for mixed-use residential development in the existing commercial areas, and by emphasizing the need to invest in healthy, safe and walkable neighborhoods, the Needs Based Plan takes into consideration and applies multiple livability principles.

This is not a financially constrained look at future transportation needs, and additional community dialogue will be needed to determine how to implement the Needs Based Plan. The Financially Constrained Transportation Plan is provided in the *MPO LRTP*. The overall annual cost in present-day dollars of the Needs Based Plan described in this section is $68 million. This is approximately $11 million more than existing transportation revenues allow. Additional funding sources and amounts will need to be developed for the Needs Based Plan to be afforded.

The following is the breakdown of funding amounts by program for the urbanizing area of Lincoln needed to fully fund the Needs Based Plan (shown in millions):

Table 10.1: Needs Based Plan Costs

Needs Based Plan	Annual Investment (Current Year Dollars in Millions)
Pedestrian and Bicycle Facilities	
Maintenance/Rehabilitation	$2.5
Capital	$0.7
TOTAL	$3.2
Multi-Use Trails	
Maintenance/Rehabilitation	$0.425
Capital	$1.0
TOTAL	$1.425
Transit System	
Capital & Operations	$13.0
Streets and Roads	
Operations	$14.0
Maintenance/Rehabilitation	$15.0
Capital/Programs	$21.3
TOTAL	$50.3
TOTAL PROGRAM	**$67.925**

Pedestrian And Bicycle Facilities — 2040 Needs

Bicycle and pedestrian facilities are very highly valued by the citizens of Lancaster County. According to SAFETEA-LU these facilities should be considered in all transportation projects. In order for these facilities to be properly planned and for a full network to be integrated into the existing transportation network, active planning and coordination of projects should be a priority. This will require a dedicated funding source of about $700,000 per year.

During the planning, engineering, maintenance, and rehabilitation of all streets and roads, bicyclists should be considered "design users," with most streets being considered a "bicycle facility." Education and enforcement of the rules of the road are keys to encourage bicycling as viable transportation and creating an environment that is safe and convenient for cyclists and motorists. The bicycle and pedestrian program should include education and promotional activities to encourage full and safe use of these facilities.

Lincoln currently has a well developed sidewalk system, and the requirement of sidewalks on both sides of all streets should continue. However, this system is in need of rehabilitation in many areas. The sidewalk rehabilitation program should be funded at a level of about $2.5 million per year in order to fully meet these needs in a reasonable timeframe. Pedestrian crossing signals should be updated and installed when warranted at appropriate sites along with other visual cues to alert drivers to pedestrian crossing points and to increase the safety and security of pedestrians. With the adoption of the 2040 Plan, a prioritized list of needed pedestrian improvements and policy changes should be identified as part of an implementation strategy. Planning and developing pedestrian facilities should consider many factors:

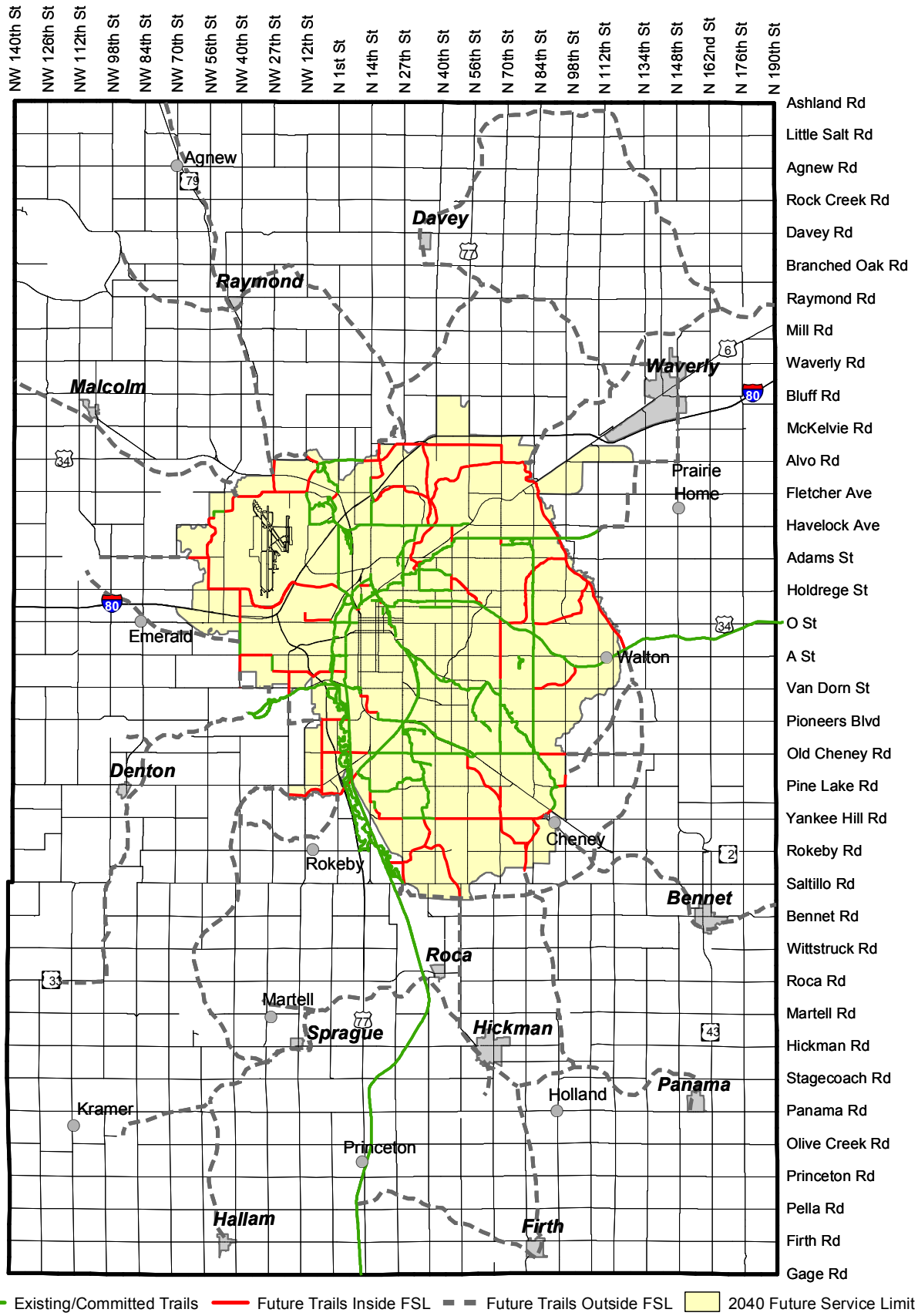
- Location of existing and planned activity centers and districts, such as shopping malls, older neighborhood centers, libraries, community centers and schools.
- Programs to retrofit established sections of town with pedestrian amenities.
- Design standards for pedestrian facilities in new residential and mixed-use developments.
- Location of existing and planned multi-use trails.
- Requirements of the Americans with Disabilities Act (ADA).
- Needs of a growing senior population.

A major element of the overall bicycle plan is the provision for adequate bicycle facilities as part of the existing urban area. For example, while parking for cars is routinely planned for, rarely is there a place where bicyclists can lock or store their bicycle. These facilities can be public facilities or part of private development. In addition to basic bicycle locking and storage facilities, many communities and larger mixed-use centers provide basic shower facilities for commuter bicyclists. The bicycle and pedestrian program should include subdivision and building codes that plan for the inclusion of appropriate bicycle facilities. As part of an implementation strategy, a prioritized list of needed bicycle improvements and policy changes should be identified.

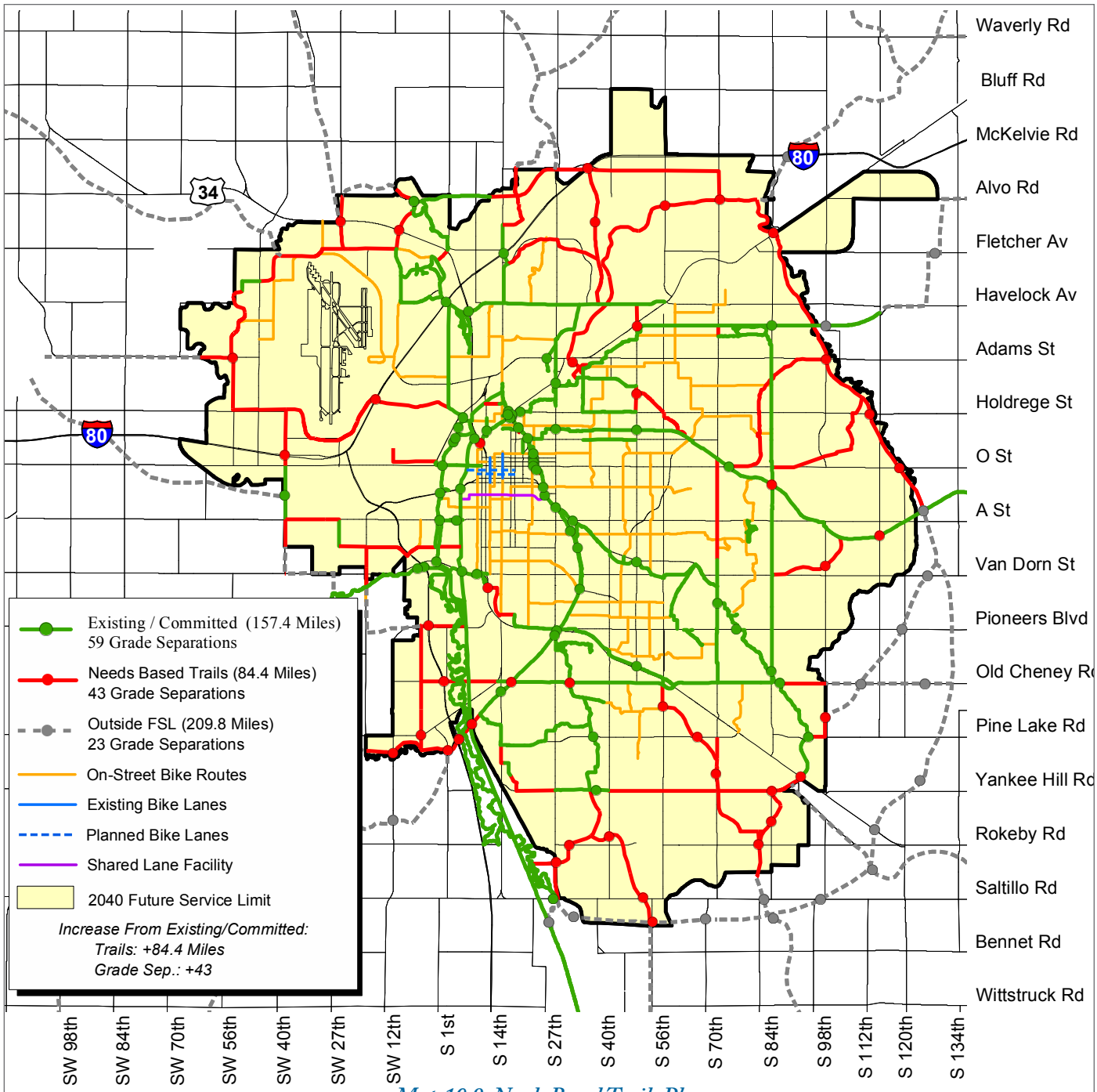
Multi-Use Trails — 2040 Needs

The grid pattern of roadways and the use of the Rails-to-Trails program have provided a strong foundation for a quality trail system. This system should be completed and new growth areas should be connected to it as they develop. To accomplish this, funding of about $1 million per year is needed. Opportunities to develop trails in the County should be identified as they are presented and efforts to complete these projects should be made as funding opportunities allow.

As the trail system begins to age, rehabilitation of trails will become a larger issue. A rehabilitation program should be developed and funded at $425,000 per year in order to complete these projects as they are needed. Additionally, some trail segments have already begun to see more use than was originally anticipated. New trails should be built to a ten foot width and in some areas existing trails should be widened to 10 or 12 feet as they are rehabilitated.



Map 10.8: Countywide Trails Plan



Map 10.9: Needs Based Trails Plan

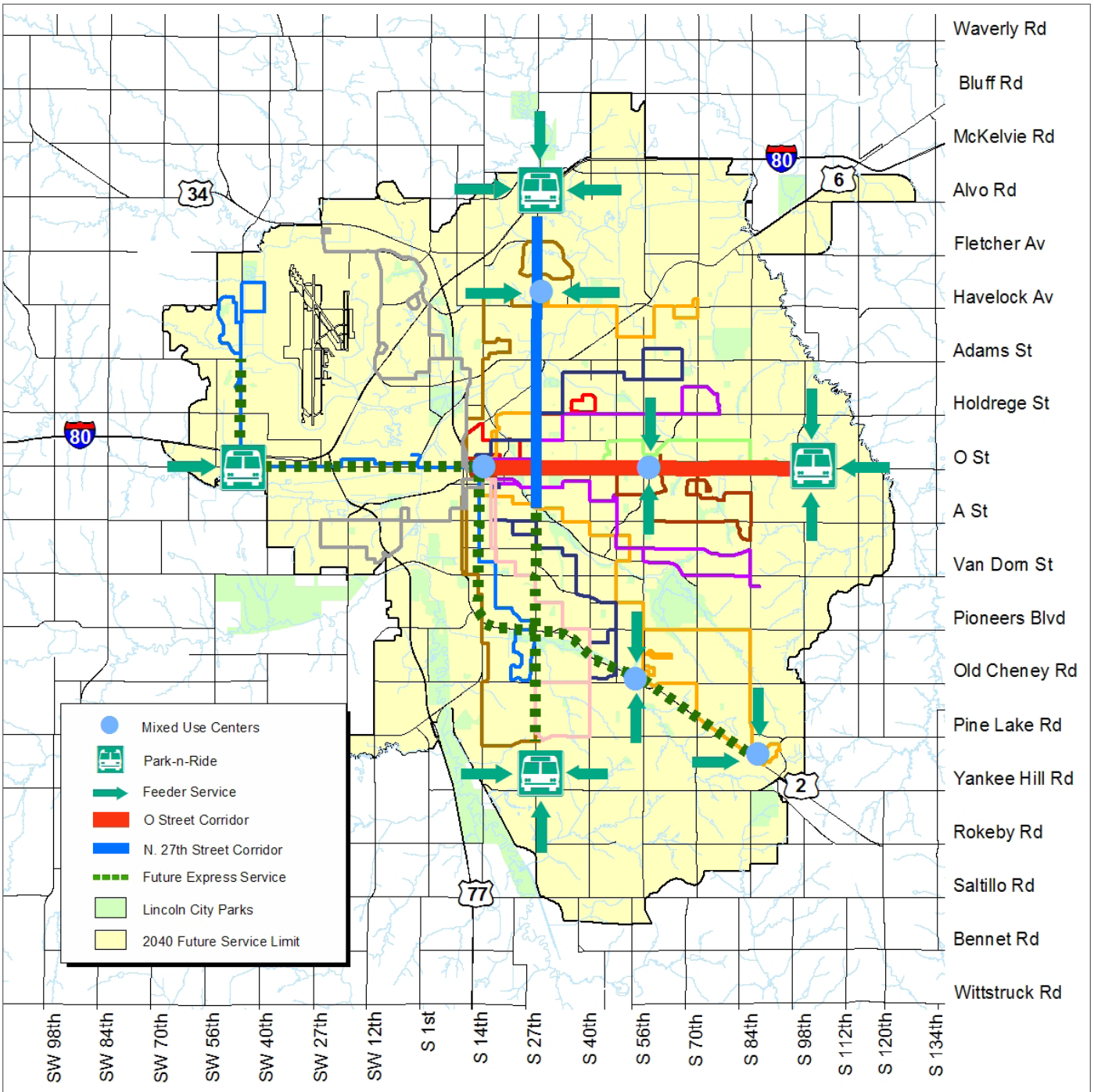
Transit System — 2040 Needs

Providing transit services throughout the City requires careful consideration of the number of routes, the frequency of service, and the hours of service. The *Transit Development Plan* (TDP) adopted in 2007 provides a framework for monitoring and modifying transit services in response to changes in development patterns and user needs, and is based on adopted service standards and policies. The TDP is developed by Public Works and Utilities – StarTran under the guidance of the StarTran Advisory Board and the public. The TDP is the main planning document for transit in Lincoln and was last updated in 2007.

The current transit pattern in Lincoln attempts to provide some level of service to all households.

However, in the future, consideration of a change to the pattern of transit delivery needs to be made in order to maximize the productivity of the system. Corridors with higher ridership should be enhanced with shorter wait times and longer service hours. Service to major employment centers should be considered for enhancement as well as areas of current and future anticipated density. The Mixed Use Redevelopment Nodes and Corridors discussed in the *"Mixed Use Redevelopment"* chapter provide an opportunity to direct redevelopment and transit services in a coordinated fashion.

To be comparable to other cities of Lincoln's projected 2040 size, funding for transit should be increased to provide similar levels of service.



Map 10.10: 2040 Transit System Concept Map

Areas of the City that are not along the transit corridors discussed above can be served to a more modest level. Neighborhood feeder routes that direct transit riders to the major corridors could be provided with smaller and more fuel efficient vehicles. Continued enhancement of the bike-and-bus feature would also allow those in areas with lower service to access and use transit. Establishing park-and-ride locations along outlying areas of the community could support transit connections to the Downtown and other mixed use centers. The use of ITS to provide route information and real-time bus location information will allow those who ride by choice to participate at a higher level and riders of necessity to plan their routes. To accomplish these projects, funding of at least $13 million per year is needed. This funding will have to increase with inflation and as the City grows in order to keep pace.

Effective public transportation service requires good pedestrian connections to and from transit stops, density of activities, and development designs supportive of transit riders. Pedestrian connections to transit must be direct and the sidewalk system must have continuity. Street crossings to transit stops must be safe. Productive transit service requires higher-density land development patterns that link residential areas and employment, retail, and service centers. Development design needs to be transit-friendly, providing convenient access to transit services.

Although Lincoln may not reach the density and demand needed to justify a bus rapid transit (BRT) system within the planning period, efforts should be made to identify potential routes and to concentrate efforts to increase density along those routes. Careful design and right of way preservation along these routes may also allow a conversion to street car or light rail in the distant future. The "O" Street corridor is a likely candidate for planning and identification as a long term BRT route.

The projected increase in the 65 and over population creates challenges in service provision. This population increase will create a greater usage of demand-responsive public transportation. Based on current funding levels, such increase in usage could create funding challenges. While all fixed-route services are, and will continue to be, accessible, the need for increased complementary paratransit services (HandiVan/Brokerage) will continue. Such services are very expensive, due to vehicle load constraints and operating policies and therefore, innovative variations of such services will be essential.

Expanded transit service within the rural areas of the County or between Lincoln and other larger cities is not currently practical, however, data should continue to be collected and analyzed to monitor travel patterns in the hopes of identifying opportunities for regional transit. The Nebraska Innovation Zone Commission and several other interest groups have advocated regional planning for just such an opportunity. The Lincoln MPO should continue to be involved in these conversations.

Streets And Roads — 2040 Needs

Cars and trucks will continue to be the primary mode of travel for Lincoln and Lancaster County residents throughout and beyond the planning period of this Plan. These vehicles depend upon the expansion and continued maintenance of a street and road network allowing ease of mobility throughout the region. Although investment in other modes of transportation may decrease reliance on the automobile, streets and highways will continue to form the backbone of the entire region's transportation system.

A major responsibility of the Long Range Transportation Plan is the operation and

maintenance of the new and existing street and roadway system. Without regular maintenance, monitoring the functionality of the existing system, and implementation of lower cost improvements designed to alleviate congestion, the addition of new roads would provide only localized improvements to the overall functionality of the system.

This subsection examines the streets and highway system designed to serve the future community form of the Lincoln MPO as presented in LPlan 2040 in terms of:

- Streets and Roads Programs
- Urban Street Network
- Rural Road Network

Streets and Roads Programs

System Management and Operations

The day to day requirements of the roadway system are met through the operations program. The operations program includes such activities as street sweeping, striping, signal maintenance, and snow removal. Routine maintenance activities such as crack sealing, pothole repairs and sign replacement are also included. Monitoring the performance of the system is an important part of the operations program. Data is gathered on a regular basis to monitor traffic flow, crash rates, and intersection functionality. This data is used in timing traffic signals and for safety studies to identify needed improvements. Engineering studies to identify future alignments and intersection design are also conducted through this program.

The City's Annual Crash Study and Transportation Crash records system are intended to address the requirements of SAFETEA-LU and the State of Nebraska Critical Emphasis areas. It is anticipated that the City's transportation safety program will continue to emphasize education, enforcement, engineering and evaluation to help mitigate crashes. This crash data was used to inform the project selection process for the 2040 Plan. It is imperative that all funding opportunities be pursued to help mitigate and improve Lincoln's transportation safety program.

The Operations Program budget is currently adequately funded, but an increase to $14 million per year is needed in order to better fund needs.

Roadway Rehabilitation Program

The rehabilitation of roadways is needed when the condition of the roadway requires attention beyond the routine maintenance provided through the Operations Program. There are varying levels of rehabilitation from pavement overlays to a complete rebuild of the roadway. In general, the former is less expensive and can delay the need for the latter. A regular system of sealing and minor repair can mean fewer roads in need of major repair and a higher overall level of service. If regular maintenance is not conducted, however, roadway condition can fall from good to poor in the matter of two or three years. An investment of one dollar in roadway rehabilitation when roads are still in good condition can mean a saving of five dollars or more in the rehabilitation required should they fall into poor condition.

This program is challenged in many ways. Inflation of project costs over the last several decades has outpaced the growth in revenue available. The lane-miles of roadway have been increasing much faster than the budget. State gas taxes, a major source of revenue, have not been growing to keep pace as people react to higher gas prices by reducing trips and purchasing more fuel efficient vehicles.

Consequently, the rehabilitation program has not been funded to an adequate level in many years.

Continuing with current funding levels would mean a decrease in overall level of service to a "poor" or "very poor" rating by the year 2040. In order to maintain the current condition of urban roadways at a "good" level, funding must be increased to $10 million dollars per year, and must subsequently increase to keep pace with inflation and the growth and aging of the system. Signal rehabilitation and bridge rehabilitation should be funded at a level of $2.5 million per year each, for a total rehabilitation annual need of $15 million per year.

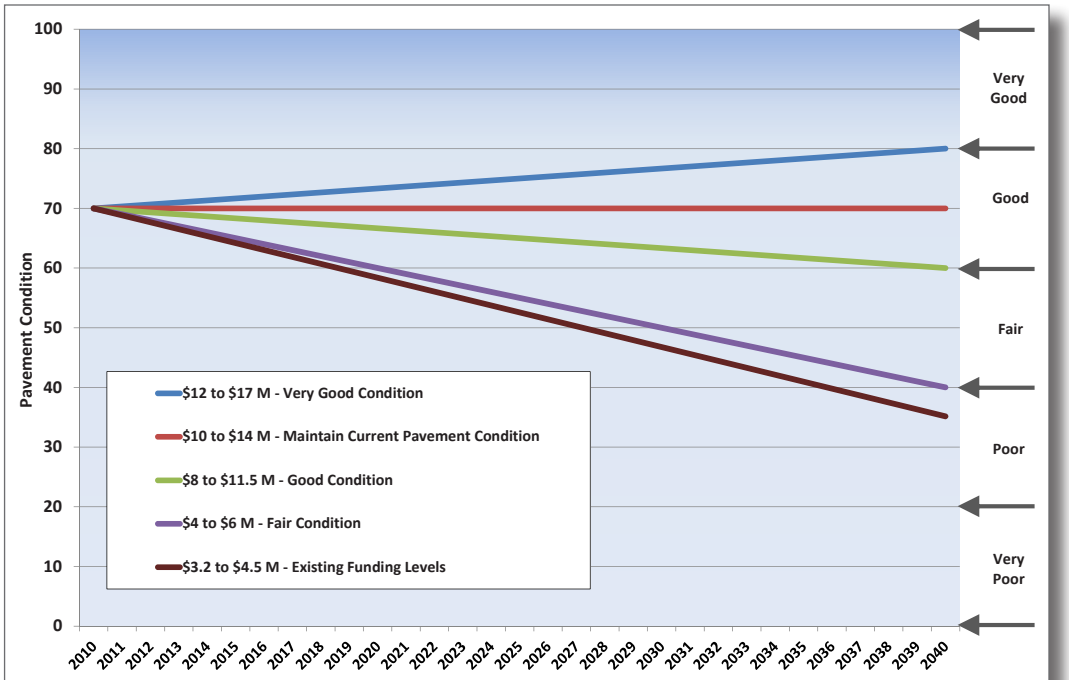


Figure 10.2: Roadway Maintenance

Congestion Management Process

The *Congestion Management Process* and mitigation efforts should remain flexible and ongoing. A regular process is in place to identify and respond to traffic congestion challenges. Many management and operational actions will be undertaken at the departmental level to provide the quickest possible resolution, while more serious issues may require a formal study process. Congestion management data is a primary source of information that shapes the decision making process for the Long Range Plan. Levels of delay, or congestion, were identified using the MPO traffic model to determine which roadway projects are most needed by the year 2040. Also, incident management is one of the major challenges of congestion management in Lincoln where much traffic congestion can be tied to crashes, incidents, and construction.

Additional studies may be desirable to identify specific congestion mitigation strategies that appear most reasonable for the particular location. Where deficiencies are identified, the MPO Technical Committee will suggest specific strategies for congestion mitigation. More general strategies include:

- Alternative transportation modes and Complete Streets policy development
- Continued monitoring and planning
- Intelligent Transportation System (ITS) improvements
- Transportation Demand Management (TDM) techniques
- Two Plus Center Turn Lane Program
- Intersection capacity improvements
- Road improvements (described in the following section)

Alternative Transportation Modes and Complete Streets Policy Development

Alternative transportation modes are discussed in previous sections of this chapter. Increased trips using alternative transportation modes, such as bicycles and transit, reduce the number of single occupant vehicles on the road, and so reduce congestion.

The streets of our City and County are important parts of the livability of our community. Most streets should be designed and maintained for all users, not just vehicular traffic. Complete streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities should be able to safely move along and across a Complete Street.

The City should develop a Complete Streets policy, related new roadway standards, and a process to implement complete street principles prior to the next regular five-year update of the Plan. A Complete Streets policy will direct planners and engineers to routinely design and operate the entire right of way to enable safe access for all users regardless of age, ability, or mode of transportation. Every transportation project should begin with the goal that the street network will be designed for use by drivers, transit users, pedestrians, and bicyclists.

Continuing Monitoring and Planning

The monitoring and planning of the community's land use patterns and transportation systems are an integral part of a continuing process. This process involves the periodic examination of the City-County Comprehensive Plan and Long Range Transportation Plan. Amendments to these two plans, as well as related capital improvement programs and other implementation documents, are an important part of this process. Such amendments help ensure these plans remain current, relevant, and practical.

Intelligent Transportation System (ITS) Improvements

A stated mission of the Lincoln MPO is "to advance the development and application of ITS across the region, which will increase highway safety, mobility, security, economic health and community development, while preserving the environment."

ITS technologies are cost effective and relatively quick to deploy. Solutions like synchronized or adaptive traffic signals yield a $40 return in time and fuel savings for every $1 invested, reduce carbon dioxide emissions up to 22%, and travel delays by 25%. The Government Accountability Office found the benefit-cost ratio of a nationwide real-time traffic information system to be 25 to 1, with benefits in safety, mobility, and environmental quality. The overall benefit-cost ratio of ITS-enabled operational improvements is estimated at 9 to 1, a significant return on investment when compared to the addition of new roadway capacity that has an estimated benefit-cost ration of 2.5 to 1.

The Federal Transportation Efficiency Act (TEA-21) required that local communities consider and include ITS applications in their transportation planning process. This mandate has been carried forward by the Lincoln MPO in subsequent updates of the Long Range Transportation Plan, including preparation and adoption of the 2005 Southeast Nebraska Regional ITS Architecture, which continues to guide ITS planning in Lincoln and Lancaster County. The analysis of future traffic growth and demand further underscores the importance of ITS investments. Given the expense and difficulty of adding expressway and arterial street capacity, and the anticipated high demand for arterial and expressway usage, it is clear that strategic ITS operational improvements will be necessary for the Lincoln area and the region.

Incident management is an important aspect of addressing non-recurring congestion in Lincoln. Non-recurring congestion is congestion that is caused by conditions that are not permanent such as vehicular crashes, construction zones, or weather conditions. Incident management provides procedures and programs to best handle such congestion to minimize the negative impacts on the road system. To accomplish this, ITS technology can be used to assist in delivering and disseminating real time data on the conditions of traffic flow that can then be shared and used by motorists and the proper authorities to effectively address changing conditions on the streets.

The safe, secure and continuous movement of people and goods during emergencies depends upon well coordinated operations plans and policies. To address the security needs of our community and the transportation system infrastructure, it is anticipated that a greater emphasis will be placed on the funding and implementation of ITS technologies. Applicable ITS technologies will be of enormous benefit, particularly when they are integrated with the information and communication systems of our public safety agencies.

The implementation of ITS technologies during the 2040 planning period is expected to include traffic monitoring cameras, dynamic messaging signs, vehicle detection, communication infrastructure, traffic adaptive signal systems, advance parking management and information systems and other traffic management systems and software. For a full description of ITS projects and costs, see the Technical Report. An annual program cost of $1 million is needed to fund this program.

Travel Demand Management (TDM) Techniques

Travel Demand Management (TDM) is a strategy to reduce demand for single occupancy vehicle use on the transportation network. TDM can reduce congestion and traveler delay, improve air quality, and improve access to jobs, schools and other opportunities. Travel Demand Management Strategies can include the following:

- Flexible Work Schedules
- Traveler information
- Employer and Campus TDM
- Auxiliary Transit Service
- Market and Financial Incentives
- Parking Management
- Transit Use
- Walking and Cycling
- Teleworking or Telecommuting

Solutions like synchronized or adaptive traffic signals yield a $40 return in time and fuel savings for every $1 invested, reduce carbon dioxide emissions up to 22%, and travel delays by 25%.

By comparison to road widening and other capital projects, TDM programs are very inexpensive and can be effective in decreasing demand on roadways, especially during peak travel times of the day. An annual program cost of $200,000 is needed to fund this program.

The Lincoln MPO should develop a travel demand management program, with dedicated funding, that is coordinated between various departments and identifies and works with large employers including the State of Nebraska, University of Nebraska-Lincoln, and various private businesses.

Two Plus Center Turn Lane Program

The Two Plus Center Turn Lane Program, or "2 + 1" program, described in the Existing Conditions section has been a very successful strategy for addressing the congestion issues seen on major arterials in older neighborhoods while remaining sensitive to the environmental and social assets of the neighborhood. This program should continue to build the "2 + 1" system as shown on the Committed Roadway Projects map. The identified 2+1 program projects should be completed by 2025, the midpoint of the 2040 planning period. These projects are generally constructed at a time that the existing pavement requires major rehabilitation. They are funded primarily through

the street rehabilitation program with the cost of additional capacity improvements covered by the capital portion of the budget at a level of $300,000 per year.

Intersection Capacity Improvements

Often, causes of congestion can be traced to bottlenecks at intersections. These congestion points can be at least partially addressed by relatively low cost additions of turn lanes, flaring of intersections, or other improvements to allow vehicles to move through intersections more efficiently.

Intersection capacity improvement projects that address congestion at a relatively low cost should be completed and remain priority projects through an annual program funded at $1 million per year. The following intersections are likely candidates for improvement projects within the planning period and were identified based on information from the Congestion Management Process including crash data:

- 27th/Superior
- 33rd/O
- 27th/Old Cheney
- 70th/South
- 70th/A
- 70th/Van Dorn
- 70th/Pioneers
- 70th/Glynoaks
- 70th/Berean Church drive
- 56th/South
- 56th/Van Dorn
- 56th/Calvert
- 56th/Pioneers
- 56th/Shady Creek
- 27th/Superior - Fairfield
- 27th/Cornhusker - Knox
- 48th/Normal
- 48th/A
- 48th/Randolph
- 48th/Vine
- 29th/Cornhusker
- Hwy 34/Fletcher
- 1st/Cornhusker
- SunValley/West O
- 1st/Superior
- Coddington/A
- 9th/A
- 9th/D

Urban Street Network — 2040 Needs

The long range program for improving the urban area street system is detailed below. This effort involves numerous projects and studies taking many years and costing millions of dollars to complete. Close planning and coordination among various Federal, State and local government agencies and departments will be needed. The planned future urban area street system is comprised of the following elements:

- Developer Commitments
- Federal and State Improvements
- Committed Roadway Projects
- Controlling Roadway Cost
- Urban Capital Roadway Projects
- South and East Beltways
- Nebraska Highway 2
- Right-of-Way Consideration

Developer Commitments

As the City grows, new roads must be built to meet the projected needs of growing areas. In some cases new development is proposed that requires infrastructure not planned for at the time it was requested. In certain cases, special agreements have been entered into that commit the City to repay developers within a time period for funding the construction of road improvements. The City will honor these agreements and is committed to participation in the funding of those improvements that have been and are expected to be constructed in the early part of the planning period. A budget of $1.6 million per year through the year 2025 is needed to meet these commitments for a total of $22.4 million in street improvement commitments.

The following are the agreements and the corresponding dollar amounts of the commitments that comprise this total amount. Specific street improvement descriptions are noted only for those projects that have not yet been constructed; these projects are shown in green on Map 10.11: Committed Roadway Projects that follows. The commitments that only show a dollar figure are repayments required for completed street improvements.

Fallbrook $313,057
Firethorn $38,475
Grandale/Southwood Lutheran..... $1,130,000
(Rokeby Road 2 lanes offset from S. 40th to S. 48th)
Highland View $3,760,000
(Alvo Road 2 lanes from NW 12th to NW 27th and NW 27th 2 lanes from Alvo to US 34)
Jensen Park..... $2,750,000
(Yankee Hill Road 2 lanes from S. 84th to railroad tracks)
Northbank Junction..... $250,000
Southwest Village $2,135,207
Waterford Estates $4,265,396
Wilderness Commons $2,876,160
Wilderness Heights $1,323,840
(S. 40th Street 4 lanes from Yankee Hill Road to ¾ mile south)
Wilderness Hills $348,253
Woodlands at Yankee Hill Road $3,200,000
(Yankee Hill Road 2 lanes from S. 70th to S. 84th)
TOTAL..... $22,390,388

Federal and State Improvements

During the planning period, improvements are planned for Interstate 80 and many of the existing Nebraska State Highways in Lincoln and Lancaster County. These improvements can generally be categorized as the widening of roadways or construction of interchanges. All of the projects listed in Tables 10.2 and 10.3 are considered to have funds committed for design and construction during the 2040 planning period with the exception of those identified as illustrative projects:

Committed Roadway Projects

Committed roadway projects as shown on Map 10.11: Committed Roadway Projects include the road segments that are part of the 2+1 program as described in this section, Developer Commitment projects that have not yet been constructed, urban area rural paving projects that have been coordinated with the County Engineer's Office, and funded urban and State projects that are scheduled to be constructed or are underway.

Controlling Roadway Costs

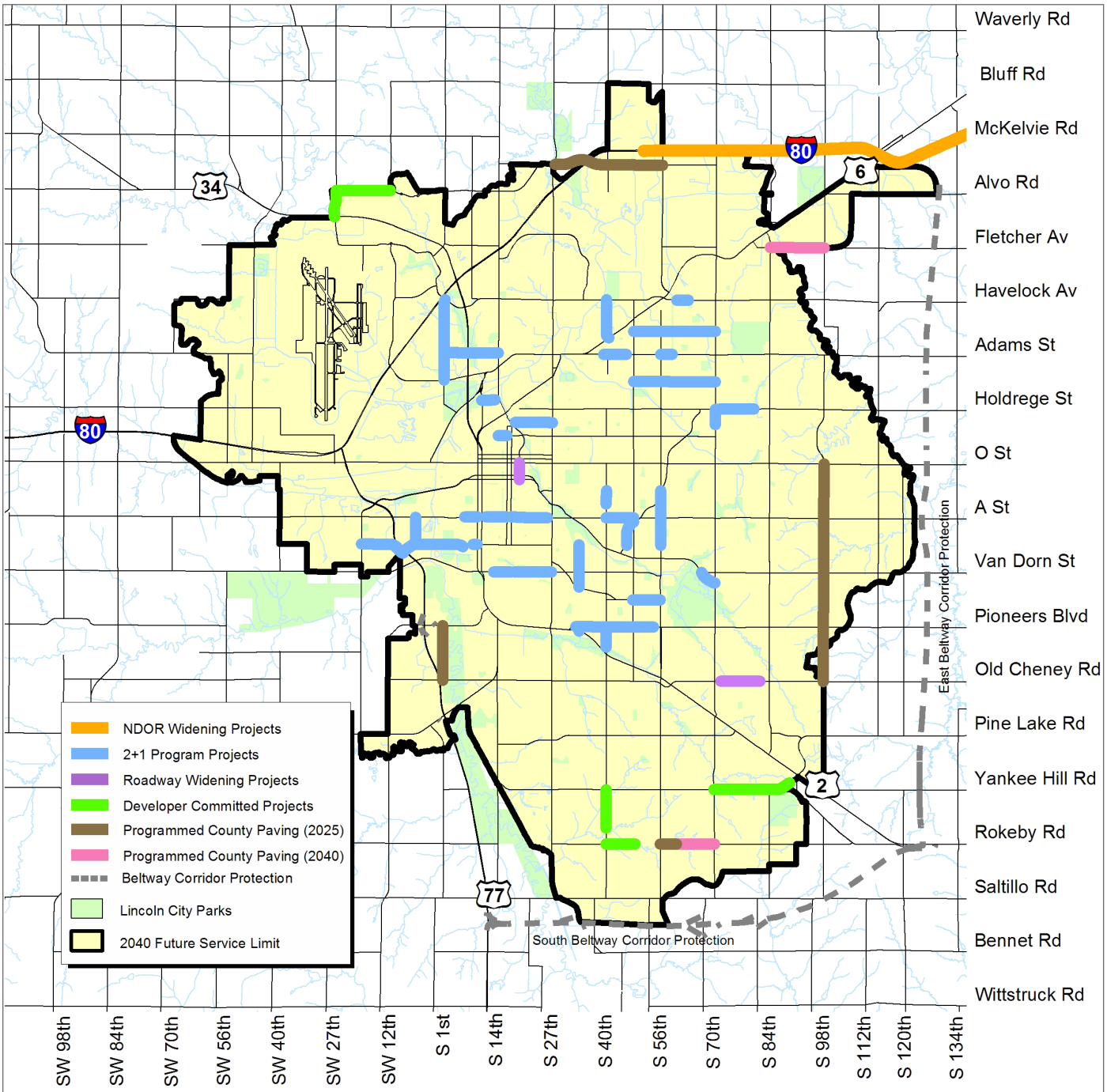
In developing the remaining future roadway system, consideration of the limits of the capital budget and the needs of the future population were considered. A valuable tool in the development of the system was the work of the Mayor's Road Design Task Force. This 14 member committee appointed by the Mayor of Lincoln was charged with developing a strategy for addressing the near term roadway funding challenges of the time. In 2008, Executive Order 081547 directed City departments to immediately begin taking steps to adopt the recommendations of the committee. Among other findings, the Task Force recommended the City consider extended life for rural paved roadways, simplified road designs, and building roads initially to meet the demand of the immediate future, rather than traffic volumes that may not exist for decades.

Table 10.2: State Projects

I-80, Lincoln to east county line	Widen to 6 lanes
I-80, Lincoln to west county line	Widen to 6 lanes
I-180, I-80 to Downtown Lincoln	Paving Improvements
US-34 East, 84th Street to east county line	4 lanes + turn lanes
US-34 West, west city limits to Malcolm spur	4 lanes + turn lanes
US-34 West, Malcolm Spur to west county line	Paving Improvements
US-6 West, Emerald to west county line	Paving Improvements
US-6 West, City Limits to Emerald	Asset Preservation Project
US-6 (Sun Valley Boulevard), "O" Street to Cornhusker Highway	4 lanes + turn lanes
South Beltway, US 77 to Hwy 2	Corridor Protection
NE-79, US-34 to County Line	Paving Improvements
Safety Projects	Program

Table 10.3: Unfunded State Projects

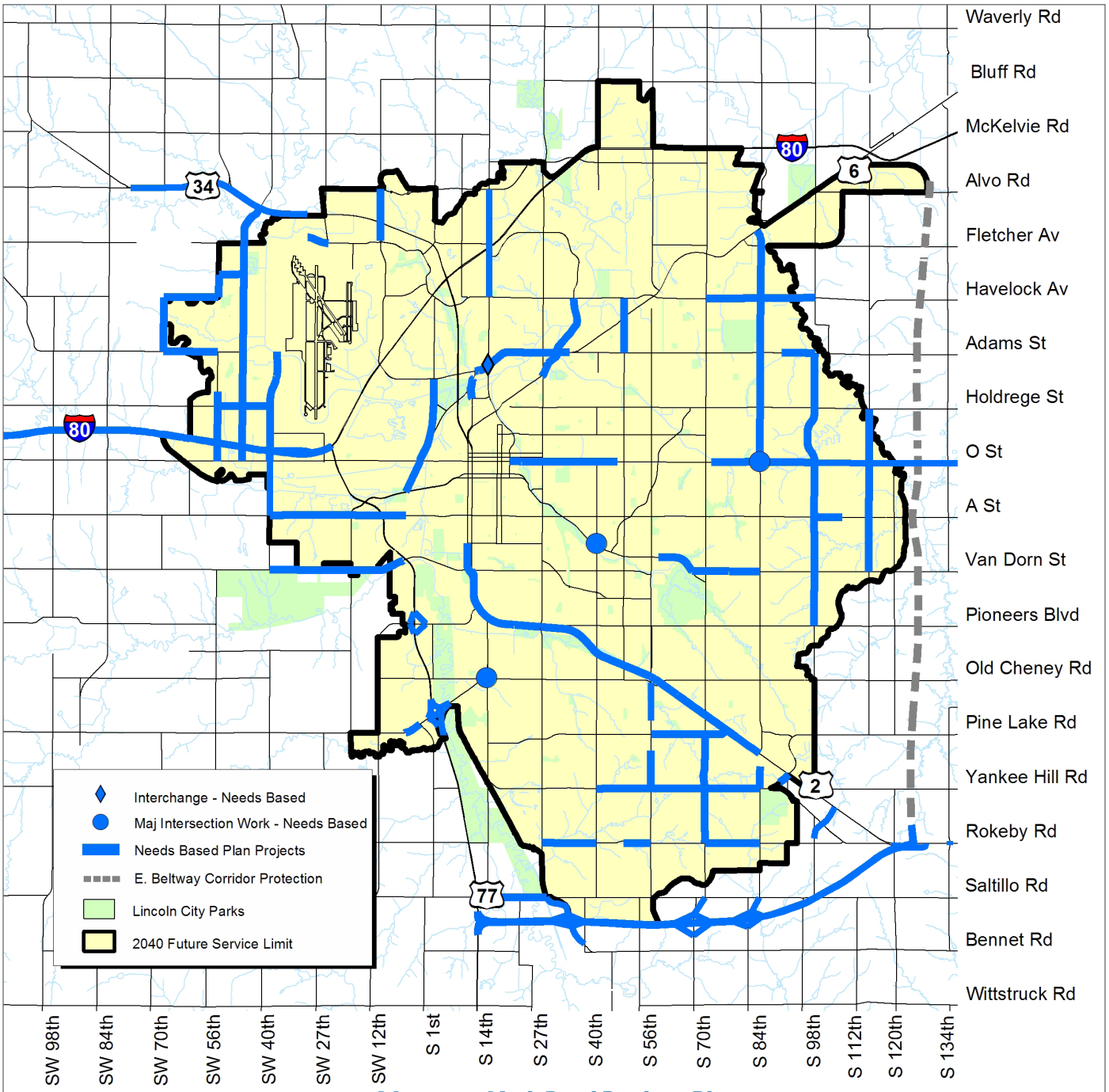
US-77 and Warlick Boulevard Intersection	Interchange - Illustrative
US-77 and West Pioneers Boulevard Intersection	Interchange - Illustrative
South Beltway, US-77 South to Nebraska Highway 2	4 Lane Expressway - Illustrative



Map 10.11: Committed Roadway Projects

The Needs Based Plan reflects this philosophy by including roadway designs that are scaled back, compared to the 2030 LRTP, to the projected traffic demands of year 2040. In some cases this means that existing pavement, such as the asphalt paving on Saltillo Road in southwest Lincoln, would remain (and be maintained) to serve the future population through 2040. However, acquisition of right-of-way should still occur with development to plan for the full build-out of the roadway beyond 2040.

The result of this philosophy of planning for future roads is a system that provides paved roadways to all areas of the future service limit and minimizes the level of congestion in the road system while keeping costs as low as possible.



Map 10.12: Needs Based Roadway Plan

Urban Capital Roadway Projects

The capital roadway projects resulting from this evaluation are shown on Map 10.12: Needs Based Roadway Plan and listed in Table 10.4: City of Lincoln Needs Based Capital Roadways Projects and Programs. Each of these projects is considered a need by 2040, but not all of them can be funded given current funding constraints. This list of urban projects and programs amounts to a $21.3 million annual cost in current dollars. The Financially Constrained Transportation Plan in the MPO LRTP uses this list of projects to develop a prioritized list of capital roadway projects that can be afforded with current revenue sources. Those projects identified as Illustrative/Unfunded are those that cannot be constructed unless additional revenue is found.

Table 10.4: City of Lincoln Needs Based Capital Roadways Projects and Programs

Facility/Project Name	Lead Agency	Project Type	Project Cost (Current Dollars)
MPO Programs			
Intersection Capacity Improvement Projects	Local	Program	$29,000,000
Two Plus Center Turn Lane Projects in the Built Environment (added capacity portion of projects)	Local	Program	$4,212,000
Intelligent Transportation System Capital Program of Projects	Local	Program	$25,375,000
Safety Projects (20% Local share for State safety program)	Local	Program	$5,800,000
Safety Projects (80% State share for State safety program)	State	Program	$23,200,000
Travel Demand Management Program of Projects	Local	Program	$5,800,000
East Beltway, I-80 to Hwy-2, " Corridor Protection" Freeway	Local	Corridor Protection	$7,250,000
Developer Commitments	Local	Various	$22,390,388
MPO Roadway Projects			
N. 14th Street, Superior to Alvo	Local	4 lanes + turn lanes	$5,604,000
SW 40th Viaduct	Local	Viaduct over BNSF Railroad	$6,500,000
S. 56th Street, Shadow Pines Dr. to Old Cheney Road	Local	4 lanes + turn lanes	$7,275,000
S. 14th Street / Warlick Boulevard / Old Cheney Road	Local	Major Intersection Work	$10,600,000
NW 48th Street, Adams to US-6	Local	4 lanes + turn lanes	$14,122,516
Pine Lake Road, S. 61st Street to Hwy-2	Local	4 lanes + turn lanes	$6,602,985
S. 9th Street, Van Dorn to South Street	Local	3-lanes + turn lanes	$2,063,195
Hwy-2, Van Dorn Street to Old Cheney Road	Local	6 lanes + turn lanes	
Phase I - Van Dorn thru S. 14th	Local		$9,359,699
Phase II - S. 14th thru S. 33rd	Local		$9,359,699
Phase III - S. 33rd thru South 56th/Old Cheney Road	Local		$18,719,399
US-6 (Sun Valley Blvd.), Corn. Hwy (US-6) to W "O" St.(US-6), including R.R Overpass (local 20% share)	Local	4 lanes + turn lanes	$4,866,487
N. 48th Street, Adams to Superior	Local	4 lanes + turn lanes	$7,296,353
W. Holdrege Street, NW 56th Street to NW 48th Street	Local	2 lanes + turn lanes	$1,249,810
NW 56th Street, W. Partridge Lane to W. "O" Street	Local	2 lanes + turn lanes	$3,840,675
W. "A" Street, SW. 40th Street to Coddington Avenue	Local	2 lanes + turn lanes	$4,022,980
N. 98th Street, Adams Street to Holdrege Street	Local	2 lanes + turn lanes	$4,683,568
N. 10th Street, US-6 to Military Road, including Salt Creek Bridge	Local	4 lanes + turn lanes	$8,119,202
US-34 ("O" St.), Antelope Valley N/S Rdwy. (19th St.) to 46th Street	Local	6 lanes + turn lanes	$15,161,957
I-80, US-77 to NW 56th	State	Widen to 6 lanes/10 Year	$32,897,984
NW 48th Street Bridge over I-80	State	2 Bridges over 6-lane I-80/10 Year	$5,134,112
NW 56th Street Bridge over I-80	State	1 Bridge over 6-lane I-80/10 Year	$2,831,903
US-34 West, west city limits to Malcolm Spur	State	4 lanes + turn lanes/10 Year	$12,546,143
US-6 West, west city limits to west county line	State	Paving Improvements/10 Year	$11,441,872
US-6 (Sun Valley Boulevard), "O" Street to Cornhusker Highway (State 80% share)	State	4 lanes + turn lanes/10 Year	$19,465,948
US-79, US-34 to County Line	State	Paving Improvements/10 Year	$15,784,477
South Beltway, US 77 to Hwy-2	State	ROW and PE/10 Year	$42,147,192
US-34 ("O" St), Wedgewood Drive to 98th Street	Local	6 lanes + turn lanes	$16,489,642
S. 56th Street, Thompson Creek Boulevard to Yankee Hill Road	Local	4 lanes + turn lanes	$4,139,817
S. 70th Street, Pine Lake Road to Yankee Hill Road	Local	4 lanes + turn lanes	$5,923,581
Yankee Hill Road, S. 40th Street to S. 56th Street	Local	4 lanes + turn lanes	$5,967,970
Yankee Hill Road, S. 56th Street to S. 70th Street	Local	4 lanes + turn lanes	$6,011,339
Yankee Hill Road, S. 70th Street to S. 84th Street	Local	additional 2 lanes	$3,876,017
Yankee Hill Road, Railroad Crossing to Hwy-2	Local	2 lanes + turn lanes	$1,720,324
S. 84th Street, Amber Hill Road to Yankee Hill Road	Local	4 lanes + turn lanes	$2,542,248
Normal Boulevard, S. 58th Street to Van Dorn Street	Local	4 lanes + turn lanes	$5,153,267
W. Holdrege Street, NW 48th Street to NW 40th Street	Local	2 lanes + turn lanes	$1,423,628
West Denton Road, Amaranth Lane to S. Folsom Street	Local	additional 2 lanes	$837,065
W. "A" Street, Coddington to Folsom	Local	2 lanes + turn lanes	$2,720,537
N. 98th Street, US 34 to Holdrege	Local	additional 2 lanes	$2,430,392

Ongoing Programs

Projects Projected to 2025

Table 10.4 (con't)

Facility/Project Name	Lead Agency	Project Type	Project Cost (Current Dollars)
MPO Roadway Projects			
South Beltway, Local 20% Share	Local	4 Lane Expressway	$35,000,000
S. 98th Street, US-34 to "A" Street	Local	4 lanes + turn lanes	$7,889,890
S. 112th Street, US-34 to Van Dorn Street	Local	2 lanes + turn lanes	$6,158,680
N. 112th Street, Holdrege Street to US-34	Local	2 lanes + turn lanes	$5,364,896
Saltillo Road, Highway 77 to S. 27th Street	Local	2 lanes + turn lanes	$4,253,759
W. Adams Street, NW 70th Street to NW 56th Street	Local	2 lanes + turn lanes	$2,622,729
W. Van Dorn Street, Coddington Avenue to US-77	Local	2 lanes + turn lanes	$2,811,311
W. Van Dorn Street, SW 40th Street to Coddington Avenue	Local	2 lanes + turn lanes	$5,008,028
Rokeby Road, S. 70th Street to S. 84th Street	Local	2 lanes + turn lanes	$2,603,248
Rokeby Road, S. 27th Street to S. 40th Street	Local	2 lanes + turn lanes	$2,933,994
Rokeby Road, S. 48th Street to S. 56th Street	Local	2 lanes + turn lanes	$1,215,196
W. Cummings Street, NW 56th Street to NW 52nd Street	Local	2 lanes + turn lanes	$638,126
NW. 56th Street, W. Cummings Street to W. Superior Street	Local	2 lanes + turn lanes	$1,363,503
W. Superior Street, NW 70th Street to NW 56th Street	Local	2 lanes + turn lanes	$2,564,904
NW 70th Street, W. Superior Street to W. Adams Street	Local	2 lanes + turn lanes	$2,622,729
Hwy-2, Old Cheney Road to S. 84th Street	Local	6 lanes + turn lanes	$16,523,640
S. 98th Street, "A" Street to Pioneers Boulevard	Local	4 lanes + turn lanes	$11,456,844
I-80, Pleasant Dale to NW 56th with Related Bridges	State	Widen to 6 lanes/10-20 Year	$96,798,791
I-180, Reconstruction with Related Bridges	State	Reconstruction/10-20 Year	$30,065,057
I-180, I-80/I-180 Reconstruction	State	Interchange/10-20 Year	$15,938,652
US-34 East, 84th Street to east county line	State	4 lanes + turn lanes/10-20 Year	$50,575,804
N. 84th Street, US-6 to US-34	Local	6 lanes + turn lanes	$34,008,524
Sun Valley Blvd. Extension, W. O Street to Rosa Parks Way	Local	4 lanes + turn lanes + RR overpass	$18,070,442
US-6 (Corn. Hwy), N. 20th Street to N. 33rd Street	Local	6 lanes + turn lanes	$9,908,111
NW 40th Street, W. Holdrege Street to W. Vine Street	Local	2 lanes + turn lanes	$1,325,821
NW 40th Street, W. Vine Street to US-6, including I-80 Overpass	Local	Overpass	$6,765,962
NW 48th Street, US-34 to Adams	Local	2 lanes + turn lanes	$10,937,084
N. 14th Street and US-6, Interchange	Local	Interchange	$8,953,020
Van Dorn Street, Normal Boulevard to S. 84th Street	Local	4 lanes + turn lanes	$7,591,126
Havelock Avenue, N. 70th Street to N. 84th Street	Local	2 lanes + turn lanes	$2,564,904
S. 40th Street / Normal Boulevard / South Street	Local	Major Intersection Work	$5,000,000
NW 12th Street, W. Alvo Road to Fletcher Avenue , US 34 Overpass	Local	2 lanes + turn lanes + overpass	$6,776,272
S. 70th Street, Yankee Hill Road to Rokeby Road	Local	2 lanes + turn lanes/Illustrative	$2,847,257
NW 38th Street, W. Adams Street to W. Holdrege Street	Local	2 lanes + turn lanes/Illustrative	$2,842,567
US-6 (Corn. Hwy), N. 11th Street to N. 20th Street	Local	6 lanes + turn lanes/Illustrative	$10,644,537
Havelock Avenue, N. 84th Street to N. 98th Street	Local	2 lanes + turn lanes/Illustrative	$2,967,313
N. 33rd Street, Ant.Valley Rdwy East Leg End to Corn. Hwy. to Superior	Local	4-lanes+turn lanes+bridge/Illustrative	$36,600,000
A Street, S. 98th to 105th	Local	2 lanes + turn lanes/Illustrative	$1,372,212
W. Fletcher Avenue, NW 31st Street to NW 27th Street	Local	2 lanes + turn lanes/Illustrative	$1,392,117
Adams Street, N. 90th to N. 98th Street	Local	2 lanes + turn lanes/Illustrative	$1,685,936
South Beltway, US-77 South to Nebraska Highway 2	State	4 Lane Expressway/Illustrative	
US-77 and Warlick Boulevard Intersection with South Beltway	State	Interchange/Illustrative	
US-77 and West Pioneers Boulevard Intersection with South Beltway	State	Interchange/Illustrative	

Projects Projected to 2040

Unfunded Needs

South and East Beltways

The South and East Beltways have long been projects included in the Lincoln and Lancaster County Comprehensive Plan. Together with the West Bypass/US Highway 77 and Interstate 80, they would form a beltway loop around the City of Lincoln. These roadways provide alternative routes for traffic traveling around the City of Lincoln, particularly interstate truck traffic. The safety benefits of removing this type of traffic from 84th Street, NE Highway 2, and 148th Street, which also serve as major intercity traffic routes, are very important. Protecting the beltway corridors, acquiring the right-of-way, and obtaining funding has begun for these routes.

The South Beltway is a $175 million State project that is currently not within the State's programmed budget. The State has completed preliminary engineering and done some level of work with landowners within the planned corridor. With the passage of the Build Nebraska Act (LB 84) during the 2011 State legislative session, road funding for the State's expressway system will be available beginning in 2013. Should this project move back onto the State list of programmed projects, the LRTP Financially Constrained Plan provides for the $35 million 20% local match to fund the project. If this occurs, an amendment and a reprioritization of road projects in the LRTP Financially Constrained Plan will be needed to coordinate with the State's timing for the project.

The East Beltway remains a local project at this time with no state or federal funding available to assist. The $275 million dollar price tag for construction of this project does not justify the traffic expected on that road in the next 30 years. At this time, the City and County should continue to fund a program for protecting the corridor where the future East Beltway is planned. However, no funding is shown at this time for construction of this project. Continued evaluation of this corridor is important in order to identify any change in its priority.

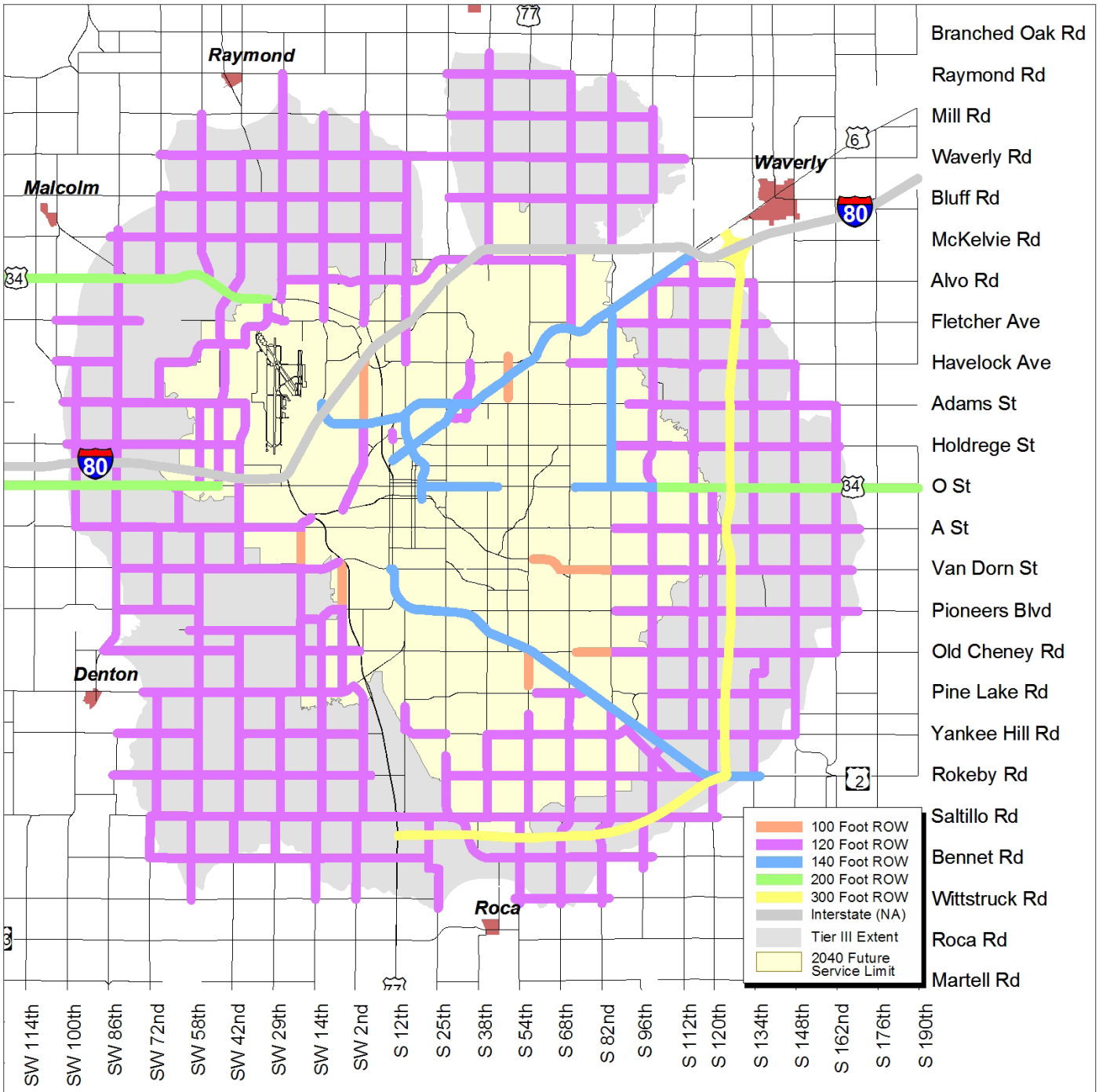
Nebraska Highway 2

One of the largest roadway projects in the first half of the prioritized capital road program is the Highway 2 widening to 6-lanes project from Van Dorn Street to Old Cheney Road. This project needs to be studied closely to determine how best to improve this important facility. A study should be completed within five years of the adoption of this plan to determine the utility of concentrating improvements at the major intersections along Highway 2 (14th Street, 27th Street, 40th Street, 48th Street, 56th Street/Old Cheney Road), or to construct the full widening to 6 lanes along the entire length of the corridor. Included in this study should be consideration of impacts to and conflicts with the rail line that runs along the south side of Highway 2. Also needed is a phasing plan based on the recommended improvements.

Right-of-Way Considerations

Right-of-Way (ROW) widths for projects on the Year 2040 Street and Highway Improvements Plan are displayed on Map 10.13: Right-of-Way Standards.

Projects occurring at the intersection of two arterial streets or at locations where right turn lanes are required will warrant the further dedication or acquisition of public right-of-way up to 130 feet in width for the "2+1 at 120 feet of ROW" and "4+1 at 120 feet of ROW" projects, and 150 feet in width for the "6+1 at 140 feet of ROW" projects, for a distance extending two blocks from the centerline (approximately 700 feet) of the intersection. The length of the intersection improvement should consider the existing and proposed land uses in the general area, traffic studies, and other pertinent information. Signalized intersections occurring along an arterial but not crossing another arterial may also fall under these ROW standards. The standard applies when land uses or other factors

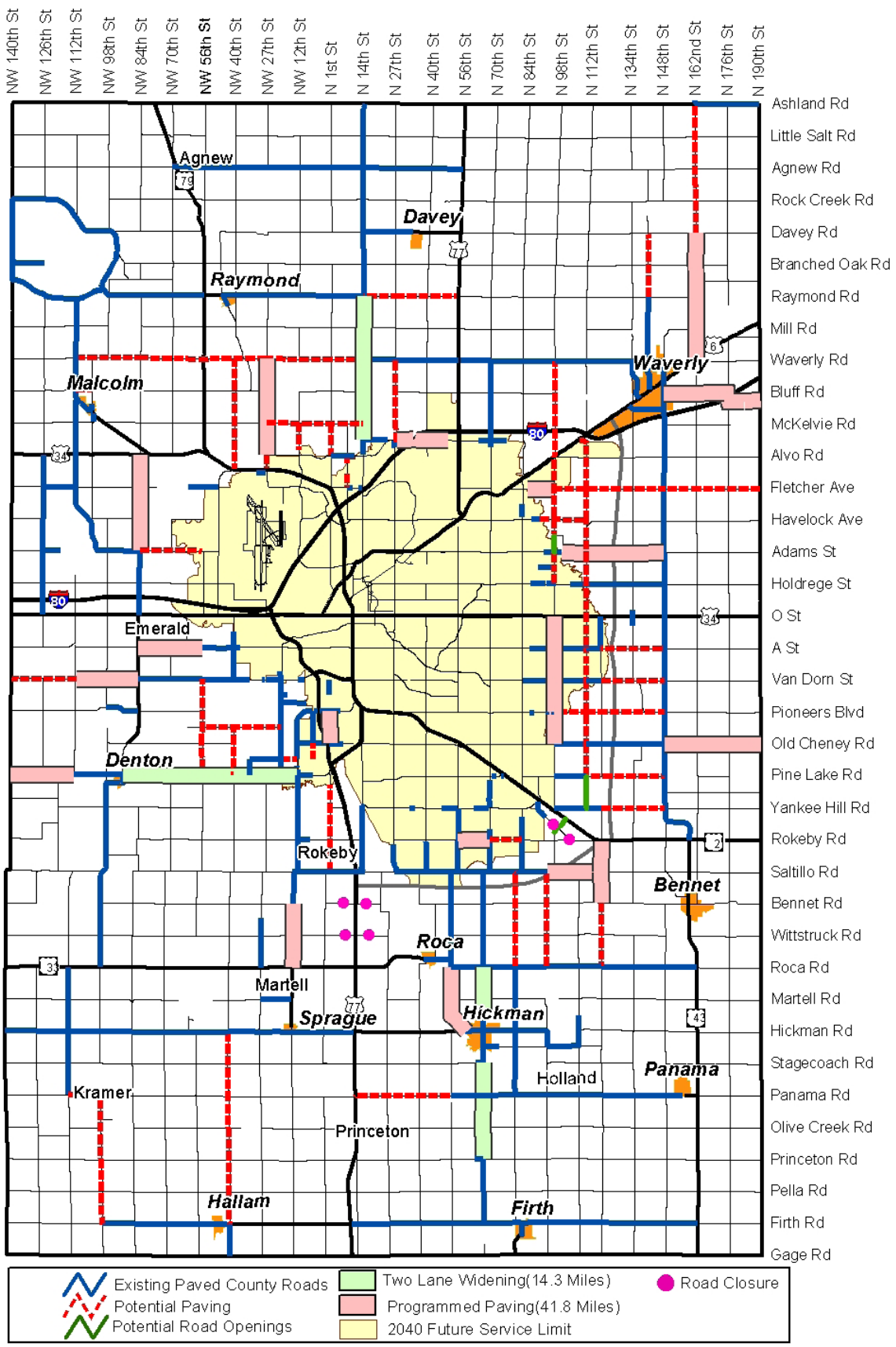


Map 10.13: Right-of-Way Standards

demonstrate the need for a wider ROW at that location.

Within Lincoln's future Growth Tiers I, II and III, a public ROW width of 120 feet for any potential future arterial street is considered the standard for this Plan. This may include, but is not necessarily limited to, the existing section and half-section line roads in these future Growth Tiers. Any ROW obtained to extend or otherwise complete the section line road system in the future growth area should also be done at this standard.

There are instances — mostly but not always in newer areas — where trails are to be placed along an arterial street. This may occur in order to provide



Map 10.14: Future County Road Improvements

trail connections and to allow safe trail crossings at arterial streets. When a future trail or bike lane is designated along an arterial roadway, the corridor should be expanded by six (6) additional feet on the side where the trail will be located. This additional ROW should be obtained in advance of development.

Within the "built environment" area of the City, 66 foot rights-of-way are typical. This is normally adequate for a two lane or a two plus center turn lane street design.

Rural Road Network — 2040 Needs

Improvements to the rural road system will occur throughout the County. The amount of new pavement installed will depend upon the growth in traffic and population, and the fiscal resources available in the future to make the improvements.

The future County Paved Road Network is subject to more impacts in areas closest to the City when compared to areas experiencing slower growth outside the urbanizing areas of Lincoln. These impacts and the resulting improvements vary from simply grading and graveling a road to a two-lane paved facility.

Road improvement decisions in the County are triggered by daily traffic volumes with the amount of traffic dictating the type and degree of improvement necessary. When a road experiences traffic levels of 300 trips per day or more, a minimum of 100 feet of ROW may be acquired by the County and grading and drainage improvements may be made in anticipation of future improvement needs. At 400 trips per day, a roadway qualifies for paving, which should remain as an effective facility, with proper maintenance, until a level of 6,000 trips per day is reached. At that point a four-lane divided facility may be needed. The Future County Road Improvements Plan shows County roads which are likely candidates for two-lane paving in the future.

Often these traffic level increases are experienced as urban development approaches the roadway. It may be possible that as this happens the roadway will move from a County road to a City street as land is annexed into Lincoln or other surrounding towns. In order to make the best use of existing facilities, these rural roads may continue to be used until the demand reaches a level where an urban design is needed.

The County Road Plan indicates some road widenings for those existing two lane paved roads that are no longer adequate for current traffic volumes. These widening projects consist of increasing the lane width and the addition of paved shoulders, not the construction of additional lanes. The County's road improvement plan also includes a new railroad viaduct under construction south of Hickman to address increasing conflicts at rail crossings from both rail and vehicular traffic. New roadways are included in this Plan to provide for continuity in the road system and better serve the adjacent areas. These segments include:

- 98th Street, A Street to "O" Street
- 98th Street, Adams Street to Fremont Street
- 112th Street, Pine Lake Road to Yankee Hill Road

This approach to County road improvements does, however, become threatened when acreage development is not focused on already paved roads and the needs exceed limited fiscal resources available for road improvements. New development should locate along those facilities that have already received improvements capable of supporting such development.

A newer program adopted in 2006 is the Rural-to-Urban Transition for Streets (RUTS). Lancaster County and the City of Lincoln agree it is mutually beneficial to provide a better transition from County roads located within the three mile zoning jurisdiction of the City to City streets at the time of annexation. This process provides a more useful life from the public investment in these County roads while at the same time accommodating future growth of the City, by establishing right-of-way

and construction standards with the initial paving offset to allow future transition from rural to urban standards without disruption to the existing through traffic and the surrounding property. A primary candidate in the first half of the planning period (by 2025) to use this more efficient road design is South 98th Street from O Street to Old Cheney Road.

Railroads — 2040 Needs

The City and County are served by both freight and passenger rail service. Continuous study and analysis of potential projects that will reduce rail/vehicular/pedestrian conflicts at street crossings should continue. The availability of Railroad Transportation Safety District (RTSD) and State Train Mile Tax revenue should allow for appropriate railroad related projects to be funded throughout the 2040 planning period.

One possible project that should remain under consideration is the consolidation of railroad tracks along the southern portion of the community. The Nebraska Highway-2 transportation corridor offers the potential of combining railroad activities, including the BNSF facilities along NE-2, and would increase the safety and security of the growing community. As a highly prioritized roadway project, improvements to NE-2 should include evaluation of the use of railroad right-of-ways and tracks.

Goods and Freight Movement — 2040 Needs

Air, rail and trucking are essential components in the local economy and play a key role in the Lincoln Metropolitan Area and Lancaster County transportation system. Efforts should be made to continue coordination with the freight community that will further integrate freight interests into the transportation planning process. Specific activities that are beneficial to the freight industry include ongoing information dissemination and dialogue through the MPO's Freight Carriers Working Group, enhanced efforts to inform the freight industry of upcoming projects and related impacts on detours and routing, and moving forward with projects like intersection improvements and improvements along major freight routes like Highway 2. The focus of discussion on freight bottlenecks with the freight community during the development of the 2040 Plan was on needed improvements to Highway 2 and the anticipated construction of the South Beltway as a major benefit to freight operations in the region. Freight considerations, including the locations of identified truck routes in the region, were part of the project selection process for the 2040 Needs assessment.

Airports and Airfields — 2040 Needs

The Lincoln Airport will continue to be the principal airport facility serving the Lincoln Metropolitan Area, Lancaster County, and a significant portion of the region in the southeast area of the State. As a member of the Lincoln MPO Technical Committee, the Lincoln Airport Authority will continue to be part of the metropolitan area transportation planning process. Specific strategies include:

- Ensure that future developments are aware of their proximity to the airport and noise issues are appropriately addressed through the Airport Environs Noise District ordinance and the recommendations of the Airport Noise Compatibility Study.
- The Airport West Subarea Plan was approved in 2005 and was amended into the Comprehensive Plan. Elements of the Plan should be pursued for implementation over time.
- Other future considerations include redevelopment of Lincoln Airpark West for a variety of uses including the development of sites for rail-accessible warehousing and seeking

opportunities for air-rail-truck freight operations. While these potential developments can make the airport into an intermodal transportation hub, attention will need to be focused on mitigating conflicts between the different freight operations.

Financially Constrained Transportation Plan

The Transportation Needs of the 2040 Comprehensive Plan include roadway operations, maintenance and capital, pedestrian and bicycle, trails and transit. The Financially Constrained Transportation Plan in the *MPO LRTP*, which is not a part of the Comprehensive Plan, describes in detail the revenue sources, anticipated revenues, and potential additional revenues to maintain, operate, and expand the transportation system in the City of Lincoln and Lancaster County from 2012 until 2040.

The financial analysis presented in the MPO LRTP meets the federal requirements stated in SAFETEA-LU. This detailed information should be referenced to guide project implementation for all modes of travel. The project costs and potential funding are estimates and will be revisited several times before the years they represent come to pass. The intent of the Financially Constrained Transportation Plan is to prepare an approximate, but realistic, estimate of both the total funds available and total program cost by year of expenditure.

6. Implementation

Land use and transportation are interdependent in that one relies on and is influenced by the other. LPlan 2040 envisions a City and County that provides an ample supply of land for future edge growth, but is also more compact with a wider range of housing options, which will support and require a wider range of transportation options. The impacts of the new land use plan will need to be closely watched to gauge and best plan for impacts on the transportation system.

It should also be noted that by federal regulation the MPO Long Range Transportation Plan is to be updated every five years. This is considered a more substantial review of the plan than the annual review process or a standalone amendment process. During these five-year updates the assumptions and identified needs and priorities of the transportation plan will be reexamined to best reflect any changes that occurred since the previous five-year update.

The following sections identify Guiding Principles and Strategies for implementing projects, programs, and studies for each of the major modes of transportation.

Guiding Principles

Pedestrian and Bicycle Facilities

- Elevate the status of pedestrians and bicyclists in the community to be an integral part of the Transportation Plan.
- Make adequate maintenance of existing and future pedestrian and bicycle facilities a priority.
- A dedicated funding source for pedestrian and bicycle projects and programs should be established.
- Provide bicyclists and pedestrians safe, direct, and convenient access to all destinations served by the Lincoln area streets and roads network.

Multi-Use Trails

- A well connected multi-use trail system provides recreational and health benefits, acts as an alternative transportation network, and promotes economic development in the community.
- Adequate maintenance of existing and proposed trails is a priority.

Transit

- A well functioning transit system that provides options to both riders by choice and those who

ride out of necessity is an integral part of an economically viable City.

Streets and Roads

- Maintain the existing transportation system to maximize the value of these assets.
- Improve the efficiency, performance and connectivity of a balanced transportation system.
- Promote consistency between land use and transportation plans to enhance mobility and accessibility.
- Provide a safe and secure transportation system.
- Support economic vitality of the community.
- Protect and enhance environmental sustainability, provide opportunities for active lifestyles, and conserve natural and cultural resources.
- Maximize the cost effectiveness of transportation.

Pedestrian and Bicycle Facilities

Dedicated funding for an ongoing pedestrian and bicycle capital program is identified as a priority in the 2040 Transportation Plan. In order to develop a list of priority projects for pedestrian and bicycle improvements, analysis of the current system must be conducted and a plan for future system improvements must be developed. A study is needed to identify projects that are most needed, including but not limited to assessment of the existing bike route system, expansion of the bike route system, the development of bike parking standards, locations of potential bike lane facilities, wayfinding and signage needs, pedestrian mid-block crossing locations, pedestrian and bike amenities needs, identification of needed local and state law adjustments, and education and promotional strategies.

Strategies

- Identify possible amendments to state law that protect the status of bicyclists as equal users of transportation facilities.
- Consider the establishment of a bicycle licensing fee, the proceeds of which would be dedicated to bicycle improvements and programs.
- Projects should be coordinated through a continuing program of data collection, interagency cooperation and public input and participation.
- Develop and implement a coordinated system of well connected pedestrian and bicycle facilities that serve both new and older neighborhoods and provide access to activity centers such as schools, parks, employment areas and shopping.
- Consider on-street bicycle facilities that are designed to meet the capacity and the opportunity of new and retrofitted roadways. These facilities may vary from bike routes with signage to shared use lanes (sharrows) to dedicated on-street bicycle lanes.
- Develop a program of standards and incentives to include bicycle amenities in employment, commercial, educational and office centers such as lockers, showers, and bicycle parking.
- Develop design standards for a variety of on and off street bicycle facilities that may be appropriate for roadways of different traffic levels.
- Conduct an analysis of the pedestrian/bicycle system to develop a plan for future system improvements and a list of priority projects.
- Include bicycle and pedestrian amenities as part of all City and County facilities to serve as a model for private investment.

- Cooperate with public and private organizations to develop and deliver educational programs for pedestrians, bicyclists and motorists on the rules, regulations, and benefits of alternative transportation.
- The Mayor and City Council should examine funding options prior to the 2012-13 city budget year that more closely match funding with identified needs in the sidewalk rehabilitation program.

Multi-Use Trails

Lincoln's multi-use trail system should continue to be a priority for the community. Plans for this system in the MPO LRTP Financially Constrained Transportation Plan identify prioritized trail segments for construction within the 30-year planning period as well as connections to be made after 2040, or as funding is available. A countywide trail system is also planned and should be considered in future development.

Strategies

- Continue the development of the multi-use trail network according to the priorities as shown on the Financially Constrained Transportation Plan trails map. Maintain existing route maps for all trails, lanes, and routes.
- Implement a useful and visually pleasing wayfinding signage program along the trail system.
- Consider the location and alignment of multi-use trails and bike lanes in reviewing development applications; request that the platform for trails be graded in conjunction with the associated development.
- Consider grade separated crossings in conjunction with all new construction and reconstruction of transportation projects.
- In rural areas of the County, identify potential bicycle corridors that serve existing and planned activity centers and link to existing and planned City bicycle facilities.
- Continue the practice of widening and paving the shoulders of County roads. This should occur when reconstruction or resurfacing of the road is planned, with safety of users as a primary consideration.

Transit

To achieve viable long range transit service for the City of Lincoln and Lancaster County in the year 2040, a number of broad policies and actions are needed to guide successful implementation and expansion of public transit. These policies and action items are to be guided by the results of an updated Transit Development Plan (TDP) Study. The TDP is the guide for near and mid-term transit planning for the 2040 Transportation Plan. Included in a Transit Development Plan is a comprehensive operations analysis, near and long term transit service alternatives, updated service standards and policies, and management and funding options.

Strategies

- Update the Transit Development Plan to reflect the input received during the LPlan 2040 public process.
- Consider evening service hours as part of the TDP update process.
- Examine alternatives to change from a coverage based transit system to a productivity based transit system.
- Consider Mixed Use Redevelopment Nodes and Corridors in developing transit corridors.

Streets and Roads

Several studies are identified to evaluate the need for detailed planning and design of future roadways. The identified studies are based on the prioritized list of programs and projects in the MPO LRTP Financially Constrained Transportation Plan. In order to best use financial resources, studies should be conducted to better frame the issues and solutions.

Strategies: General

- Implement the recommendations of the Mayor's Road Design Task Force to maximize cost-effectiveness in roadways, build roads to serve the traffic projected in the near term, and ensure all roadways within the future service limit are served by an appropriately paved surface.
- Adjust the division of roadway funding between maintenance and rehabilitation, programs, and capital projects to reflect and implement the funding program identified in the Financially Constrained Transportation Plan.
- Continue to discuss strategies to more fully fund the roadway rehabilitation program to more closely match identified needs.

Strategies: Complete Streets Policy

The Lincoln MPO should develop a Complete Streets policy, related new roadway standards, and a process to implement complete street principles prior to the next regular five-year update of the Plan. A Complete Streets policy will direct planners and engineers to routinely design and operate the entire right of way to enable safe access for all users regardless of age, ability, or mode of transportation.

Strategies: Roadway Project Impact Studies

- North 44th at BNSF RR — Closure of North 44th Street at the BNSF Railroad should be studied with consideration given to neighborhood and business access, safety, and access as it relates to future improvements at 35th and Adams Street
- Beltway and Fringe Arterial Streets — Explore options for promoting the maximum utilization by local traffic of the West, South, and East Beltway, Interstate 80, and major urban fringe arterials in order to minimize the impact of future traffic growth on interior roadways within the built environment.
- North 70th to North 84th Streets and Havelock Ave. to Bluff Road Area Study.
- Highway 2 Corridor Study from 9th and Van Dorn Street to South 84th Street, including study of benefits of widening compared to focusing efforts on major intersection improvements, and the phasing of needed improvements.
- Cornhusker Highway Corridor Study from I-80 Exit 399 to I-80 Exit 409, including study of the benefits of widening and intersection capacity improvements.
- A study that encompasses the general area bounded by NW 48th Street and NW 27th Street, West Webster to US-34. The study is to include north/south and east/west roadway needs and alignments, including the West Fletcher corridor and US-34 access considerations.
- As part of the US-77/West Beltway freeway project, study a potential overpass at US-77 and Old Cheney Road and Rokeby Road. The study is to be a joint State/County/City feasibility study, including a traffic analysis, a citizen participation element, an appropriate environmental review, and will be started no later than one year prior to the contract letting of the West Bypass freeway upgrade. The study will comply with FHWA procedures for Federal Aid projects

and will attempt to maintain an Old Cheney connection to 1st Street. (Study for a potential overpass at Rokeby Road has been approved by the County Board only.)

Strategies: Congestion Management Process

One area of ongoing emphasis is the Congestion Management Process. Congestion mitigation efforts should continue and remain flexible. There should be a regular process in place to identify and respond to traffic congestion challenges. Many management and operational actions will be undertaken at the departmental level to provide the quickest possible resolution, while more serious issues may require a formal study process. Additional studies may be desirable to identify specific congestion mitigation strategies that appear most reasonable for a particular location. Where deficiencies are identified, the MPO Technical Committee may suggest strategies for congestion mitigation.

- Studies or recommendations for congestion mitigation should address as a minimum the impacts on the following:
  - Established neighborhoods
  - Homes and businesses
  - Pedestrian and bicycle safety
  - Public and private trees
  - Environmental resources
  - Property values of the surrounding area
  - Access to adjacent properties
  - Cost of ROW and of purchasing properties
  - Traffic noise
  - Crash rates
  - Budgetary constraints
- Continue development of a travel demand management program with dedicated funding.
- Implementation of ITS projects for congestion management, safety and security.
- Completion of Two plus Center Turn Lane Program within the first half of the planning period.
- Continue to develop the use of traffic monitoring devices at key locations to monitor transportation activity on a daily basis.
- Continue to use technology, such as the internet and dynamic messaging signs, to bring real time traffic and road condition information to the public.
- Collect and analyze data on a regular basis to identify intersections, bottle necks, and safety issues in the roadway system that may be appropriate for additional turn lanes, intersection improvements, or safety projects.

> Congestion Management Process: Congestion mitigation efforts should continue and remain flexible and ongoing. There should be a regular process in place to identify and respond to traffic congestion challenges.

Airports and Airfields

Lincoln Municipal Airport is governed by the Lincoln Airport Authority (LAA). The LAA is part of the MPO and participates in its activities; however, planning for airport facilities is done in a separate process. Private airports and airfields must abide by the rules of the Nebraska Department of Aeronautics as well as County and City zoning code.

Strategies

Maintain compatible land uses and zoning within the 60 DNL and 75 DNL noise contour lines.

Freight

Strategies

- Build on current efforts to establish an MPO freight advisory task force with representatives from all appropriate modes to ensure that projects proposed by the private sector are incorporated into the planning and programming process. The focus of discussion on freight bottlenecks with the freight community during the development of the 2040 Plan was on needed improvements to Highway 2 and the anticipated construction of the South Beltway as a major benefit to freight operations in the region.

- Review existing policies concerning distances (i.e., buffers) between conflicting land uses.
- Encourage the assessment of risk concerning hazardous materials and impact on land uses.
- Enhance access to external transportation connectors (e.g., Interstate system) in order to minimize impact on existing land uses.
- Enhance the internal transportation routes (e.g. State highways and City arterials) in order minimize impact on existing land uses.
- Encourage and support the development of individual inter-modal projects by private industry. Opportunities for expanding the intermodal facility should be encouraged in the Lincoln Airport and Airpark areas where rail access exists.

Mitigating Impacts on Environmental, Social and Cultural Resources

As part of the planning process to develop the 2040 Long Range Transportation Plan, environmental impacts of proposed transportation projects were analyzed by a group of state and local government representatives, non-profit organizations and interest groups in a process which is fully described in the Technical Report. The purpose of this effort was to provide an opportunity to identify any conflicts between environmental, social and cultural resources and potential transportation projects, and to use this information to help determine which projects to include in the transportation plan. The following is an explanation of these reviews by topic area. This information will be considered as transportation projects from the plan are implemented.

In summary, GIS mapping was used to represent proposed roadway and trail projects and to analyze their relationship to identified environmental, social, cultural and historic resources. Possible conflict points and areas were identified and information and maps were sent to a group of 27 different contact persons. These individuals were asked to consult with their group or agency and report back on 1) any possible conflict points that were missed in the analysis, 2) issues that may be raised by the conflict points, and 3) possible mitigation strategies to address these issues. Responses are included in the Technical Report.

The list of projects analyzed includes projects that were ultimately removed from the final list through the prioritization process. Therefore, the list of projects in the Technical Report, Alternative Transportation Analysis, is longer than that found in the LRTP 2040 Financially Constrained Transportation Plan and the 2040 Needs Based Plan.

In general, transportation projects shown did not represent the construction of an entirely new roadway, but rather the widening of existing right

of way. An exception to this would be the South and East Beltways, which have both had some level of environmental analysis as part of their preliminary planning to date. Trails also follow railway or roadway right of ways. Environmental impacts are fairly limited because the area has already been impacted to some extent with the establishment of the existing right of way. Because of this, comments received, particularly from the environmental groups, were fairly general and limited. Social and cultural groups commented more generally with concerns of inadequate transit service, linkages between modes, and maintenance of streets in older parts of the City.

Mitigation strategies

In general, adherence to the overall mitigation sequence of "avoid, minimize impacts, and compensate for unavoidable impacts" should be applied for all projects that are implemented. Detailed mitigation strategies should be developed during the engineering of all transportation projects. Cooperation and collaboration with environmental agencies early and throughout the construction process will insure the best result.

Wetlands and Saline Wetlands

Freshwater wetlands should be avoided as much as possible. When avoidance is not possible, mitigation can be done on site or through a wetland mitigation bank. Generally, mitigation on a 2:1 basis with five years of monitoring is required, but this ratio varies depending on the type and quality of wetland impacted.

The Growth Tiers Map in the Vision and Plan chapter of LPlan 2040 indicates an emphasis on directing growth away from saline wetlands and urban growth outside the Little Salt corridor for the very long term.

Endangered Species

Projects that are planned in areas identified as known or possible threatened and endangered species habitat must comply with all state and federal regulations. In general, these areas have a higher imperative to avoid when engineering roadway projects. Trail projects, when carefully designed, should not be detrimental to endangered species and may in fact provide opportunities to educate and increase awareness.

Tree Mass

Tree masses may be affected by construction even when the trees are left in place. Changes in grading can change runoff flows and subsurface water available to roots. Compaction of soil by heavy equipment can decrease soil permeability. Root zones should be protected from compaction by avoiding the area or by placement of non compacting materials over equipment travel lanes during construction. Retaining walls may be used when site distances require dramatic changes in grade, rather than grading back beyond the right of way. When trees must be removed they should be replaced with similar species at an appropriate ratio.

Floodplain

When grading must be done in floodplain areas the surface hydrology must be carefully considered. While compensatory storage mitigation addresses the floodwater quantity issue, the flow of surface water during a flood event must also be addressed in order to mitigate any possible effects to downstream, or upstream, properties. Lincoln and the three mile extraterritorial jurisdiction are governed by a "No Adverse Impact" policy for new growth areas. This ensures that construction activity on one piece of property will not negatively impact another. The floodway should remain open for the conveyance of flood water; stream crossings

must generally be constructed so as to cause no rise in the flood level.

Often trails are constructed in floodplain areas. These structures, if properly constructed, should not cause adverse impact. However, care should be taken when grading for trail construction, and the trails themselves may require a higher level of maintenance due to sediment and debris deposit during flood events, movement of the base material due to high water table, and increase vegetative growth.

Native Prairie

Native prairies can be negatively impacted by runoff from impermeable surfaces which can often carry pollutants. Runoff detention and retention areas where pollutants can settle and runoff can be slowed and infiltrate are useful mitigation strategies. Issues can also arise when prairies are burned as part of regular management practices causing smoke and reduced visibility. Proper management techniques include selection of burning event dates to ensure favorable winds, or use of mowing when burning is not feasible.

Stream Corridors

Stream corridors, or riparian areas, provide important habitat and connections for wildlife. These corridors are often associated with floodplains and so similar mitigation efforts are effective. Lincoln ordinances define buffer areas that must be kept in place to provide a functional riparian area. When roadways must cross streams it is important that proper design allows a sufficiently wide riparian corridor to pass underneath the structure. The use of culverts on significant streams should be avoided as these stretches interrupt the continuous stream corridor.

The process for analysis of social, cultural and historic resources was similar to that described for environmental resources above. Census data was used to identify Census tracts with a higher than average percentage of low income, racial, and ethnic minorities. Projects were then mapped and data was provided on the number of lane miles of roadway proposed in these high population areas. Eighteen different agencies and non-profit organizations were asked for input. Responses are included in the Technical Report.

There were very few roadway projects that crossed through or were adjacent to these population concentrations. There were only 1.53 miles of trail proposed in these areas. Most of the identified Census tracts are located in the older parts of the City, where very few new transportation projects are proposed.

The majority of comments received from these groups were in reference to transit issues, particularly concerns regarding the lack of evening bus service and the proposed reallocation of service to higher density and higher ridership areas.. Major issues identified are in the Technical Report.

Transit Service

The most frequent comment was in regard to the lack of evening bus service. It is difficult for those who are transit dependent to find transportation to and from work if their jobs require them to work before 6:00 a.m. or after 6:00 p.m. This is one of the goals of the proposed update of the Transit Development Plan and was also a common issue in other surveys and open house commentaries.

There was also discussion about the proposed reallocation of transit service to higher density and higher ridership areas, providing more frequent or perhaps longer service hours on those routes. Some identified this as a desirable change which would allow these areas, identified as higher in low to moderate income and racial and ethnic

minority populations, to benefit from a higher level of service. Others expressed concerns that the very service provided would discourage low income populations from moving out of the areas and inadvertently cause poverty to remain concentrated in these areas of the City. In order to avoid this unintended circumstance, careful evaluation of service and Census data will need to be made on a regular basis and as future transit plans are developed.

Historical Impacts

There was a specific comment from the historic impact review of the proposed plan regarding the mapping of Pioneers Park as a single site (point). The park should be considered as a district (polygon) as it encompasses 500 acres, putting it in proximity to Coddington and West Van Dorn trails and street projects. Another mapping information comment during this review was the fact that the Woodsshire Historic District is not mapped, but there were no streets or trails projects in proximity to this area.

For the broad-brush level of planning, mapping to identify designated cultural resources in proximity to potential projects is appropriate, mostly to serve as an early reminder to potential historic impacts. It is noted that the actual project planning should consider both designated cultural resources and those eligible for the National Register of Historic Places, but not yet identified; that projects that are federal undertakings (federal funding or approvals) require review under Section 106 of the National Historic Preservation Act; that early planning, once actual projects are programmed, helps avoid, minimize, or mitigate adverse impacts on cultural resources.

It also bears mentioning that proximity alone does not constitute adverse impact, and in fact well-designed improvements and especially system maintenance can benefit historic resources, especially neighborhood districts.

Similarly, trails may have no adverse impact or even be beneficial to the livability of historic residential areas and revitalization of commercial areas.

Roadway Maintenance in Existing Neighborhoods

Another area of concern expressed was the apparent lack of new road projects in the existing neighborhoods. While the mapping and tabular tools shared with the evaluating groups did include all new projects, they did not include existing and committed projects which include the Two Plus Center Turn Lane program. These projects are explained more fully in an earlier section, but generally improve traffic flow without requiring additional right of way and are designed to alleviate traffic congestion and all of the negative associated impacts (noise, air quality impacts, etc…) without significantly impacting the profile of the roadway.

The question was asked whether there would be increased efforts to improve roadway quality in existing neighborhoods. As explained in the LRTP 2040 Financially Constrained Transportation Plan section, roadway rehabilitation projects are an emphasis with the rehabilitation budgets for roads, trails and sidewalks proposed to roughly double for all modes.

Connectivity between Modes

The ability of people to move around by various modes was listed as a concern by some groups. Connection of trail systems to the pedestrian and street system, ability to move from bike to transit, and transit service to major employment centers were some of the topics discussed. The City recently added bike racks to all City buses to improve the

bike-to-transit connection; this is anticipated to continue.

Connection of the trail network to the pedestrian and street system is a major goal of the trails plan as described in the Multi-Use Trails Guiding Principles and Strategies section. The on-street bicycle system will also be a major area of concentration for the new pedestrian and bicycle program.

Process for Amending the MPO LRTP Financially Constrained Transportation Plan

With the adoption of the MPO LRTP Financially Constrained Transportation Plan, there is a need to explain how the plan will be amended in the future when needed. As with all long range plans, conditions in the community likely will change over time and related shifts in priorities will occur. A change such as an increase in the amount of growth in one direction of the urbanizing area with a corresponding decrease in expected growth in another direction will shift the needs and priorities of the transportation system. Some projects that were expected to be needed farther out in the planning period may become needed sooner. Likewise, a project that is no longer needed as soon as expected could be delayed.

Changes in the basic assumptions or goals and policies of the 2040 Lincoln/Lancaster County Comprehensive Plan may require formal amendments to the 2040 Comprehensive Plan including the Transportation chapter. More likely will be more specific shifts in needs and priorities that will need to be reflected in the MPO LRTP Financially Constrained Transportation Plan in order to continue to have a financially constrained plan that meets the needs of the community over time. Changes to the Financially Constrained Transportation Plan are to be made by a formal plan amendment through the MPO planning process. These may take the form of a standalone amendment or as a package of amendments during the established annual review process discussed in the Plan Realization chapter of LPlan 2040.

For example, when a project is identified as needed sooner than expected and that need is in the first ten years of the MPO LRTP Financially Constrained Transportation Plan, a project(s) of similar cost will need to be dropped lower in the priority list to keep the plan financially constrained.

Close adherence to the amendment process will be of particular importance if a project is desired to be placed in the first four years of the plan. The first four years of the MPO LRTP Financially Constrained Transportation Plan should closely reflect the MPO Transportation Improvement Program (TIP) for projects of regional significance and those using the federal planning process and federal funding. Close coordination and consistency between the TIP and the Long Range Transportation Plan should be an ongoing effort.

All amendments to the Financially Constrained Transportation Plan will need to be reviewed and approved by the Technical Committee of the Metropolitan Planning Organization (MPO) that includes local, state, and federal representation, the Lincoln-Lancaster County Planning Commission and the MPO Officials Committee. The amendment process will also need to adhere to the MPO's Public Participation Plan to ensure opportunities for public engagement and information dissemination.