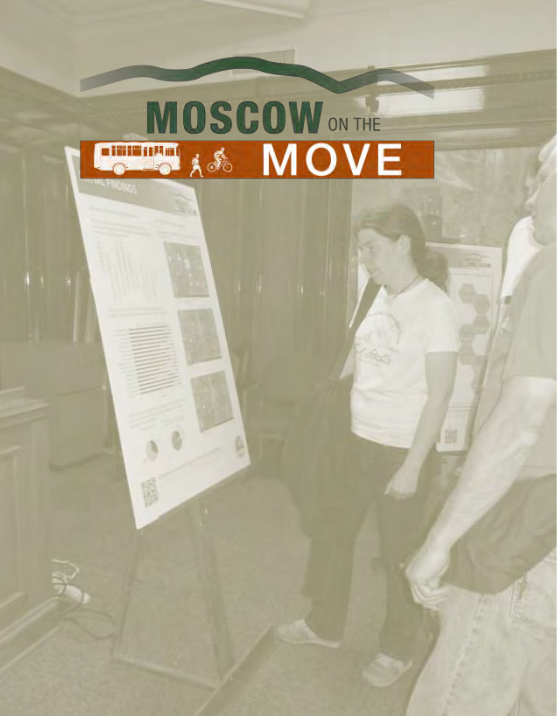

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MOSCOW MULTI-MODAL TRANSPORTATION PLAN

NELSON NYGAARD

CITY OF MOSCOW 1887 IDAHO

In association with DKS Associates and Alta Planning + Design

ADOPTED
FINAL
July 2014

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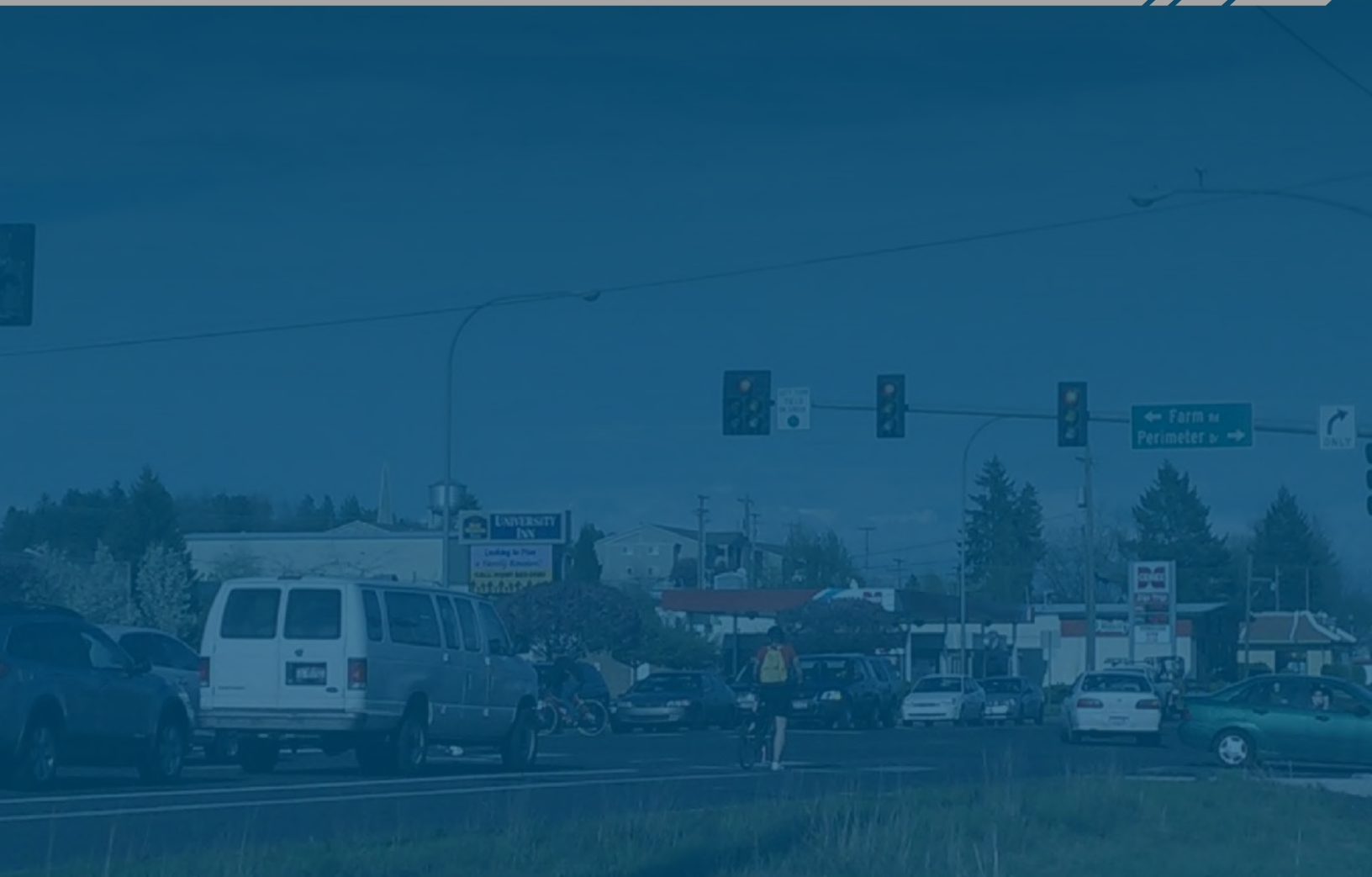
SETTING THE CONTEXT | CHAPTER 1

INTRODUCTION



This chapter explains why the City is developing a multi-modal transportation plan and establishes the guiding principles and objectives of *Moscow on the Move*. The Introduction also summarizes *Moscow on the Move's* planning process and the resulting document's structure.

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1 INTRODUCTION

Cultivating a balanced, sustainable, and efficient multimodal transportation system is a high-priority goal of the City of Moscow. This plan, *Moscow on the Move*, acts as an implementation tool for the policies established in the City of Moscow's Comprehensive Plan. The Comprehensive Plan, along with several prior planning efforts such the Downtown Revitalization Plan, seek to improve mobility options and opportunities to access Moscow's wealth of cultural, retail, civic, and university destinations. *Moscow on the Move* will guide transportation investments within Moscow over the next 20 years by establishing policies and strategies that promote a range of attractive and viable transportation options.

A VISION FOR MOBILITY AND ACCESSIBILITY

The Comprehensive Plan calls for a transportation system that extends its street and pathway networks and ensures safe access throughout the city for all transportation modes, including walking, bicycling, driving, carpooling, and public transportation. As the street, pedestrian, and pathway network is improved and expanded, the City will use transportation investments to leverage economic development, improve human health, and preserve community character. The City will balance the need for improved and safer local business access with its commitment to accommodate delivery vehicles and state highway traffic. Achieving these goals will in turn enhance Moscow's attractiveness for future residents, visitors, and businesses, including University students, staff, and faculty.

Developing a Multi-Modal Transportation Plan for Moscow

According to the 2012 Moscow Biannual Citizens Survey, most Moscow residents rate the quality of life in Moscow as "good" or "excellent." Still, transportation issues are among the community's key concerns. Residents have expressed interest in a wide range of mobility issues, from the level and quality of transit service and lack of bikeway connections to deficient street connections and sidewalk conditions.

Ultimately, the City's streets are one of Moscow's most heavily utilized and most critical community assets. *Moscow on the Move* seeks to balance the competing needs of the city's diverse travel markets[1] and improve local quality of life through transportation investments.

Although transportation plans are necessary for ensuring adherence to Idaho Code, there are many other reasons to develop a multi-modal transportation plan. For the City of Moscow, these include the following:

- People desire transportation options and a variety of route options.
- The recent adoption of MAP-21, the updated federal transportation bill, will likely add new challenges to funding transportation improvements in Moscow. This plan seeks to expand funding options and local partnerships to develop the transportation network of the future.

[1] A travel market is a segment of commuters or travelers using any particular mode, or the markets that are most likely to access a particular transportation service. For example, the transit market commonly includes students, elderly, carless, and low-income populations.

- The cost of transportation is increasing due to rising fuel costs. Offering affordable travel options in a city with a large college student and elderly population is critical.
- Many Moscow residents are physically active and are interested in expanding opportunities to walk and bicycle for transportation and recreation.
- Moscow is competing on a national and global scale to attract new companies, talented workers, and new students and faculty. Developing streets that foster civic, retail, and social activity as well as vibrant, well-connected neighborhoods is a key strategy to attract new business and support cultural vitality.
- Moscow residents enjoy a healthy Paradise Creek and clean air. Greater emphasis on infrastructure that promotes the use of low impact modes of travel like walking, bicycling, public transit, and ridesharing, can limit the impact on local air quality, water quality, and global climate change by reducing per capita tailpipe emissions and runoff.
- To benefit from expanded opportunities for physical activity and active transportation, residents of all ages must feel comfortable and safe using Moscow's streets, sidewalks, and pathways. Safe and inviting streets and clear connections to bicycle and pedestrian pathways are essential to encourage active living and recreation.
- As Moscow residents age, the City must accommodate those who wish to age in place by providing mobility options for older adults. This will ensure senior populations are engaged, active, and independent.

Moscow has a diversity of streets with varying levels of accommodation for walking, transit, and bicycles. Barriers like major arterials and topography can limit mobility options. *Moscow on the Move* aims to expand the availability of safe and efficient transportation options for Moscow's residents, while addressing broader community issues.

Image from Nelson\Nygaard

GUIDING PRINCIPLES AND OBJECTIVES

A set of visionary and achievable transportation principles and objectives will guide investment, management, and operation of Moscow's local transportation system over the next twenty years. The key philosophy of *Moscow on the Move* is that outcomes generated from the plan are tied directly to broader community goals. Mobility and the investments that guide development of a multi-modal transportation system are not an end in themselves. Communities do not invest in transportation for the sole purpose of moving people and goods. Transportation is really a means to achieve wide-ranging local and regional economic, environmental, and community goals.

Moscow on the Move's guiding principles and objectives are summarized below and listed in Figure 1:

Mobility and access. Ensures people can access destinations using a diversity of travel options, routes, and seamless multi-modal connections. Objectives relate to providing a variety of travel options for all types of users (including the provision of a connected sidewalk and pathway system); increasing transit ridership through improved transit service; establishing high-quality and affordable intercity transportation options to nearby regional centers; improving access to Pullman-Moscow Regional Airport; and ensuring efficient goods movement and delivery access.

Downtown and University public spaces. Creates great community places throughout Moscow that residents and visitors want to visit and pass through. Objectives include ensuring downtown thoroughfares and the streets that lead to them are walkable, interesting, and safe; developing downtown and commercial districts as places that encourage people to stay, eat, shop, and play; and ensuring current campus street connections and future campus-related development makes car-free living an attractive and realistic option.

Economic resilience. Develops a transportation system with active downtown and neighborhood environments that support and create sustained economic activity. Objectives include designing walkable commercial streetscapes that promote retail activity and local business growth; reducing transportation costs and insulating residents from global economic fluctuation in oil prices by providing affordable travel options; striking a balance between safe and efficient delivery access and fostering a walkable downtown; and developing a well-connected trail system that improves access to retail and jobs, while attracting visitors to Moscow.

Land use, design, and quality of life. Supports expanded quality of life in downtown and residential neighborhoods through well-designed streets, growth, and trail development. This may include integrating land use decisions to promote walkable and well-connected communities supported by trails and open space. Related to this, a key objective is to advance neighborhood quality of life in Moscow by investing in, and developing, streets that foster active, healthy, tranquil, clean, safe, and socially cohesive neighborhoods.

Safe streets. Promotes safer travel behavior and awareness of different roadway users through design, traffic operations, expansion of route choices, and education. Objectives cover the design, operation, and maintenance of streets and pathways to promote safe, comfortable use for all roadway users; applying the Complete Streets model; targeting lighting improvements in key corridors; and expanding awareness and traffic enforcement efforts. For more information on Complete Streets, see page 5-14 of Active Transportation Strategy (Chapter 5).

Active and healthy living. Encourages citizens to maintain an active lifestyle. Objectives relate to supporting walking to transit with adequate pedestrian infrastructure; providing a variety of bikeways and bike parking to expand the benefits of cycling to a broader section of Moscow's population; and developing walking routes and intersections that are fully accessible to pedestrians of all ages and abilities.

Environmental quality. Ensures Moscow's transportation system coexists with and supports the health of the local and regional environment. Objectives include limiting the impact of transportation operations on air quality, watershed health, and farmland, and reducing transportation-related greenhouse gas emissions.

Figure 1 ***Moscow on the Move* Guiding Principles and Objectives**

Guiding Principles/Goals	Objectives
Mobility and access: Ensure people can access destinations throughout Moscow using a diversity of travel options, routes, and seamless multi-modal connections.	Ensure Moscow's streets, intersections, and transportation networks facilitate multi-modal access to neighborhoods and major destinations accommodating all modes and all users, regardless of age or ability.
	Increase transit ridership by improving frequency, reliability, and service span, as well as the quality of transit facilities, passenger amenities, and vehicles.
	Establish and maintain high-quality, affordable intercity transportation options between Moscow and other regional centers like Pullman, Lewiston, Coeur d'Alene, Spokane, and Boise.
	Improve non-single occupant vehicle connections to Pullman-Moscow Regional Airport.
	Provide cost-efficient parking options that respond to customer demand and integrate with walkable street and community design.
Downtown and University public spaces: Create great community places throughout Moscow that residents and visitors want to access.	Ensure downtown thoroughfares and the streets that lead to them are walkable, interesting, and safe.
	Develop downtown and commercial districts as places that encourage people to stay, eat, shop, and play.
	Coordinate with the University of Idaho to ensure current campus street connections and future campus-related development makes car-free living an attractive and realistic option and allows people to arrive on campus and move about without a private vehicle.
Economic resilience: Develop a transportation system with active downtown and neighborhood environments to support and create sustained economic activity.	Design walkable commercial streetscapes that promote retail activity and local business growth.
	Develop a well-connected trail system that improves access to retail and jobs and attracts visitors to Moscow.
	Provide a range of transportation options to reduce transportation costs and retain local wealth.
	Reduce the impact on residents from global fluctuation in oil prices by expanding local and regional travel options beyond automobile travel.
	Ensure safe, efficient, and predictable freight and delivery access while acknowledging the need to foster walkable downtown and University streetscapes.
Land use, design, and quality of life: Support expanded quality of life in downtown and residential neighborhoods through conscious street design, growth, and trail development.	Integrate transportation and land use decisions to promote walkable and well-connected communities.
	Expand and develop better connections to Moscow's trail and open space network to support more active transportation and recreation.
	Advance Moscow's neighborhood quality of life by investing in and developing streets that foster active, healthy, quiet, clean, safe, and socially cohesive neighborhoods.
Safe streets: Promote awareness of different roadway users through design, traffic operations, expansion of route choices, and education.	Operate and maintain streets and pathways to promote safe and comfortable use for all roadway users.
	Improve user visibility by better illuminating key corridors.
	Improve safety by designing Complete Streets for all roadway users and discouraging excessive vehicle speeds.
	Coordinate with Moscow Police Department to enforce traffic laws and provide educational opportunities to traffic law offenders.
	Expand educational efforts for motorists (both cars and trucks), pedestrians (including transit users), and bicyclists on safe operation and behavioral expectations.
Active and healthy living: Encourage citizens to maintain an active lifestyle.	Ensure walking to transit is supported with adequate sidewalks and crossing facilities.
	Provide a variety of bikeways, including paths, bike lanes, low traffic bicycle routes, and separated on-street facilities, as well as secure bicycle parking to expand cycling's benefits to a broader section of Moscow's population.
	Develop walking routes furnished with sidewalks and intersections that accommodate the diverse needs of pedestrians of all ages and abilities.
Environmental quality: Ensure Moscow's transportation system coexists with and supports the health of the local and regional environment.	Limit the impact of transportation operations on air quality, watershed health, and farmland.
	Reduce transportation-related greenhouse gas emissions.

PLANNING PROCESS

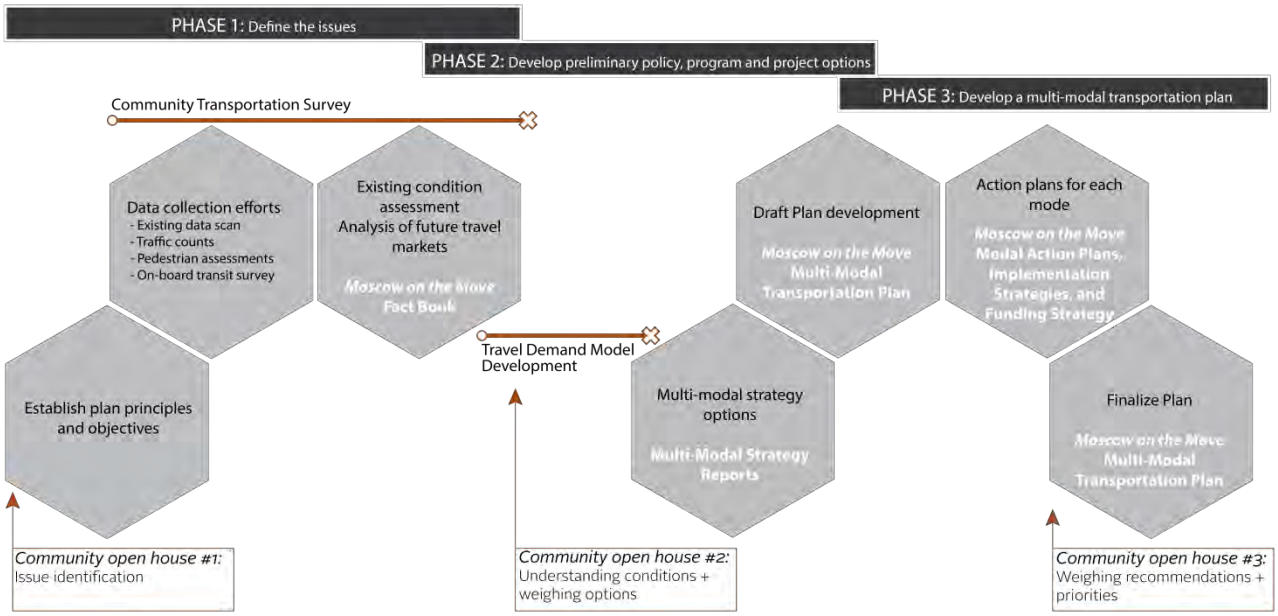
Moscow on the Move is a 20-year transportation plan that prioritizes short- and long-term actions for the City to reach the vision and goals set forth by the community. Input from key stakeholders and citizen participation guided the process of developing *Moscow on the Move* plan and setting implementation priorities. The plan's recommended actions aim to balance residential, commercial, downtown, institutional, and regional interests through a community and stakeholder engagement process. The city's transit provider Sustainable Moscow Area Regional Transportation (SMART), the University of Idaho, and the Idaho Transportation Department are key partners in the planning effort whose support will be needed to implement *Moscow on the Move*. City departments, Moscow School District, and Latah County participated throughout the process. A detailed summary of outreach activities will be provided in Appendix C, after the final open house is complete.

Moscow on the Move's first community open house gathered community members to discuss issues and opportunities for all transportation modes in Moscow.
Image from Nelson\Nygaard

Moscow on the Move was developed in three key phases:

- **Phase 1 – Define the issues:** Involved meetings with stakeholders and interested citizens as well as technical work in the areas of Transit Operations, Traffic Operations and Street Design, Bicycle and Pedestrian Environments, and Parking and Travel Options Programming.
- **Phase 2 – Develop multi-modal transportation policy, program, and project options:** Identified programs and physical improvements based on the findings of Phase 1.
- **Phase 3 – Develop a multi-modal transportation plan:** Included definition of near- and long-term projects and programs for Streets and Traffic, Goods Movement, Transit, Active Transportation, and Parking and Travel Options.

Figure 2 Moscow on the Move Planning Process



PLAN ORGANIZATION

Moscow on the Move is a roadmap that guides transportation investments over the next 20 years. This document identifies projects and programs that help address Moscow's community needs as well as current and future mobility challenges facing the city. Projects and programs underlined in the plan are prioritized and detailed to move them from plan to implementation. The plan also provides policy guidance to help meet, not only the goals of *Moscow on the Move*, but also broader community goals adopted in the Comprehensive Plan.

Moscow on the Move is organized into four elements. The plan's organization is listed below.

Setting the Context

Chapter 1: Introduction—Identifies the plan's principles and objectives and explains the overall purpose and planning process.

Chapter 2: Getting Around Moscow Today—Provides a brief summary of existing conditions, challenges, mobility and access gaps, and future growth and land use trends.

Chapter 3: Land Use Impacts on Mobility and Access—Summarizes Moscow's planned land uses, future development centers, and the population and growth trends that will influence needs for mobility and access in the future.

Establishing Multi-modal Strategies

Chapter 4: Roadway and Traffic Operations Strategy—Determines cost-effective strategies to improve street connectivity and manage traffic, and identifies critical capital improvements to the roadway network.

Chapter 5: Active Transportation Strategy—Provides a policy blueprint for better walking and bicycling conditions as well as a citywide network of neighborhood greenways, bicycle lanes, and Paradise Path expansion with descriptions of bicycle and pedestrian projects.

Chapter 6: Transit Strategy—Focuses on policy and implementation actions related to transit, leading to development of service guidelines, near-term transit improvements and vision for Moscow's transit network in 2035.

Chapter 7: Parking and Transportation Demand Management Strategy—Guides future parking management as necessary and recommends a package of transportation programs aimed at encouraging transit use, bicycling, and walking for transportation.

Implementing the Plan

Chapter 8: The Action Manual—Identifies a prioritized list of multi-modal projects for near-term, establishes a 20-year capital improvement plan, and highlights a realistic funding strategy for Moscow.

Appendices

Appendix A: Transportation Fact Book—Developed in the early stages of *Moscow on the Move*, the Transportation Fact Book documents existing conditions, best practices, and research on transportation outcomes.

Appendix B: Active Transportation Toolkit—Offers design guidance for bicycle and pedestrian improvements.

Appendix C: Community Outreach Summary—Overview of community outreach activities and their outcomes.

Appendix D: Community Transportation Survey Summary—Summarizes a web-based community survey identifying citizen travel behavior, transportation priorities, and demographics.

Appendix E: Transit Survey and Ridecheck Summary—Observed transit ridership data and passenger preferences, attitudes, and needs related to transit in Moscow.

SETTING THE CONTEXT | CHAPTER 2

GETTING AROUND MOSCOW TODAY

This chapter summarizes the current state of Moscow's transportation system, including the roadway network and performance, parking supply, the bicycle and pedestrian network, and transit services and needs. Key issues, challenges, and barriers for each mode are highlighted that will inform modal strategies in the chapters to come.

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2 GETTING AROUND MOSCOW TODAY

This chapter summarizes Moscow's key transportation issues, including those related to the roadway network, parking supply, the bicycle and pedestrian network, and transit services and needs. Key issues, challenges, and barriers for each mode are highlighted and will inform modal strategies in Chapters 4-7. For a more comprehensive overview of existing conditions, please see the *Moscow on the Move Transportation Fact Book* in Appendix A.

MOSCOW AT A GLANCE

Moscow is a small but growing city located along the Idaho-Washington border in north central Idaho. At 6.2 square miles, the city is relatively compact in land area and is home to 23,800 residents. Moscow is located in the Palouse region of the Columbia River Plateau. Known for its strong agricultural heritage, the city has grown a more diverse economy that includes education and health care. The city is surrounded by mountains and ridges: the Moscow Mountain range lies to the northeast and Paradise Ridge and Tomer Butte are to the southeast. The city itself is situated on hilly terrain, especially the neighborhoods east of downtown.

Moscow is well-known for its trail network including the iconic Bill Chipman Palouse Trail.

Image from Nelson\Nygaard

Moscow is located near several regional centers including Pullman, Washington (situated eight miles to the west), Lewiston, Idaho (located 32 miles to the south), and Spokane, Washington (roughly 80 miles to the north). The most populous city and the county seat of Latah County, Moscow is also home to the University of Idaho, which is the city's largest employer. As part of the Palouse Knowledge Corridor, Moscow and the University are leveraging the community's intellectual and creative assets to house new and growing industries, attract a diverse residential population, and grow and diversify its economy.

As home to the University of Idaho and an active and engaged citizenry, Moscow hosts a variety of community, cultural, and art events including a thriving Farmers Market, Moscow Art Walk, and Rendezvous in the Park events.

ACTIVITY CENTERS AND LAND USE CHARACTER

Downtown Moscow (and areas immediately north of the center), Eastside Marketplace, and strip commercial on the eastern and western reaches of SH-8 serve as the city's key commercial nodes. The University of Idaho is located directly to the southwest of Moscow's downtown and is the city's largest employer. The University is bordered by SH-8 and US-95 and can be accessed via Taylor Avenue, Sweet Avenue, College Street, Line Street, Sixth Street, Stadium Way, Perimeter Drive, Old Pullman Road, and the Paradise Path.

The K-12 schools serving Moscow include J. Russell Elementary, Lena Whitmore Elementary, West Park Elementary, A.B. McDonald Elementary, St Mary's School, Logos School, Moscow Middle School, Moscow Charter School, Palouse Prairie Charter School, White Pine Montessori, Paradise Creek Regional Alternative School, and Moscow Senior High.

Medical facilities in Moscow are clustered in the downtown area around the Gritman Medical Center, although several have moved to West A Street, making multi-modal access more difficult. Social services and nonprofits, including the United Way, Community Action Agency, Success by Six Cares Center, Opportunities Unlimited, and Inclusion North, are located in the core downtown area. The Health & Welfare Department and Latah County WIC Program are located further out, on the Troy Highway (SH-8) and East Palouse River Drive.

Senior housing and assisted living facilities are less centralized than other uses. These facilities tend to be located outside of downtown, in less dense areas north of East D Street, south of Styner Avenue, and east of South Mountain View Road. Key destinations and activity centers that create travel demand are shown in Figure 2-1.

Housing and residential form

Residential housing is the most prevalent land use in Moscow. Housing is generally low density in nature, with the exception of multifamily and student housing in the neighborhoods immediately north, south, and southeast of the University. Residential housing can range from traditional neighborhood development (like the grid neighborhoods immediately east of downtown), planned subdivisions east of Mountain View Road, higher density apartments in portions of Southeast and Southwest Moscow, and mobile home parks. Most pre-1950s housing development occurs on a grid street network. However, mid-century and more recent suburban style subdivision development has led to the construction of "loop and lollipop" style street networks—land use decisions that impact current travel behavior.

Because of urban expansion and changes to compact community form, car dependency has been instilled in many households. A sizable low-income population living along the North Polk Extension northeast of the downtown area is located outside of the area that receives transit service from SMART (Sustainable Moscow Area Regional Transit) Transit's West and East Routes. Similarly, areas east of Mountain View Road have limited access to transit. The lack of public transportation services, sidewalk connectivity, and bikeways may lead to higher rates of driving in these areas.

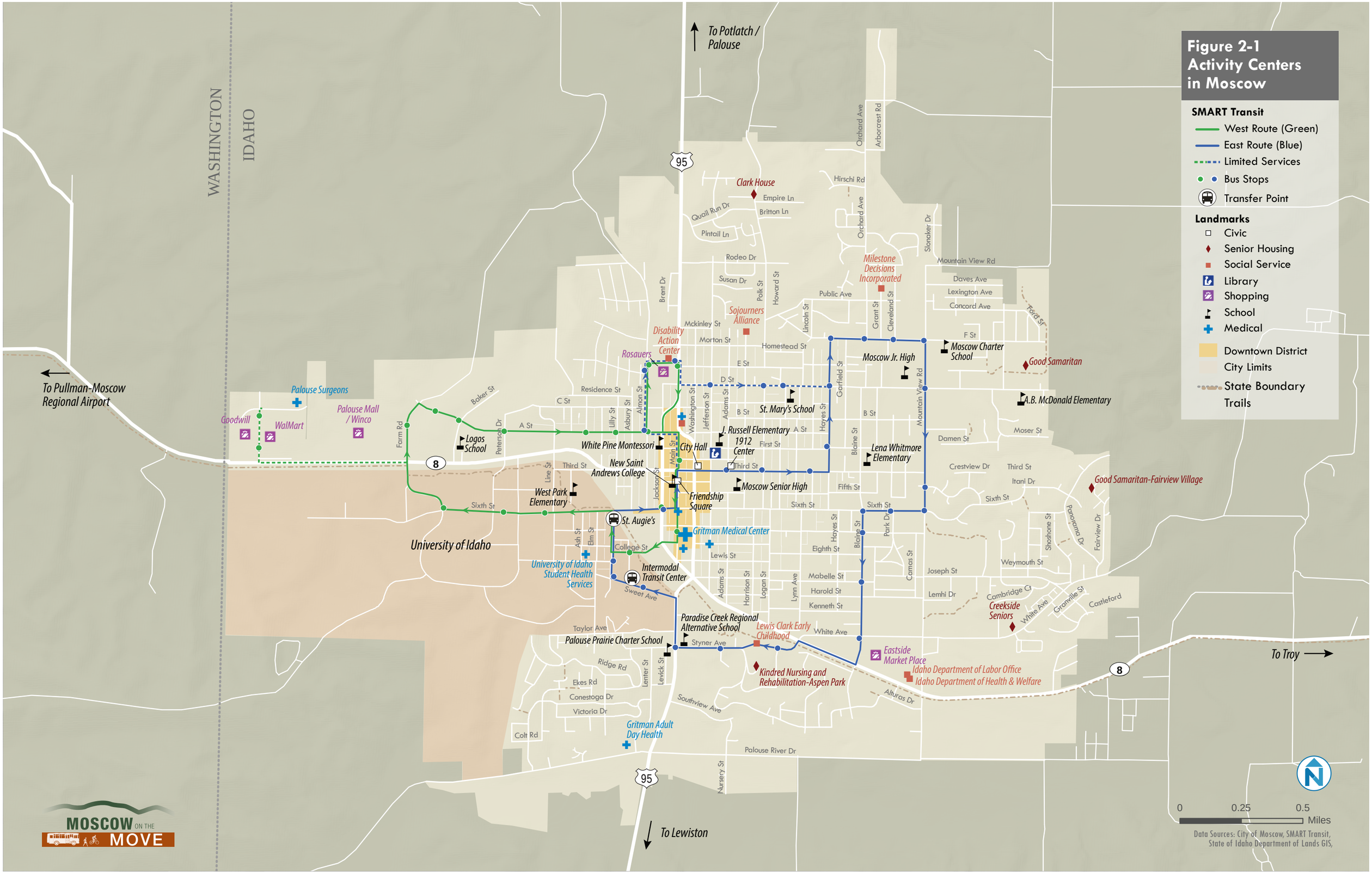
Figure 2-1
Activity Centers in Moscow
SMART Transit
West Route (Green)
East Route (Blue)
Limited Services
Bus Stops
Transfer Point
Landmarks
Civic
Senior Housing
Social Service
Library
Shopping
School
Medical
Downtown District
City Limits
State Boundary
Trails
WASHINGTON
IDAHO
To Potlatch / Palouse
To Pullman-Moscow Regional Airport
To Troy
To Lewiston
95
8
Clark House
Empire Ln
Britton Ln
Quail Run Dr
Pintail Ln
Hirschi Rd
Orchard Ave
Arborcrest Rd
Slonaker Dr
Mountain View Rd
Rodeo Dr
Susan Dr
Brent Dr
Polk St
Howard St
Public Ave
Milestone Decisions Incorporated
Daves Ave
Lexington Ave
Concord Ave
Ford St
Sojourners Alliance
Lincoln St
Grant St
Cleveland St
Mckinley St
Morton St
Disability Action Center
Rosauers
Homestead St
F St
Moscow Charter School
Good Samaritan
Moscow Jr. High
E St
D St
Garfield St
Palouse Surgeons
Residence St
Baker St
C St
Almon St
Washington St
Jefferson St
Adams St
St. Mary's School
A.B. McDonald Elementary
Goodwill
WalMart
Palouse Mall / Winco
Farm Rd
Lilly St
Asbury St
B St
Hayes St
Mountain View Rd
Moser St
Logos School
Peterson Dr
A St
J. Russell Elementary
1912 Center
First St
Blaine St
Damen St
White Pine Montessori
City Hall
Main St
Third St
Lena Whitmore Elementary
Crestview Dr
Line St
New Saint Andrews College
Jackson St
Moscow Senior High
Fifth St
Itani Dr
Good Samaritan-Fairview Village
West Park Elementary
Friendship Square
Sixth St
Park Dr
Panorama Dr
Fairview Dr
Shoshone St
St. Augie's
Gritman Medical Center
Ash St
Elm St
College St
Eighth St
Camas St
Weymouth St
University of Idaho
University of Idaho Student Health Services
Lewis St
Intermodal Transit Center
Sweet Ave
Harrison St
Logan St
Lynn Ave
Mabelle St
Harold St
Kenneth St
Joseph St
Lemhi Dr
Cambridge Ct
Granville St
Castleford
Creekside Seniors
White Ave
Taylor Ave
Paradise Creek Regional Alternative School
Lewis Clark Early Childhood
Palouse Prairie Charter School
Styner Ave
Eastside Market Place
Idaho Department of Labor Office
Idaho Department of Health & Welfare
Ridge Rd
Lenter St
Levick St
Kindred Nursing and Rehabilitation-Aspen Park
Ekes Rd
Conestoga Dr
Victoria Dr
Southview Ave
Alturas Dr
Gritman Adult Day Health
Colt Rd
Palouse River Dr
Nursery St
0
0.25
0.5
Miles
Data Sources: City of Moscow, SMART Transit, State of Idaho Department of Lands GIS,
MOSCOW ON THE MOVE

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MOBILITY PROFILE

For a small city, Moscow excels in promoting commuting alternatives to the car.[1] As noted in Figure 2-2 less than 60% of Moscow residents drive alone to work and 11% carpool; a total of 69% of residents drive or ride in a car to work. While public transit ridership is low, at just over 1%, walking and bicycling rates are very high, at almost 20% and 6% respectively. Moscow's high non-motorized commute population is driven by the local University population and the city's compact size.

Compared to Moscow, fewer residents of Pullman drive or ride in a car to work (63%). This is partially due to Pullman exhibiting a higher student proportion than Moscow (65% compared to 52%, respectively). Due to Pullman's more established transit system with dedicated funding sources and a higher student proportion, their transit ridership is dramatically higher than Moscow's, at nearly 9%. Residents in Moscow and Pullman walk at similar rates, but bicycling in Pullman is much lower than Moscow, at only 2%.

Compared to Latah County and Idaho as a whole, Moscow residents drive less, take public transit more often, and walk and bike at significantly higher rates than average.

Boulder, Colorado is often described as a leading University town in the U.S. when it comes to maintaining a low drive alone mode split. Moscow has a similar drive alone mode split (Boulder was at 53% in 2010).

Figure 2-2 Means of Transportation to Work, Moscow, Lewiston, Pullman, Latah County, Idaho, 2006-2010

	Moscow	Lewiston	Pullman, WA	Latah County	Idaho State
Drove alone	57.6%	82.5%	54.3%	63.1%	76.4%
Carpooled	11.4%	10.2%	8.6%	13.7%	11.4%
Public transportation	1.2%	0.4%	8.8%	0.8%	0.9%
Walked	19.6%	2.5%	21.5%	13.2%	3.2%
Bicycle	5.7%	0.7%	1.8%	3.8%	1.2%
Worked at home	3.8%	2.2%	4.1%	4.6%	5.4%

Source: American Community Survey 2006-2010 5 Year Estimates

WALKING AND BICYCLING IN MOSCOW

The City of Moscow has many programs in place to support a great walking and bicycling city. Many trips are within walking or biking distance – and no point within the city limit is farther than 1¾ miles from downtown Moscow or the University of Idaho. Moscow also has a well-used trail system and an active bicycle advocacy community.

Today, there is a limited bicycle network provided for people riding bicycles for transportation or recreation. Outside of the trail network, much of the existing infrastructure requires riding in mixed traffic and may not appeal to many potential bicyclists. Expanding the current network and increasing the amount of dedicated bicycle facilities will be critical to encouraging new riders. Likewise, focusing on sidewalk continuity and safe crossings is necessary to ensure a safe and comfortable walking environment and potentially achieve greater levels of walking for all types of trips.

In addition to continued investment in expanding the availability of safe facilities for walking and biking, new strategies for promoting active transportation must consider the following barriers:

Auto-Centric Street Design. Many Moscow streets, like West A Street, have been designed primarily for the purpose of moving motor vehicles. The travel speeds and design of these streets can be a barrier to bicycling. For example, Washington and Jackson Streets downtown are regulated as 25mph streets, but their design facilitates

[1] US Census Bureau, American Community Survey, 2006-2010 5-Year Estimates

speeding. Current roadway design, typified by wide travel lanes and large turning radii, inhibits safety for motor vehicle drivers, pedestrians, and people on bicycles.

Topography. Moscow contains hilly terrain, especially east and south of downtown. With grades as high as 15-16%, traversing some of Moscow's hillier streets can be challenging for cyclists and pedestrians. Pedestrians and cyclists alike select their route based on topography. Some pedestrians would not walk from their residence to work or to a downtown restaurant because of the steep grades in eastern Moscow.

Highway Crossings. Crossings at several locations along SH-8 and US-95 have limited visibility, sightline issues, and significant signal delay. These issues, as well as signal delay in downtown and along Pullman Road, were highlighted as problems by community members at *Moscow on the Move*'s first community open house. Without proper signal detection, pedestrians and bicyclists are more prone to ignore traffic control signals, thereby increasing their risk of collision.

Many east-west routes (such as Sixth Street as shown) have terrain that can be challenging for bicycles.

Image from DKS Associates

A bicycle and pedestrian underpass has been proposed at this location to eliminate the difficult crossing at Styner Avenue and SH-8.

Image from Nelson\Nygaard

Indirect Connections and Sidewalk Coverage. One of the most significant challenges for pedestrian travel is navigating the large number of gaps in the sidewalk network. These gaps particularly affect people with mobility or visual impairments and those walking to access SMART Transit. Gaps in the bicycle network are significant barriers for bicyclists as well. Although circuitous routes are sometimes necessary for bicyclists due to topography, dropped bike lanes at intersections or unnecessary detours necessitated by gaps in the bicycle network impede trip-making.

Trail Connections. Because Paradise Path and the two regional trails—Latah Trail and the Bill Chipman Palouse Trail—are primary components of the Moscow bicycle network, connections to these trails are critical. Current trail connections are limited and sometimes difficult to access. White Avenue/Styner Avenue at SH-8 is a notoriously difficult crossing location for those seeking to access the trail network.

Downtown Access. Enhanced bicycle connections to downtown Moscow are important to those who choose bicycling and to encourage new bicycle trips to and through downtown. Improving downtown access is critical to integrating University of Idaho student life into the broader fabric of the city. Downtown-bound bicyclists currently lack comfortable bicycle access and secure bicycle parking options. Improving these conditions will help students access downtown retail and keep Downtown Moscow competitive with other retail areas.

Friendship Square in downtown Moscow offers a safe, comfortable pedestrian environment.

Image from Nelson\Nygaard

Commercial Center Access. People seeking to access commercial centers outside of downtown (e.g. Eastside Marketplace and Palouse Mall) by bicycle or on foot are faced with a range of challenges including topography, bikeway connectivity, traffic conditions, and lack of bike parking.

Pedestrian Delay in Downtown and Along Highways. Downtown traffic signals at the intersection of Jackson and Washington Streets require pedestrians to actuate the signal instead of providing an automatic WALK phase**.**

Bicyclists' Behavior. Today, there is a perception that many bicyclists in Moscow behave either illegally (riding the wrong direction on a street, failing to yield at stop signs and traffic signals) or unsafely (riding on the sidewalk, riding without a helmet). Highly visible education campaigns for all roadway users are necessary to ensure bicycling remains safe and predictable for all roadway users.

A cyclist waits over a minute to cross Washington Street.

Image from Nelson\Nygaard

Signage directing cyclists to Paradise Path and destinations within Moscow.
Image from Nelson\Nygaard

Legibility & Public Awareness. In some places, lack of information about the existing bicycle network, trip travel times, and routing may prevent residents from taking trips by bicycle. In some cases, the fact that much of the city's bicycle network and, specifically, Paradise Path, are not visible to motorists might cause residents to overlook the network's potential utility for cycling for transportation, in addition to cycling for recreational purposes.

Bikeway and Sidewalk Maintenance. Sidewalks and bikeways in Moscow require maintenance and snow removal to prevent slipping hazards, sidewalk cracking, pavement drift from heavy vehicles (a phenomenon where pavement corrugates or ripples due to extensive use by heavy vehicles like trucks and buses), exposed railroad tracks, unswept debris, and gutter seams wide enough to catch bicycle tires. Without policies guiding how to address these issues, current conditions can discourage and endanger people walking and biking.

Providing better accommodations for mobility-impaired citizens in Moscow

In 2010, the City of Moscow established the Mobility Task Force to assess the condition of City streets to determine the efficacy of a continuous network of accessible pedestrian facilities including curb ramps for those with mobility impairments. The Task Force developed a set of mobility route principles that guided mobility improvement recommendations and sidewalk construction priorities. In the Mobility Task Force Report, these principles include the following fundamental principle:

Moscow should be accessible to citizens of all ages and physical abilities. We should be able to use sidewalks to move safely and without serious impediments from any neighborhood to and throughout the downtown business district, to major shopping centers, to the University of Idaho, to major medical complexes and care facilities, and to schools, parks, and major recreational complexes.

The estimated cost of installing sidewalks on at least one side of every street, including replacing all nonconforming pedestrian facilities and building accessible curb ramp improvements, is $19 million. This may be supplemented by the City's planned enforcement of City Code Title V Chapter 7, which requires property owners to maintain their sidewalks "in good repair and safe condition" and indicates that "where no sidewalks exist on a street, the Council may require construction by the property owner."

TRANSIT IN MOSCOW

SMART (formerly known as Moscow Valley Transit) is the primary transit service provider in Moscow. SMART provides three types of transit service: fixed-route, Dial-A-Ride (DAR) service which includes Medicaid transportation, and complementary ADA paratransit service. General service characteristics for the fixed-route and DAR services are summarized in Figure 2-3 below. Further detail on system characteristics and performance can be found in Chapter 3 of the *Moscow on the Move Transportation Fact Book* (Appendix A of this document).

Figure 2-3 SMART Overview (2012)

Type of Service	No. of Routes	Total Vehicles/ Max. in Service	Weekday Service Hours	Service Frequency	Standard Fare	Annual Unlinked Trips
Fixed-route	2	5 / 2	6:40 a.m. – 6:00 p.m.	30 minutes	None	168,756
Dial-A-Ride	N/A	3 / 2	6:40 a.m. – 6:00 p.m.	Demand Response	$1.50	11,094

Source: SMART Transit

*Note: Unlinked passenger trips referred to the number of passengers who board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination

Fixed-Route Service and Performance Trends: SMART fixed-route service includes two routes: the West Route and the East Route. Both routes, depicted in Figure 2-4 operate as one-way clockwise loops every 30 minutes from 6:40 a.m. until 6:00 p.m. during weekdays only. These routes play a critical role in increasing mobility for Moscow residents. SMART fixed route service has become more popular and more efficient over the past 5 years, with a 134% increase in total passengers and a 65% increase in passengers per revenue hour. Page 2-12 summarizes how SMART performs compared to an average of similar peer fixed-route transit systems.

Dial-A-Ride Service and Performance Trends: SMART's DAR service is provided to those who are unable to use fixed-route transit service, including people with disabilities and older adults. This service operates on the same days and hours as the SMART fixed-route service: 6:40 a.m. to 6:00 p.m., weekdays only. The fare for DAR is $1.50 for ADA qualified riders, and no fare is charged to ADA Priority Paratransit eligible riders. SMART provided 11,094 DAR rides in 2012. Use of the system has fluctuated somewhat over the years, with a net decrease in ridership of approximately 1% and an equivalent increase in passengers per revenue hour.

SMART's East Route at Mountain View and F Street is a key stop for students.
Image from Nelson\Nygaard

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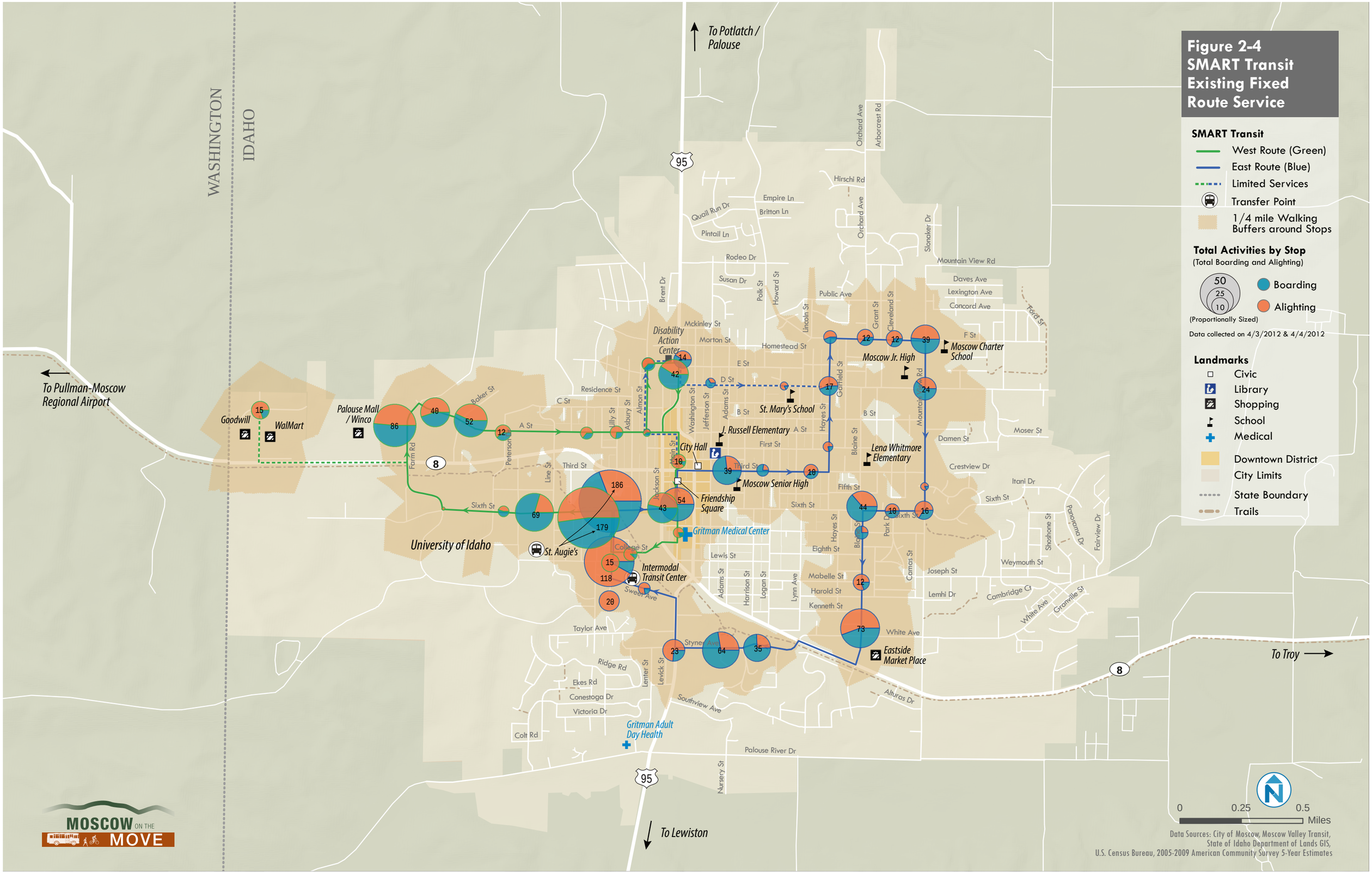
Figure 2-4
SMART Transit
Existing Fixed
Route Service
SMART Transit
West Route (Green)
East Route (Blue)
Limited Services
Transfer Point
1/4 mile Walking Buffers around Stops
Total Activities by Stop
(Total Boarding and Alighting)
50
25
10
(Proportionally Sized)
Boarding
Alighting
Data collected on 4/3/2012 & 4/4/2012
Landmarks
Civic
Library
Shopping
School
Medical
Downtown District
City Limits
State Boundary
Trails
0
0.25
0.5
Miles
Data Sources: City of Moscow, Moscow Valley Transit,
State of Idaho Department of Lands GIS,
U.S. Census Bureau, 2005-2009 American Community Survey 5-Year Estimates
WASHINGTON
IDAHO
To Potlatch / Palouse
To Pullman-Moscow Regional Airport
To Troy
To Lewiston
Goodwill
WalMart
Palouse Mall / Winco
Disability Action Center
St. Mary's School
J. Russell Elementary
City Hall
Moscow Jr. High
Moscow Charter School
Lena Whitmore Elementary
Moscow Senior High
Friendship Square
Gritman Medical Center
University of Idaho
St. Augie's
Intermodal Transit Center
Eastside Market Place
Gritman Adult Day Health
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How does SMART perform compared to similar systems?

Peer Review of Fixed-Route Services

A peer review was conducted to illustrate SMART's performance compared to other similarly-sized systems. Five systems were chosen as peers:[2]

- Billings Metropolitan Transit (Billings, Montana)
- City of Cheyenne Transit Program (Cheyenne, Wyoming)
- Corvallis Transit System (Corvallis, Oregon)
- Missoula Urban Transit District (Missoula, Montana)
- Pocatello Regional Transit (Pocatello, Idaho)

Peer data were collected from the National Transit database (NTD); Moscow Valley Transit data was submitted by SMART staff. The table below summarizes key operating and system performance statistics for the year 2010 for Moscow Valley Transit/SMART and the average of its peers. SMART's operating expenses per revenue mile is about 47% higher than that of its peers, but is only 4% higher per revenue hour than the peer average. Passenger trips per revenue mile are significantly higher for SMART (66%).

Comparison of Key Operating & System Effectiveness Statistics – SMART and Peer Systems

Statistic (2010 numbers)	SMART	Peer Average	SMART vs. Peers
Service area population	24,080	67,656	36%
Service area square miles	6.8	23	29%
Passenger trips	137,121	535,031	26%
Vehicle revenue miles	61,574	519,370	12%
Vehicle revenue hours	6,277	35,585	18%
Fare revenues	$0	$248,724	n/a
Operating expense	$393,434	$2,191,221	18%
Estimated operating subsidy	$393,434	$1,942,497	
Available vehicles	6	20.8	29%
Peak vehicles	2	13.3	15%
Operating expense per revenue mile	$6.39	$4.34	147%
Operating expense per revenue hour	$62.68	$60.46	104%
Passenger trips per revenue mile	2.2	1.35	166%
Passenger trips per revenue hour	21.84	18.29	119%
Revenue hours per capita	0.26	0.54	48%
Passenger trips per capita	5.69	8.17	70%

Source: Data provided by SMART staff; peer data is from the National Transit Database (2010)

[2] Peers were selected based on the presence of a major university, the presence of a local transit agency (i.e. one that is not part of a regional system), and population.

Transit Service Needs

As part of *Moscow on the Move*, a number of public outreach efforts were conducted to gauge the transportation needs of the community. Transit needs in Moscow are presented below based on community input. Additionally, an assessment of existing transit service in Moscow today and a review of existing transit service relative to planned growth are provided. Transit priorities and gaps identified in this section are used to develop the Service Design Scenarios in the Transit Strategy (Chapter 5).

Key Transit Markets in Moscow

Transit demand in Moscow is driven by the needs of specific travel markets. Low-income residents, households without cars, University affiliates, youth, and senior populations are key transit markets in Moscow. As Moscow implements its vision for transit for the next 20 years, transit service should be prioritized for these populations and connect to major activity centers.

Low-Income Residents

Twenty-three percent of households in Moscow are considered low-income, defined as households earning at or below the federal poverty level, based on household size. As shown in Figure 2-5, the highest density of low-income residents is concentrated along Sixth Street on the campus of the University, in student dormitories. Although the highest density clusters are generally served by transit, portions of moderate density low-income clusters, such as those located south of Styner Avenue, are not in close proximity to transit.

Households without Cars

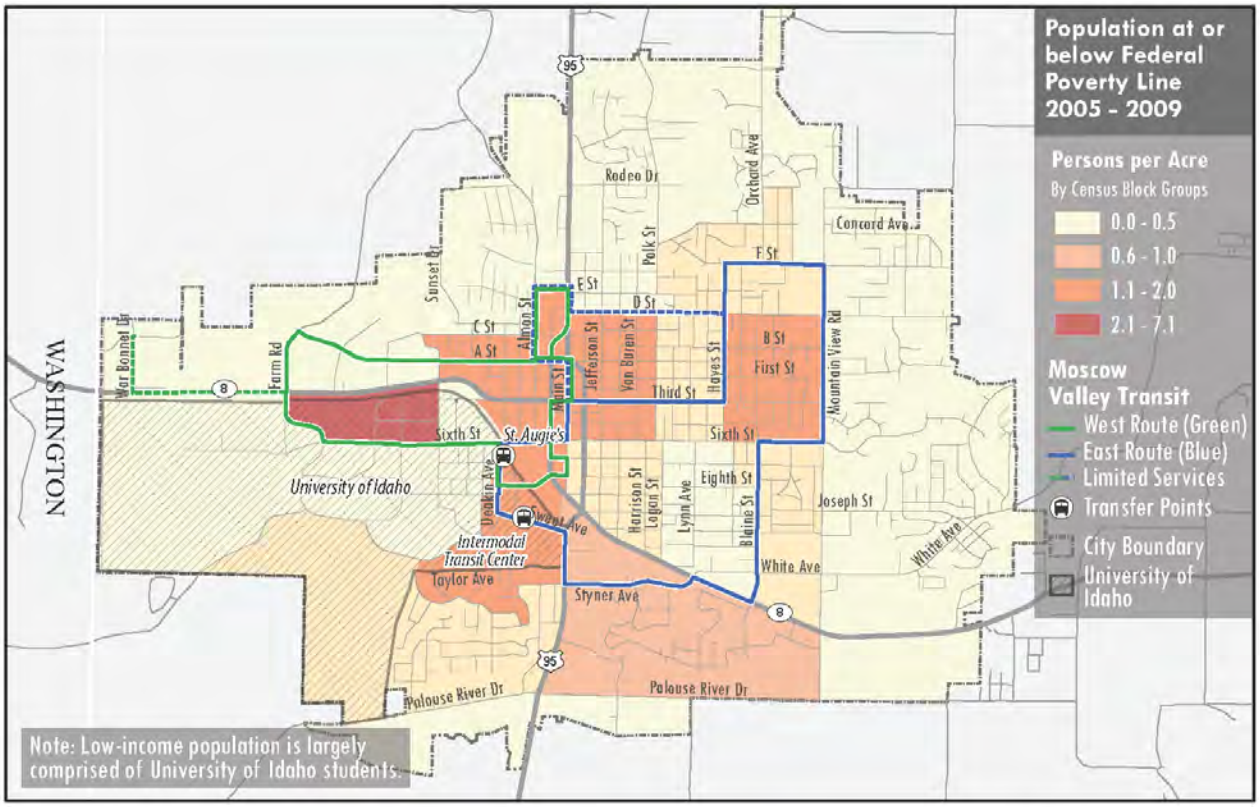
Households without access to a car may represent households without economic means to own a vehicle, as well as households with individuals that choose not to own a car or are unable to drive. *Moscow on the Move* identifies projects, policies, and programs to help households without a car access transit.

Six percent of households in Moscow do not have access to a vehicle. Figure 2-5 shows that the distribution of these households is roughly aligned with the distribution of low-income households and seniors. A notable exception is the pocket of students living on campus between Third Street and Sixth Street. Although these students are low-income, many have and store a vehicle on campus.

Youth & Senior Population

Public transportation and walking serve as critical means of transportation for older adults and youth. Older adults often exhibit higher demand for transit (especially door-to-door demand-response service like SMART's DAR service) as they become less capable or less willing to drive themselves, or can no longer afford to own a car on a fixed income. Young people without driver's licenses, those unable to drive, and those who choose not to drive need reliable transit service and safe and convenient biking and walking routes to access school, after-school activities, part-time jobs, recreation, and entertainment. In Moscow, the highest concentration of youth is located in close proximity to the University of Idaho campus (see Figure 2-6). The greatest concentration of senior residences is at the Good Samaritan Village on Eisenhower Street northeast of downtown roughly one-half mile from the closest transit route. Other concentrations of senior residences are located at the Kindred Nursing and Rehabilitation Center on Styner Avenue, directly on the SMART's East Route, and the Good Samaritan-Fairview Village located on the outskirts of Moscow.

Figure 2-5 Low-Income Population and Households without Cars, 2005 - 2009



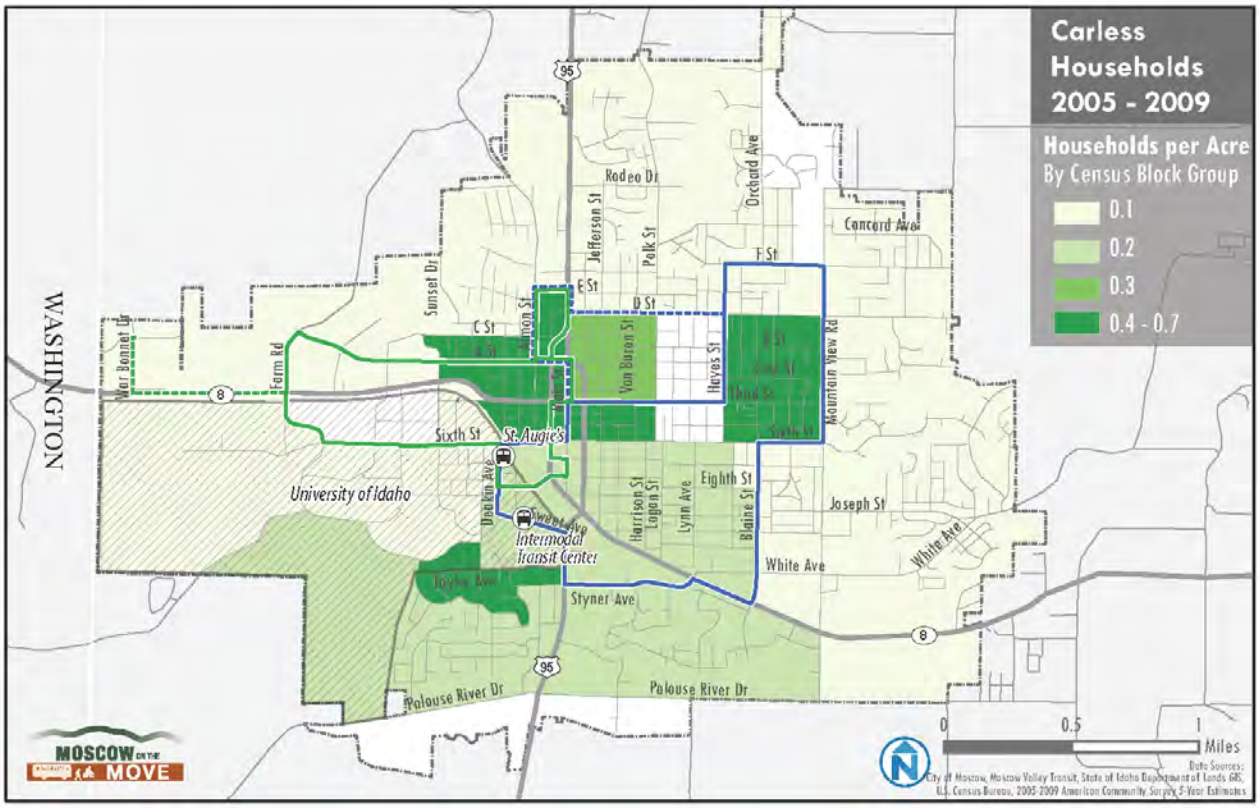
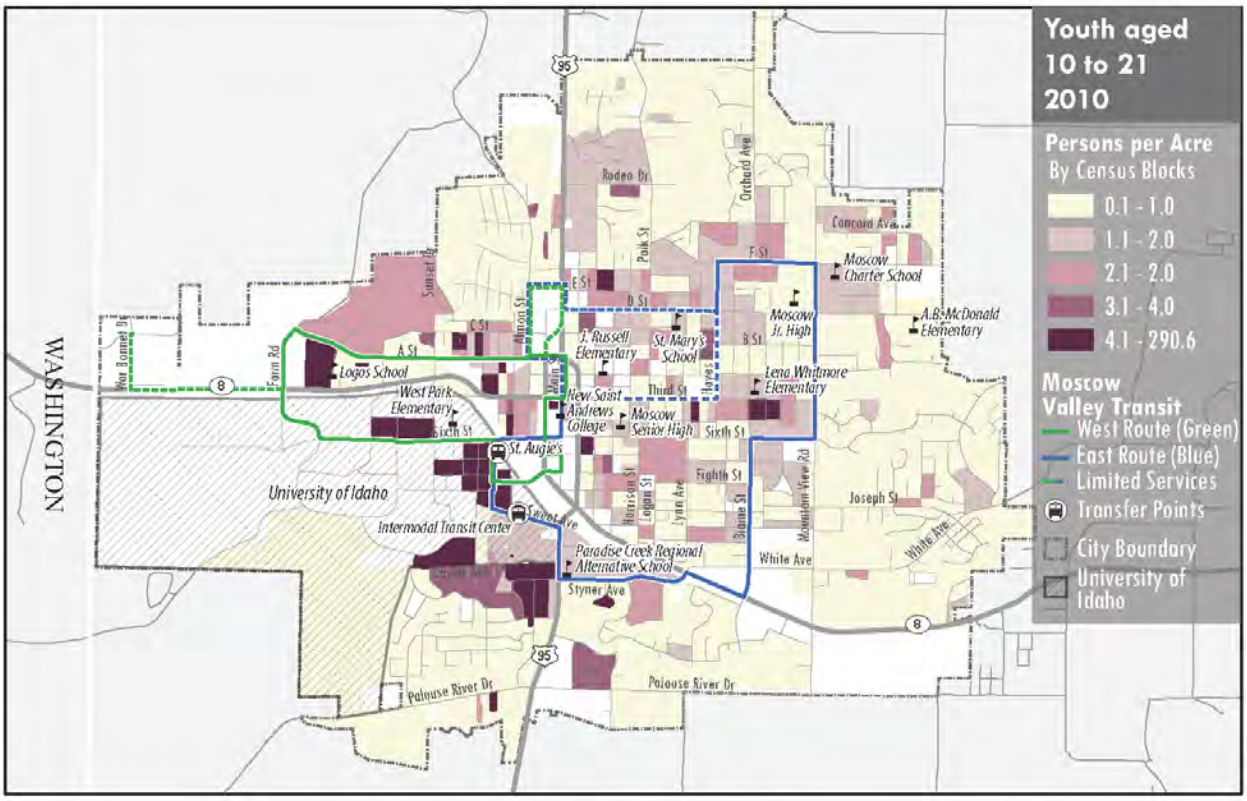
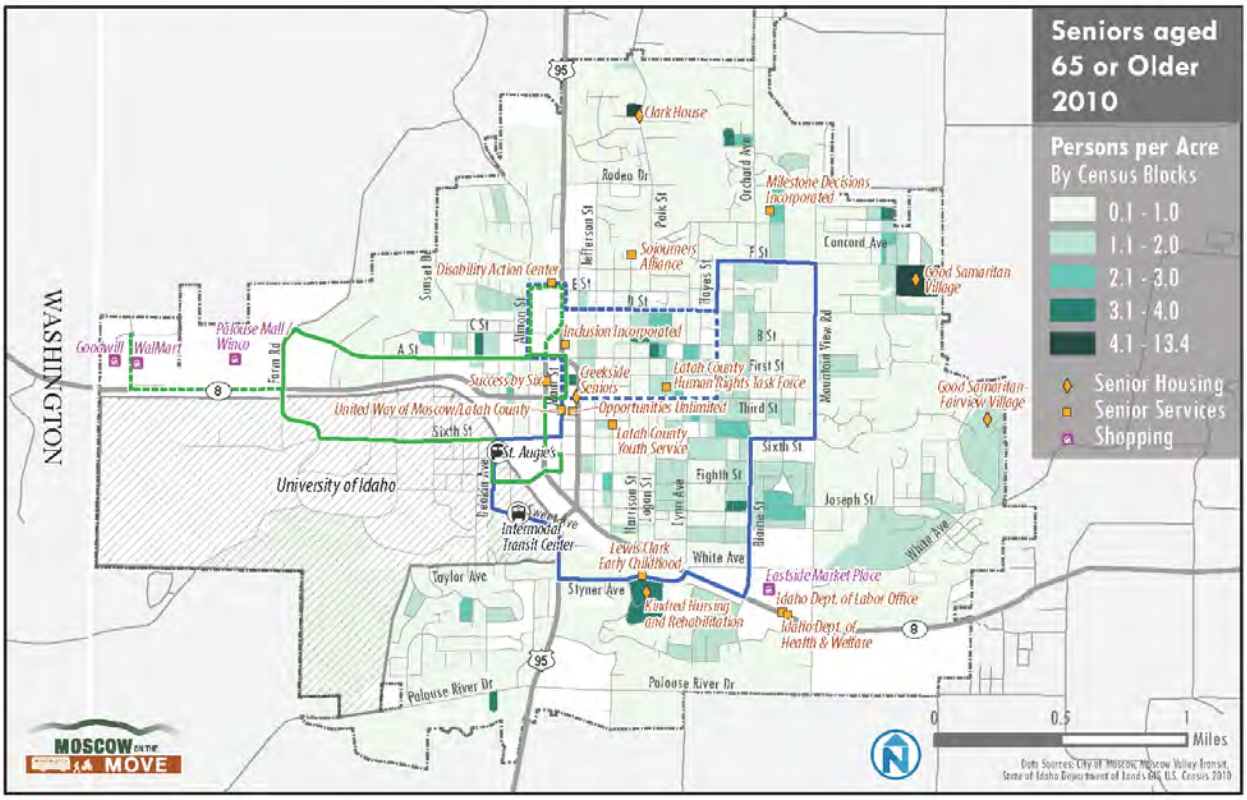


Figure 2-6 Youth & Senior Population, 2010





Existing Transit Service Needs

Gaps in existing transit service were identified based on community input, an assessment of existing transit service in Moscow, and the locations of key services and transit-dependent populations. Existing transit service needs are illustrated in Figure 2-7 and summarized below:

- **South of Styner Avenue**: Low-income residential neighborhoods south of Styner Avenue in the south end of town are not currently served by transit.
- **Southeast of Gritman Medical Center:** Although centrally located, the neighborhood between South Adams Street and South Lynn Street (west to east) and 7th Avenue and Kenneth Street (north to south) is not within one-quarter mile walking distance to transit service.
- **East of Mountain View Road:** Residential neighborhoods east of Mountain View Road do not have access to transit. This neighborhood includes some low-income households, in addition to senior housing at Good Samaritan Village on North Eisenhower Street and on Fairview Drive.
- **North of McKinley Street:** Senior housing in the north end of town (Clark House on North Polk Extension) and youth and low-income populations on and around Rodeo Drive are not currently served by transit.
- **South of Taylor Avenue:** Residents, students, and faculty accessing the south and southwest side of the University of Idaho campus must walk between a one-half mile to a mile to access the East Route.
- **North Almon Street:** Neighborhoods to the east of North Almon Street are home to some of Moscow's poorest residents. Parts of this community are within one-quarter mile of the West Route, while other areas—most notably the mobile homes to the north– is up to one-half mile to the nearest transit stop.

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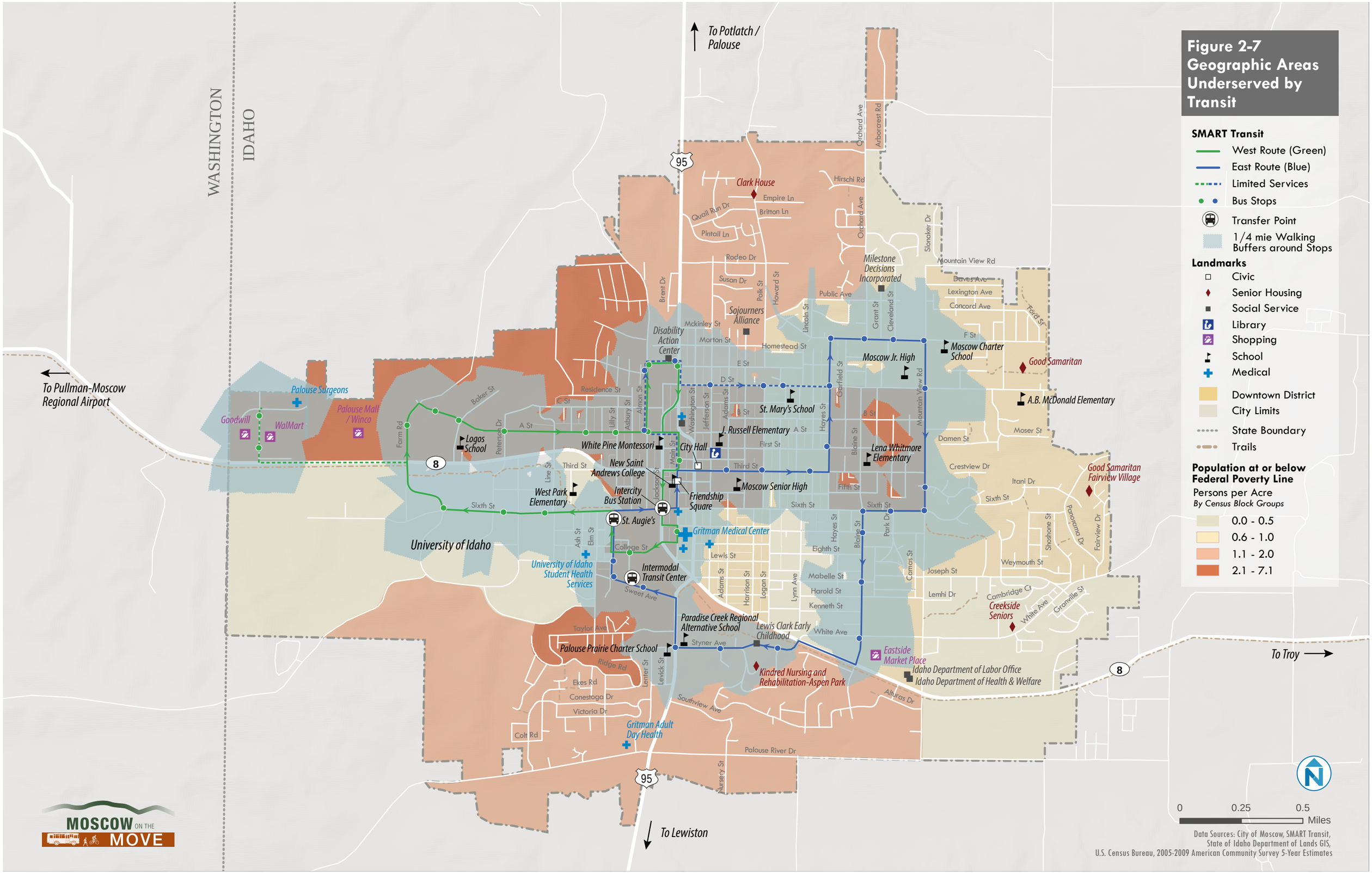
Figure 2-7
Geographic Areas Underserved by Transit
SMART Transit
West Route (Green)
East Route (Blue)
Limited Services
Bus Stops
Transfer Point
1/4 mie Walking Buffers around Stops
Landmarks
Civic
Senior Housing
Social Service
Library
Shopping
School
Medical
Downtown District
City Limits
State Boundary
Trails
Population at or below Federal Poverty Line
Persons per Acre
By Census Block Groups
0.0 - 0.5
0.6 - 1.0
1.1 - 2.0
2.1 - 7.1
WASHINGTON
IDAHO
To Potlatch / Palouse
To Pullman-Moscow Regional Airport
To Troy
To Lewiston
University of Idaho
Clark House
Milestone Decisions Incorporated
Sojourners Alliance
Disability Action Center
Moscow Jr. High
Moscow Charter School
Good Samaritan
A.B. McDonald Elementary
St. Mary's School
J. Russell Elementary
Lena Whitmore Elementary
Moscow Senior High
City Hall
Friendship Square
Intercity Bus Station
St. Augie's
Intermodal Transit Center
Gritman Medical Center
University of Idaho Student Health Services
West Park Elementary
New Saint Andrews College
White Pine Montessori
Logos School
Palouse Surgeons
Goodwill
WalMart
Palouse Mall / Winco
Good Samaritan Fairview Village
Creekside Seniors
Paradise Creek Regional Alternative School
Lewis Clark Early Childhood
Palouse Prairie Charter School
Kindred Nursing and Rehabilitation-Aspen Park
Eastside Market Place
Idaho Department of Labor Office
Idaho Department of Health & Welfare
Gritman Adult Day Health
MOSCOW ON THE MOVE
0 0.25 0.5 Miles
Data Sources: City of Moscow, SMART Transit, State of Idaho Department of Lands GIS, U.S. Census Bureau, 2005-2009 American Community Survey 5-Year Estimates

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Transit Service Needs for Planned Growth

Based on an assessment of planned growth in the city, gaps in service would exist if the following targeted growth areas were developed without changes to transit service (see the following chapter of *Moscow on the Move* for a complete discussion on future targeted growth areas):

- **Legacy Crossing:** The formation of the Legacy Crossing Urban Renewal District came about from the community's desire to eliminate conditions impeding the City's economic growth between Moscow's historic downtown and the University of Idaho campus. The Legacy Crossing project is important because it reinforces the connection between downtown and the University. A well-designed redevelopment project at Legacy Crossing provides an opportunity to build dense, urban residential development and prime retail space for students and faculty at the University and visitors to downtown. Future transit service will need to provide service to this mixed-use center.
- **"A" Street Development between Warbonnet Drive and Farm Road:** Without a change in transit routing to serve new development near the "A" Street extension, this development would be about a one-half mile walk to existing transit service on SH-8.
- **Alturas Technology Park:** The Alturas Technology Park Urban Renewal District was established in 1996 to encourage business development south of SH-8/Troy Road and west of Mountain View Road. Today, Alturas is home to a growing cluster of high-tech companies that benefit from their proximity to the University of Idaho and Washington State University. The SMART East Route currently stops at the corner of Blaine Street and White Avenue, a roughly one-half mile walk to the Alturas Technology Park.
- **Southeast Industrial Corridor:** As described in the Comprehensive Plan, the area between the Indian Hills subdivision and the Palouse River between South Main Street and Carmichael Road would provide opportunities for residential, commercial, and industrial development. Currently, the section of this corridor east of South Mountain View Road is not within walking distance to transit.

In addition to the projects noted above, Figure 2-8 provides a map of future residential, mixed-use, and commercial growth areas in Moscow.

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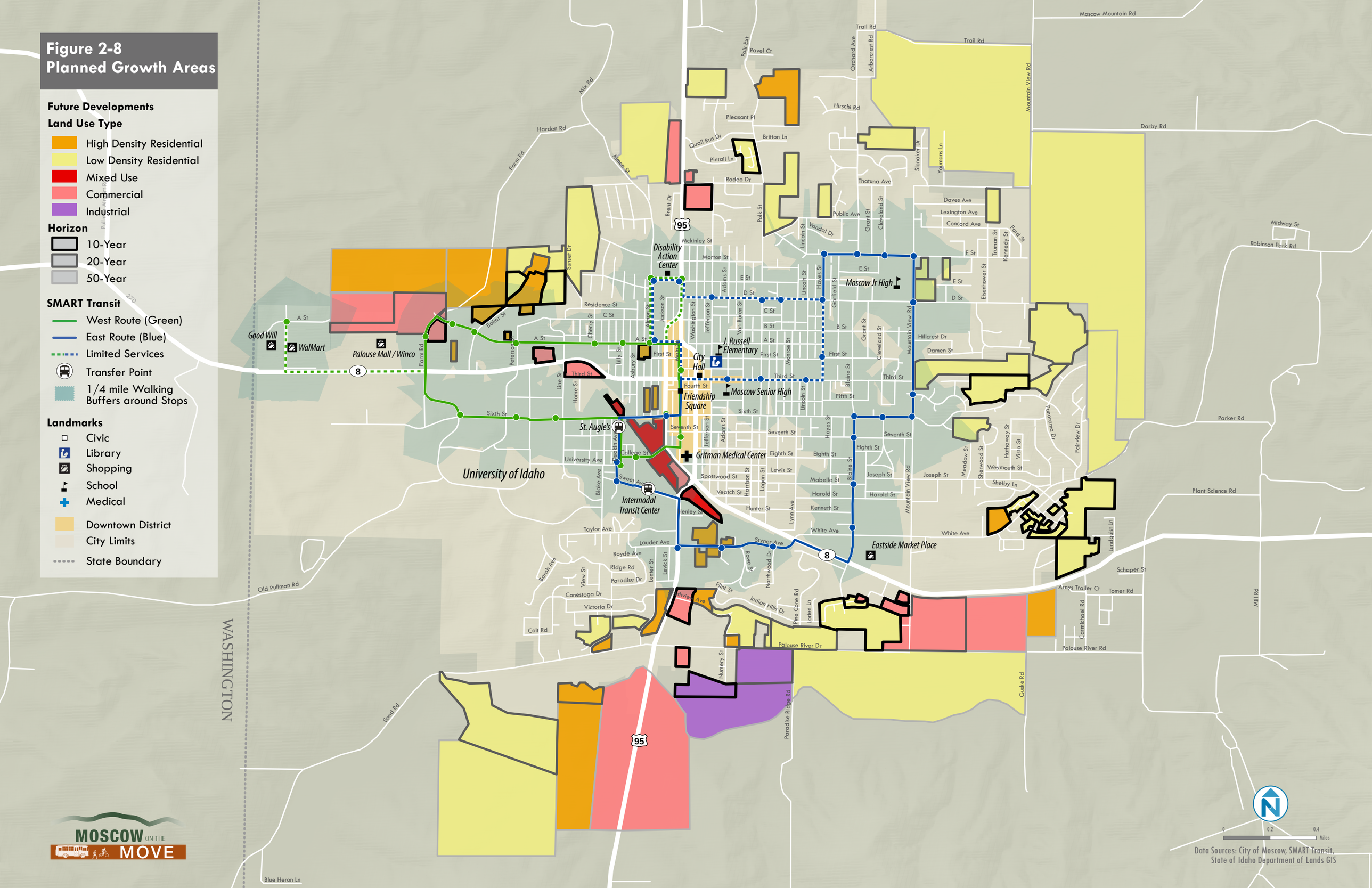
Figure 2-8
Planned Growth Areas



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Transit Coverage, Frequency, and Span

In addition to the geographic gaps in transit service noted above, the frequency and span of existing transit service was identified as an issue by community members. Community members identified the following needs:

- **Expand the Coverage of SMART Service.** Many believe that several key areas, including the residential area south of downtown (The Grove), subdivisions to the east, and senior housing in the northeast are not well served by transit. The south and southwest side of the University campus also needs better service. Better transit support is needed for elderly populations to retire in Moscow. Adding a new route is a priority investment for the near future, once funding is made available.
- **Expand Service Frequency.** The on-board survey reported that 26% of passengers would ride transit more often if there was more frequent bus service. Evidence from other communities suggests that improved frequency would also draw new riders.
- **Extend Evening Hours and Add Saturday Service.** The on-board survey asked passengers to choose the most important transit improvement. Thirty-seven percent of passengers identified *later evening service* as the most important improvement, and 28% chose *Saturday service* as the most important.

Other Needs

- **Regional access to/from Moscow by Transit.** Transit access to/from Pullman, the Pullman/Moscow airport, Lewiston, and Coeur D'Alene could be strengthened and better marketed. About 16% of on-board passengers surveyed said they would ride transit more often if an additional route within Moscow was provided. Pullman was by far the most commonly cited additional location (including areas within Moscow) respondents would like SMART to serve. Given the cost to provide this service and the level of coordination between the Cities of Moscow and Pullman, University of Idaho, Washington State University and both states, this will likely serve as a long-term improvement.
- **Grow and Sustain Funding for SMART.** SMART needs to establish a sustainable funding source and better manage the costs of paratransit service. University support, including possibly student fees, was mentioned by several stakeholders. There is disagreement regarding instituting fares; some stakeholders view fares as the solution to the funding shortfall and others view preserving the free service as a priority. Collecting fares comes with a variety of tradeoffs. Fare collection would work in the City and SMART's favor by freeing up funds for local match and covering operating costs. Eliminating the current fareless system would have minimal impact on ridership and would not impact the City's ability to secure ITD funding from the Public Transportation Advisory Council. However, if the City decides to pursue the competitive federal Small Transit Intensive Cities (STIC) grant, introducing fares would change some of the metrics of securing such a funding source. If SMART were to secure federal funding in the future, instituting fare collection would require the agency to comply with federal civil rights requirements per Title VI of the Civil Rights Act of 1964.

ROADWAY & TRAFFIC OPERATIONS IN MOSCOW

The City of Moscow operates roughly 80 miles of roadway within its city limits, including 34 miles of collector streets, which make up 42% of all roadway facilities in the city. The street network is gridded in downtown Moscow and in the historic Fort Russell neighborhood. It includes more suburban street designs to the north and east of the city, including curving roads, cul-de-sacs, and many streets without adequate sidewalks. There are two main highways connecting Moscow to its regional neighbors and the Interstate Highway System: US-95 and State Highway-8. Moscow's roadways serve freight traffic for local deliveries and through movement to other regional destinations like Pullman, Potlatch, Troy, Lewiston, Spokane, and Coeur d'Alene.

Driving in Moscow today

Today, driving in Moscow includes using a mix of local streets and large arterials. Arterials are characterized by multiple lanes and significant delays at some traffic signals. Residential streets are a mix of gridded blocks in older sections near downtown and more suburban street designs that offer limited connectivity.

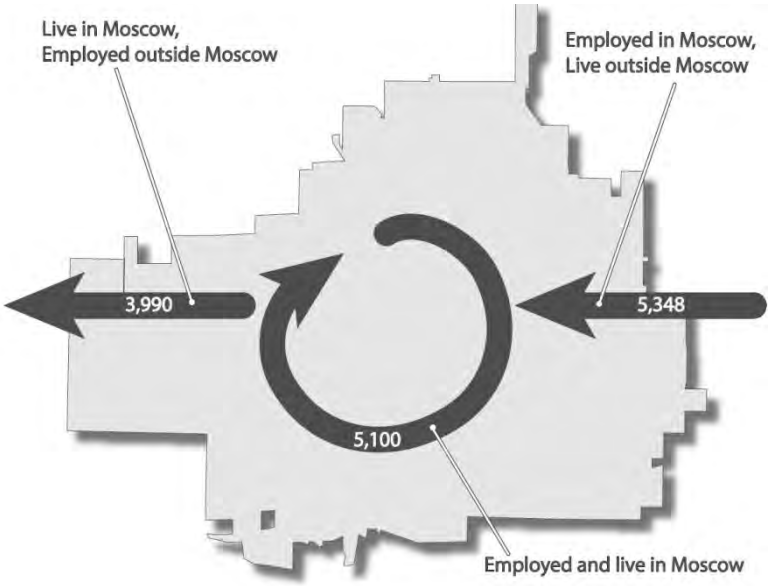
Census data are the best available indicator of work-related transportation because data are available for individual "places" and are based on reported data. Census commuting data show over half of Moscow residences stay in Moscow for work. A large proportion, 16%, travels to Pullman, Washington for work. Figure 2-9 shows that more workers live outside of Moscow and commute in (5,348) than live in Moscow and stay for work (5,100). Twenty-seven percent of Moscow's residents leave the city to access work. A majority of people who work in Moscow travel 10 miles or less to work, mostly from the east and northeast. However, 17% travel more than 50 miles, mostly from the north.

Residents who commute to work by single occupancy vehicle (SOV)—illustrated in Figure 2-10—mostly live in residential areas to the east, west, and south of downtown Moscow. However, a high percentage of residents living downtown north of Third Street and west of Polk Street also drive alone to work. Residents on the University of Idaho campus and downtown south of Third Street have lower rates of SOV use.

US-95 is a critical freight and interstate highway connection that bisects Moscow from north to south.

Image from Nelson\Nygaard

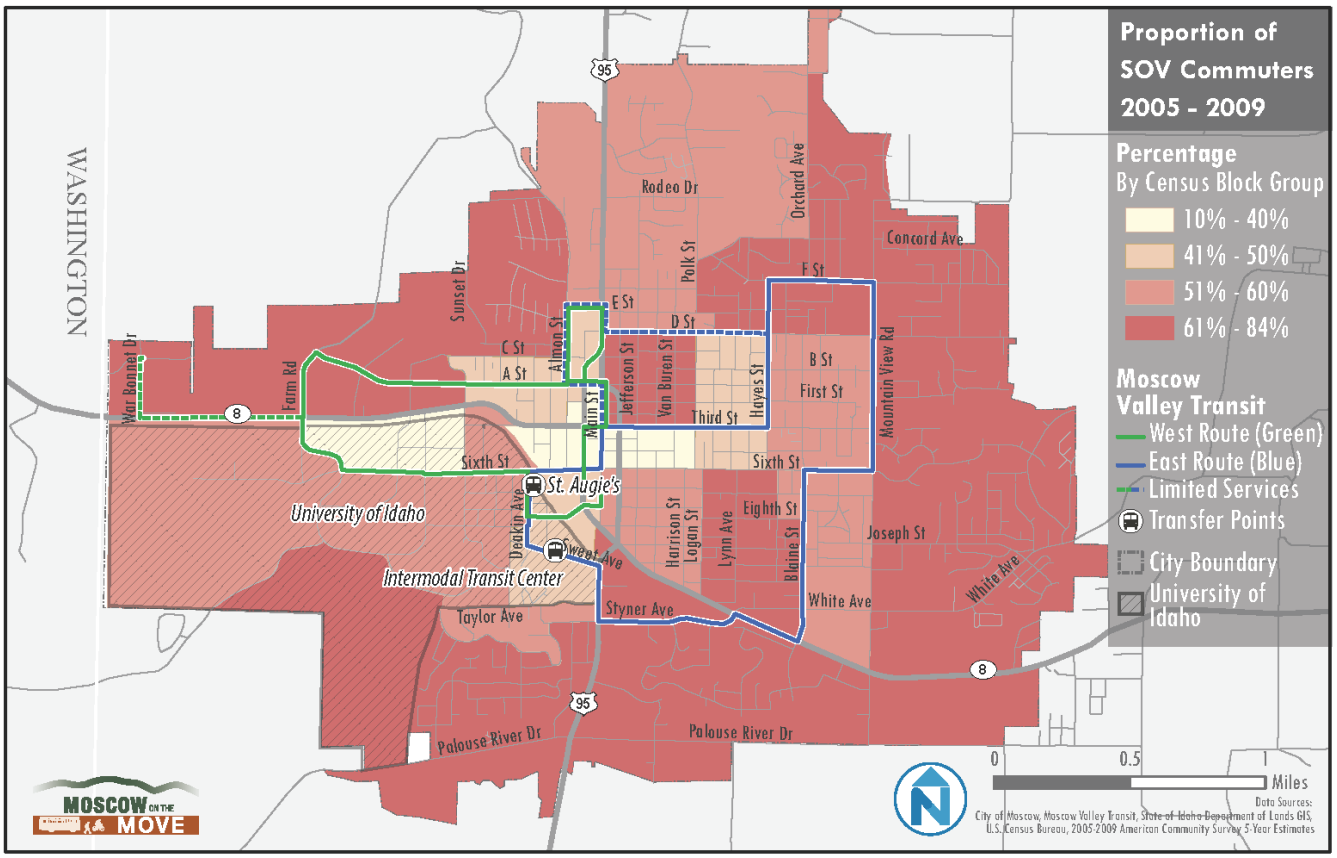
Figure 2-9 Inflow and Outflow of Moscow Residents and Workers, 2010



Note: Overlay arrows do not indicate direction of worker flow between home and employment locations.

Source: 2010 Census Longitudinal Employer Household Dynamics, OnTheMap

Figure 2-10 Single Occupant Vehicle (SOV) Commuters in Moscow



Source: American Community Survey 2005-2009 5-Year Estimates

Characteristics of Moscow Travel

A host of characteristics influence daily travel in Moscow, including topography, the transportation network, and population makeup, among others. Many of the primary east-west streets that connect the residential areas of eastern Moscow with the downtown core are characterized by steep grades making for challenging use by non-motorized users or vehicles in inclement weather. Moscow is located at the junction of two highways, which carry regional freight and are impacted by seasonal traffic volume fluctuations related to tourism and recreational travel. The University of Idaho staff and student population contribute to motor traffic levels on city streets as well as use of non-motorized modes. The variations of the academic calendar (including differences between the number of midweek classes on Tuesday versus Wednesday, for example) and summer break influence how heavily streets are used at various times.

Many east-west routes (such as Sixth Street as shown) have terrain that can be challenging for bicycles and local delivery trucks.

Image from DKS Associates

Traffic Volumes and Performance

Individual traffic counts were collected during the morning and evening peak periods at 18 intersections throughout Moscow during April 2012. High morning peak counts were concentrated at Third/Jackson Street and SH-8/Farm Road. Evening peak counts were highest at the same locations but also included SH-8/US-95/Washington Street and SH-8/Line Street.

The Idaho Transportation Department (ITD) maintains permanent data collection stations at the four major gateways to the city. These automatic traffic recorders (ATR) collect daily traffic volumes (both directions) on all days of the year. Figure 2 provides a summary of average daily traffic volumes at primary gateways to the City. Average daily traffic (ADT) at three of the city's major gateways ranges from approximately 5,000 to 6,000 vehicles per day. However, the western gateway has significantly higher traffic – approximately 15,000 vehicles per day.

Figure 2-11 Average Daily Traffic at Primary Gateways to Moscow (2011)

Location	Average Daily Traffic (ADT)
SH-8 (West)	14,900
US-95 (South)	6,300
US-95 (North)	6,200
SH-8 (East)	4,800

Source: ITD/DKS Associates

Traffic Capacity, Intersection Performance Measurements, and Alternatives

Vehicle/capacity (v/c) ratio and intersection level of service (LOS) are indicators of the speed, convenience, and quality of motor vehicle travel on a road. For vehicular traffic on arterial streets, the v/c ratio measures the number of vehicles projected to use a road in a particular period divided by its capacity of that same period. A v/c ratio close to 0.0 represents free-flowing traffic while a ratio exceeding 1.0 means that the flow of vehicles exceeds capacity. Level of service measures the average delay per vehicle at an intersection, ranging from A (representing almost no delay) to F (representing significant delay). ITD requires a level of service of B in rural areas and level of service C in urban areas. The City does not have a mobility standard (LOS or v/c) for intersection operations. For the traffic analysis, LOS D (signalized intersections) and LOS E (unsignalized intersections) were applied as a minimum level of service standard at City intersections. In urban areas, these are typical standards for intersections to balance the needs of all

roadway users. The objective is to allow moderate motor vehicle delay while providing a safe and comfortable roadway size for pedestrians, cyclists and transit riders.

Intersection Operations

In general, most intersections in Moscow operate with a relatively low vehicle delay and (LOS of B or better) and with little congestion, even during morning (7 to 9 a.m.) and evening (4 to 6 p.m.) peak periods. A key concern in town is traffic operations at the intersection of Washington Street (US-95) at Third Street (SH-8). During the PM peak hour, this intersection operates at LOS B and the northbound left turn movement experiences vehicle queues that extend up to a few blocks in length. Figure 2-13 summarizes existing LOS conditions at study intersections.

Roadway Functional Classification

Moscow is located at the junction of US-95 and SH-8, which contribute to regional traffic passing through the community.

Image from DKS Associates

Moscow's Thoroughfare Plan classifies streets in the City based on intended function and character. This "functional classification," described in Figure 2-12 and illustrated in Figure 2-14 on page 2-32, serves as a general plan for streets and their role in the community. City staff has begun the process of updating these designations. Proposed updates are shown in Chapter 4.

The classification not only identifies the purpose of the street, but it can be used to apply design criteria such as driveway spacing and access requirements. Streets classified for more intensive use, such as arterials, are intended to provide mobility and move large volumes of traffic through and within the City. To achieve this goal, these streets typically have higher posted speeds and more lanes, require vehicles to stop at fewer locations, and have limited side streets and driveways. Streets with lower functional classifications, such as local streets, are intended to focus more on providing access to properties. These streets typically have lower posted speeds, one lane in each direction, and may have numerous intersections that require vehicles to stop.

Figure 2-12 Functional Classification of Moscow Streets

Classification	Characteristics	Examples(s)
National Highways	Regional travel, high volumes, high speed, limited access; should include sidewalk, bike, and transit facilities	Portions of Jackson St, Washington St, and MainSt
Principal Arterials	Regional travel, high volumes, moderate to high speed, limited access; should include sidewalk, bike, and transit facilities	SH-8
Minor Arterials	Typically fed by collectors with limited local street access; should include sidewalk, bike, and transit facilities	Mountain View Rd, D St
Collectors	Distribute traffic from local streets to arterials with low to moderate speed; should include sidewalk, bike, and transit facilities	Sixth St
Local Streets	Low volume, low speed, high access; should include sidewalk facilities	Adams St, Jefferson St

Source: Thoroughfare Plan, Moscow Comprehensive Plan, Adopted December 7, 2009.

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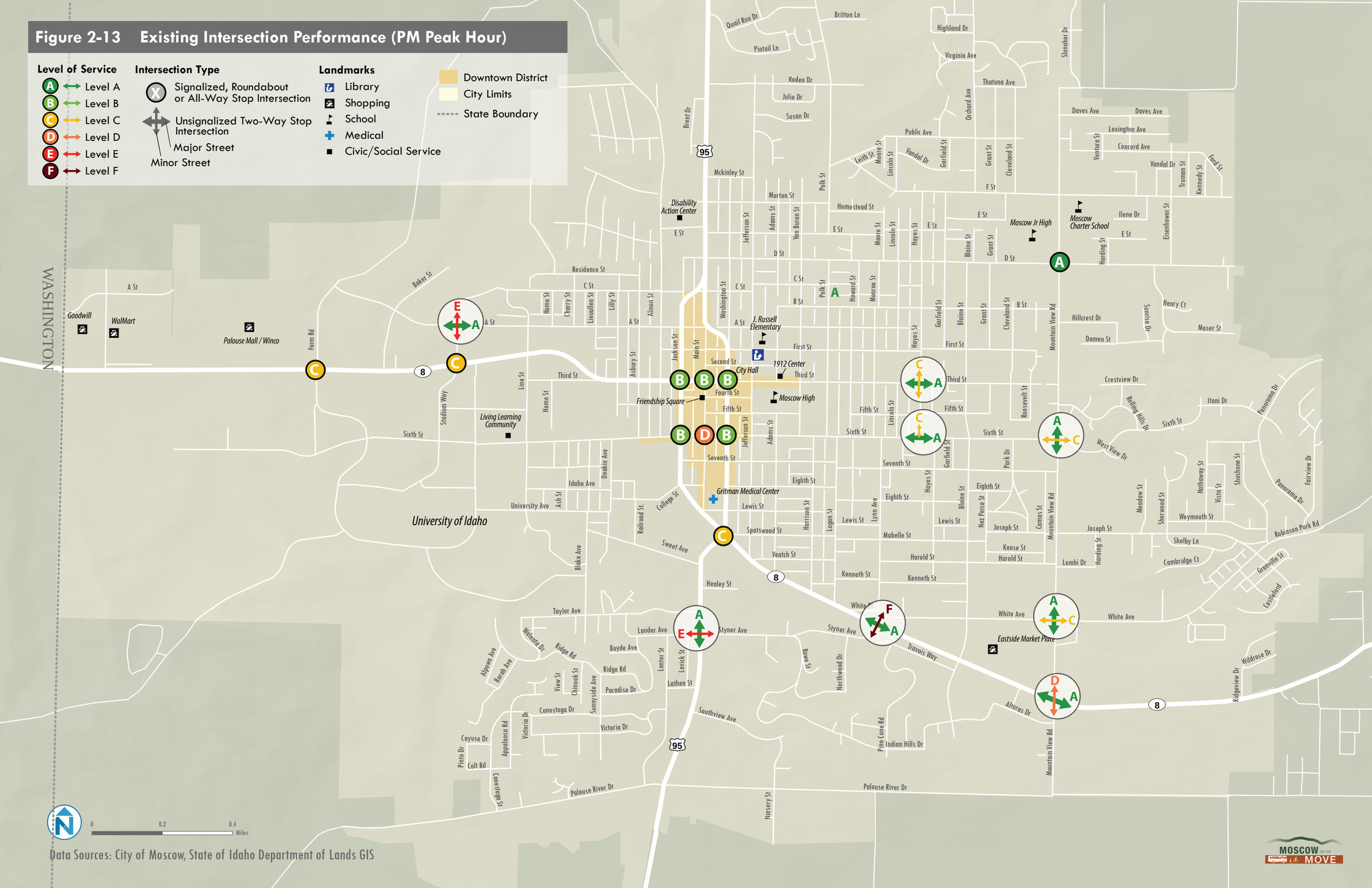
Figure 2-13 Existing Intersection Performance (PM Peak Hour)



0 0.2 0.4 Miles

Data Sources: City of Moscow, State of Idaho Department of Lands GIS

MOSCOW ON THE MOVE

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Freight Mobility

Source: U.S. Department of Transportation, FHWA
(Major Flows by Truck To, From, and Within Idaho: 2007)

Both US-95 and SH-8 have high freight weight/size limits within Idaho (only rated lower than the Federal Interstate system), which contributes to freight use along both corridors. US-95 connects south through Lewiston to I-84 and Boise, and to the north through Coeur d'Alene to I-90 and Canada. SH-8 connects through Pullman (via SR 270) to US-195 to the west and through Troy to Elk River to the east.

The majority of Idaho freight travels through I-84, which connects to Moscow via US-95. Heavy vehicles (including delivery trucks, larger freight, and buses) generally compose between 2-5% of intersection vehicle traffic during the morning peak hour and 2% or less during the evening peak hour, with school buses contributing to the higher heavy vehicle share at several intersections during the morning peak. The intersections with the highest share of heavy vehicle traffic are typically those located along US-95 or SH-8.

Road Safety

According to ITD collision data reporting, shown in Figure 2-15 and displayed in Figure 2-16, 753 collisions were reported in Moscow between 2007 and 2011. Collisions in nearly every category decreased during this time, year to year. However, 2011 saw the first traffic-related fatality in five years. Collisions occurred in a variety of weather conditions, but only 13% occurred in snowy or rainy conditions. In addition, road surface conditions were primarily dry (67% of collisions versus the 18% occurring in icy or snow covered road conditions), and three quarters of all collisions (77%) occurred during the daylight hours. Factors contributing to collisions included high travel speeds, failure to yield, limited sight distances or obstructed visibility, and failure to obey traffic control devices such as red lights and stop signs.

Figure 2-15 Severity of Reported Collisions in Moscow, 2007-2011

Year	Property damage only	Injury C (minor)	Injury B (moderate)	Injury A (severe)	Fatal	Total
2007	108	33	15	7	0	163
2008	112	30	16	2	0	160
2009	118	22	17	8	0	165
2010	94	25	10	3	0	132
2011	78	18	31	5	1	133
Total	**510**	**128**	**89**	**25**	**1**	**753**

Source: Idaho Transportation Department State Crash Database/DKS Associates

Note: The source for collision information is the Idaho Transportation Department State Crash Database. The database consists of collision reports completed by all law enforcement agencies in Idaho. All law enforcement agencies use a standard collision report, as designated in Idaho Code 49-1307. The resulting numbers are conservative since the database consists of only collision investigated by law enforcement officers.

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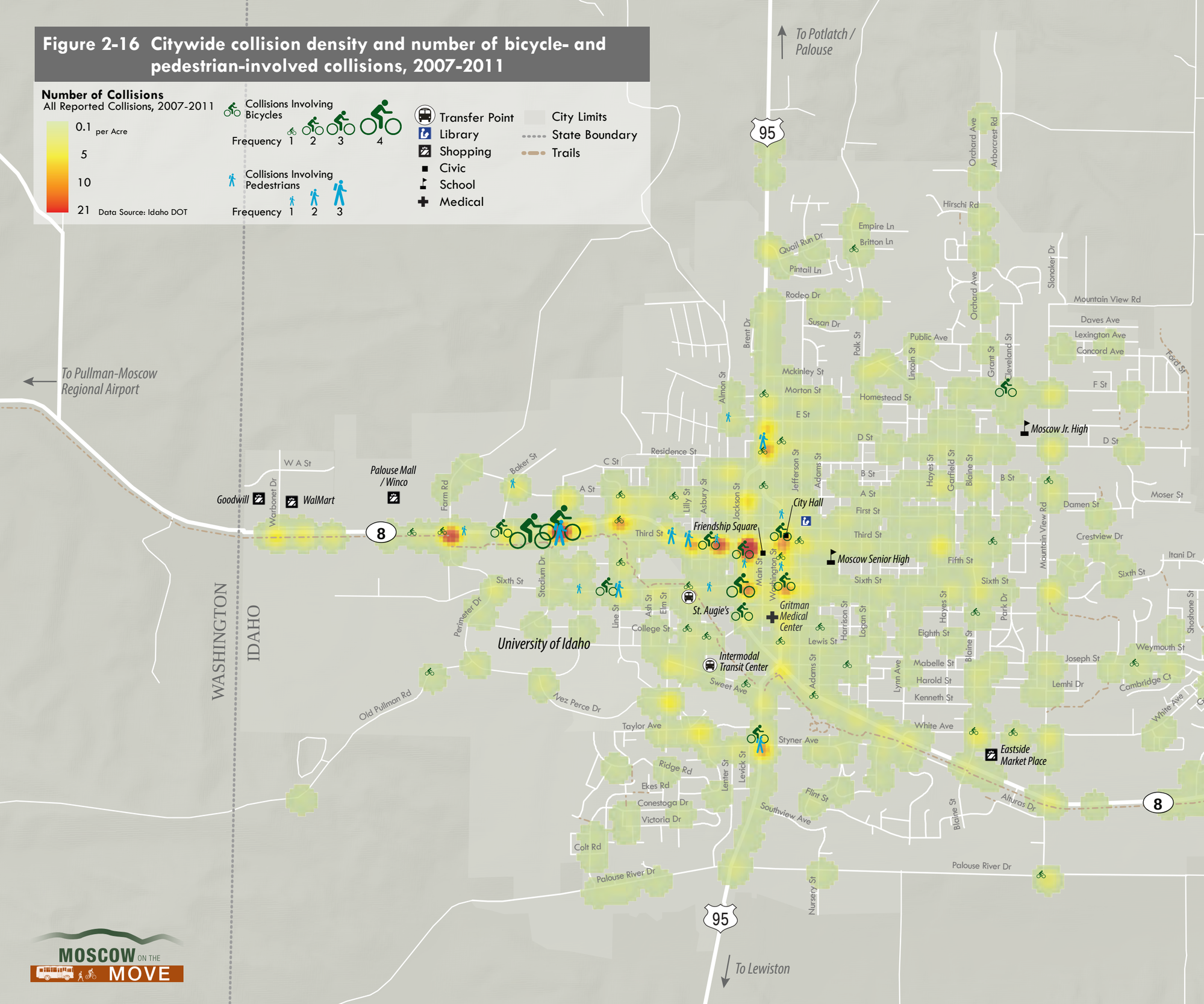
Figure 2-16 Citywide collision density and number of bicycle- and pedestrian-involved collisions, 2007-2011



TOP 15 COLLISION LOCATIONS IN MOSCOW

Rank	Street	Cross Street	Collisions
1	Jackson Street	Third Street	51
2	SH-8	Driveway/Parking Lot	50
3	SH-8	Peterson Drive	44
4	SH-8	Farm Road	26
5	Jackson Street	Sixth Street	24
6	SH-8	Line Street	22
7	Third Street	Asbury	21
8	Main Street	D Street	19
9	Third Street	Lilly Street	17
10	SH-8	Warbonnet Drive	16
12	Main Street	E Street	14
12	Third Street	Washington Street	14
15	Third Street	Almon	13
15	Jackson Street	A Street	13
15	SH-8	Perimeter Drive	13

MOSCOW ON THE MOVE

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PARKING CONDITIONS IN DOWNTOWN MOSCOW TODAY

This section provides an overview of parking facilities and utilization in Moscow today, and a summary of key issues and opportunities. As of 2008, there were 959 public parking spaces downtown, including on-street and off-street parking. One thousand ninety additional spaces in downtown are privately owned. The Downtown Parking District is shown in Figure 2-18 on the following page.

On-Street Parking

There are a total of 736 on-street public parking spaces in downtown Moscow. On-street parking is free and is limited to three hours, Monday through Friday between 8:00 a.m. and 5:00 p.m.

On-street parking in downtown is both angled (head-in) and parallel. Angled parking is found primarily in the vicinity of Friendship Square on portions of First, Second, Fourth, Fifth, and Main Streets. Where angled parking does exist, it is often found on one side of the street with parallel parking is on the other. Although head-in angle parking provides a more prominent pedestrian buffer and is an easier parking maneuver, back-in or head-out angle parking offers additional benefits for downtown patrons and roadway users and should be considered.

Off-Street Parking

There are four public off-street parking facilities in downtown Moscow. These include the North Jackson Lot, the South Jackson Lot, the City Hall Lot, and the Third and Jefferson Street Lot—with a total of 223 parking spaces. Patrons can park in the Jefferson off-street parking lot all day in designated "all day parking" spaces for free. All other designated spaces in off-street parking lots are restricted to three-hour or reserved permit parking. Permit parking spaces are also reserved for those who pay $85 per year, called Green Permits. These spaces are available on a first come first served basis. One hundred thirty Green Permits are currently available for purchase each year. Figure 2-17 provides an overview of off-street parking utilization.

Figure 2-17 Off-Street Parking Utilization (2011)

Parking Lot	# of Spaces	Average Utilization (permits)	Average Utilization (all cars)
North Jackson	29	30%	72%
South Jackson	129	27%	65%
City Hall	30	69%	82%
Jefferson St.	35	33%	52%
Overall Average	68%		

Source: City of Moscow

Downtown Parking Challenges

Downtown currently has enough public parking supply to meet the demands of downtown patrons and employees,[3] although this is not always the perception of shoppers, business owners, and employees. As noted in Figure 2-17 above, current utilization rates for both on- and off-street parking are well below optimal levels.[4] Optimal parking

[3] Per the off-street utilization analysis described below, off-street utilization is at 68%.

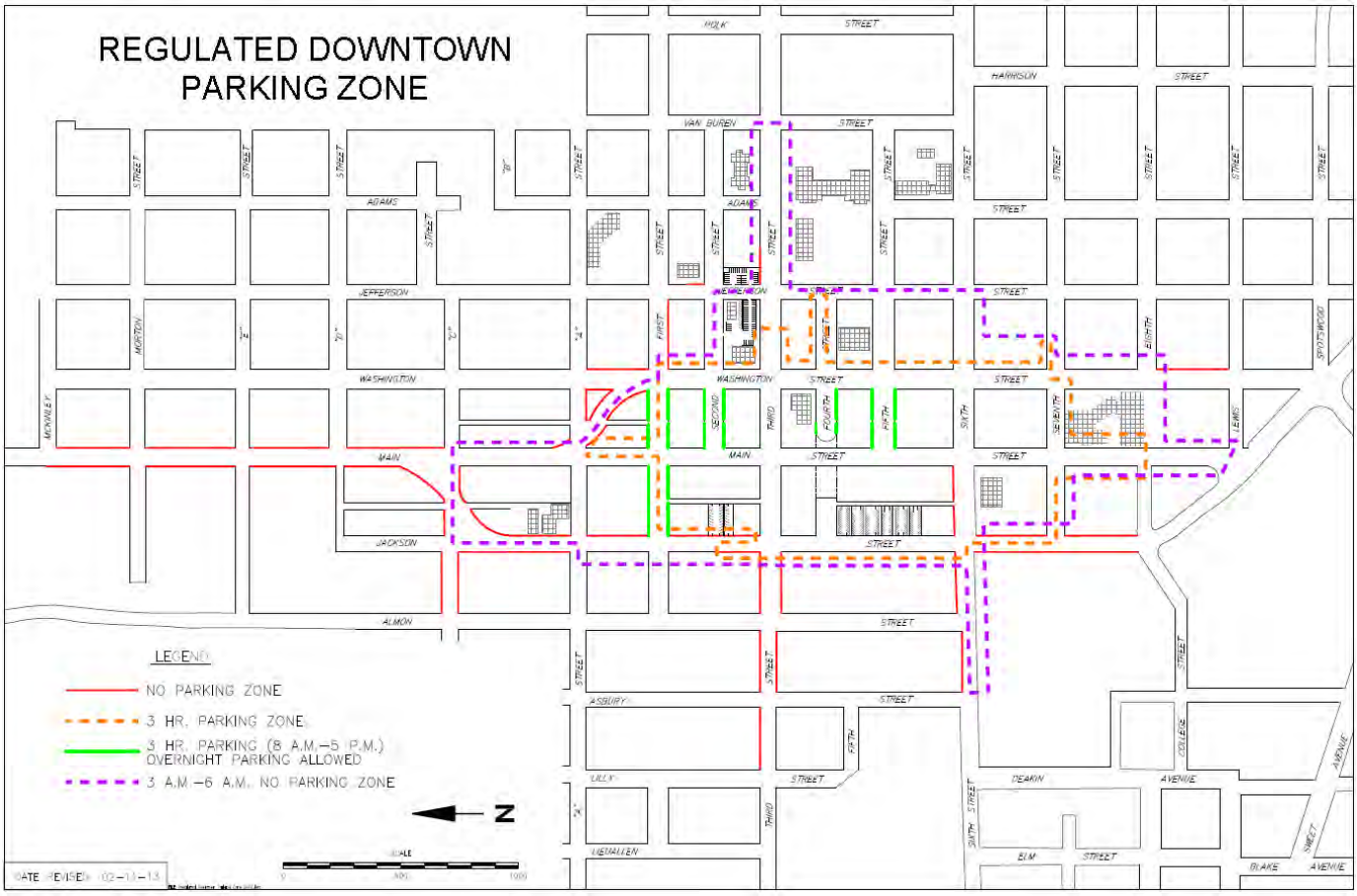
[4] While no parking utilization survey has been conducted, observed occupancy during peak and off-peak parking periods appear well below 85% on most block faces throughout downtown.

levels are typically around 85% for on-street and 90% for off-street. This creates a number of problems, beginning with the inability to generate sufficient parking revenues to help pay for parking maintenance costs.

Parking in Moscow faces the following challenges and opportunities:

- On-street and off-street parking are free in downtown (paid parking is available for a low cost if patrons would like to purchase a parking permit to park in downtown lots longer than three hours).
- Parking is easy to find in most areas – off-street parking operates at an average of 68% utilization,[5] which is low. An optimal parking utilization rate is around 85%. At this level, parking appears to be full, yet there are still 1 or 2 available spaces per block.

Figure 2-18 Moscow Parking Zone Map (2012)



[5] City of Moscow Parking Utilization, 2011

EXISTING TRANSPORTATION DEMAND PROGRAMS

Transportation Demand Management (TDM) is a term for strategies that increase transportation system efficiency by reducing auto travel and congestion. A number of organizations and programs in Moscow seek to educate residents about travel options, including:

- **City of Moscow Vanpool:** The vanpool program is operated by the City of Moscow and currently offers a regular Commuter Route from Lewiston to Moscow and a Conference Commuter Service that provides a transportation alternative for those one-time trips out of the area for conferences and training opportunities.
- **SMART:** SMART provides fixed route and ADA paratransit service.
- **University of Idaho:** The University of Idaho is crucial to TDM, providing programs for students, faculty, staff, and visitors. The University operates the Vandal Access Shuttle service, stores two Zipcars on campus, and recently launched ZimRide – an online social network ridesharing platform. The Division of Student Affairs at the University hosts a transportation website that provides information on SMART, taxi service, and transit options for people with disabilities.
- **Bike for Life:** Bike for Life is a local advocacy organization that provides safety information and organizes bicycling-related events in Moscow.
- **Safe Routes to School:** Safe Routes to School (SR2S) is a state funded program with a mission to encourage teachers, parents, and children to walk, bike, and share rides to school.

Transportation Demand Management Needs

Moscow does not currently have a coordinated TDM strategy that focuses on marketing the use of biking, walking, transit, and ridesharing. Although individual programs do exist, these programs primarily focus on providing transportation services (e.g., vanpool, fixed-route transit service, and the Vandal Access Shuttle) and lack an emphasis on encouraging and educating people about travel options.

Bike Fest 2012, Bike for Life provided snacks and refreshments for bicyclists on their morning commute to school and work..

Image from Bike for Life

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SETTING THE CONTEXT | CHAPTER 3

Land Use Impacts on Mobility and Access

This chapter offers a snapshot of what land use and growth factors in Moscow will play into future travel patterns and behavior. A summary of Moscow's demographic profile, growth trends, future land uses, and geographic areas targeted for growth is also reported. The chapter culminates with the city's projected traffic conditions in 2035—a result of Moscow's demographic, land use, and growth factors.

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3 LAND USE IMPACTS ON MOBILITY AND ACCESS

Moscow on the Move balances the transportation system's shifting demands with the growth of City population, the local and regional economy, and the University of Idaho population. As the City and University continue to grow, pressures to maintain quality access to all of Moscow's offerings will increase. *Moscow on the Move* recognizes that land use is a critical element of any long-range transportation plan. This chapter sets the land use context for recommendations established in Chapters 4-7, describes current and projected population and job growth, and identifies where that growth will be located per the Moscow Comprehensive Plan (2009). The chapter ends with a discussion of planned transportation improvements.

DEMOGRAPHIC PROFILE AND GROWTH

Current & Projected Population Growth

Of Moscow's 23,800 residents in 2010, 48% were enrolled in the University of Idaho (graduate and undergraduate). Relatively dense pockets of population and employment are concentrated in downtown, within and just south of the University and in the neighborhoods immediately east of downtown. Figure 3-3 on page 3-3 shows the population and employment density in 2010.

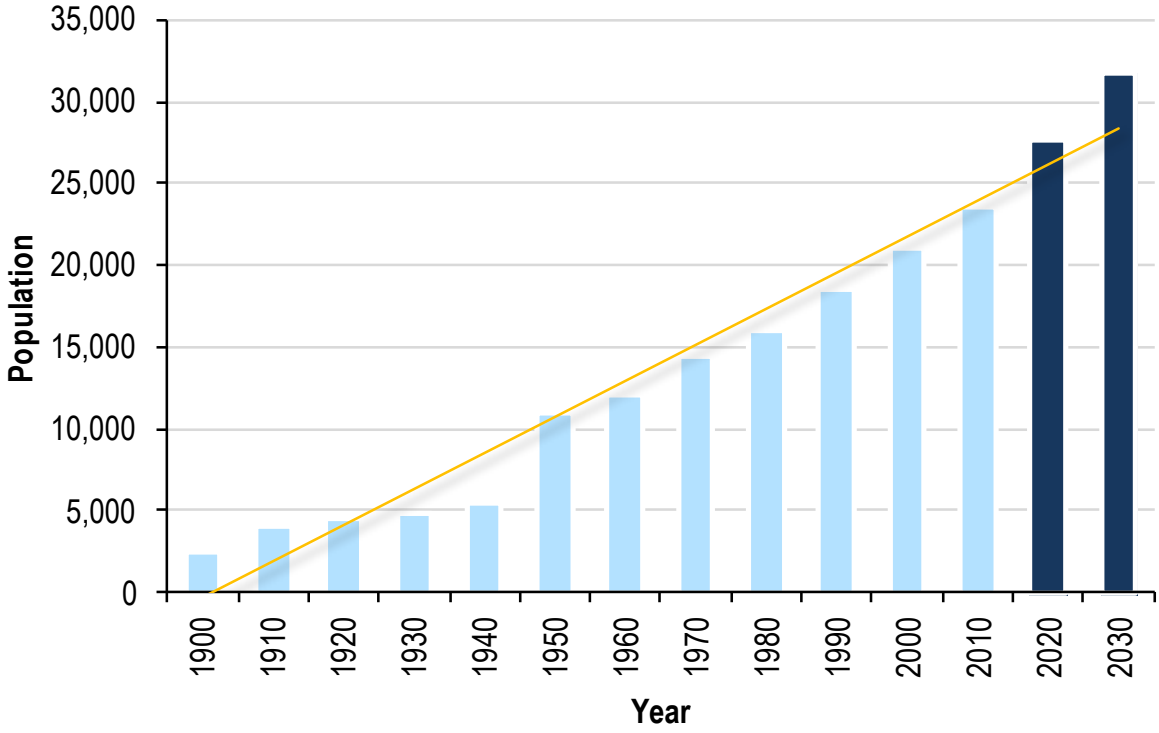
Based on past ratios and the University's targets for future enrollment, roughly half of the projected population growth is likely to be students at the University of Idaho. Figure 3-1 on the following page provides a snapshot of historic population growth since 1900 (pop. 2,500) and projected population growth in 2030 (pop. 31,761). Expansion of Moscow's boundary is limited by the city's ability to serve outlying areas with costly infrastructure like streets, sewer, and water. All across the United States, cities are struggling to maintain and expand infrastructure and services to sprawling communities that were developed in better economic times and were often initially financed through developer fees. In many recent cases, this burden has contributed to insolvency and cities declaring bankruptcy. Much of the 32% projected increase in population in Moscow between now and 2030 will need to occur within the existing community to avoid building and operating costly new infrastructure outside of Moscow's area of impact. This is consistent with the Comprehensive Plan's general land use and community character goal: "Direct land uses to meet current and future community desires and needs while conserving natural resources and protecting agricultural lands from scattered development through efficient and orderly development."

Current & Projected Employment Trends

Moscow is a key player in the regional economy, providing jobs, retail, and services to Latah and Nez Perce County communities, and Pullman and Whitman County communities in Washington. Analysis of Census data has revealed that Moscow is increasingly an attractive place for residents and for workers employed throughout the region. To remain an inviting place to live, job growth needs to match the pace of population growth. As such, concerted effort is noted in the Comprehensive Plan to create a better jobs/housing balance, not only making more jobs available, but also distributing employment near existing activity centers and housing to allow workers the opportunity to commute by transit, walking, and bicycling.

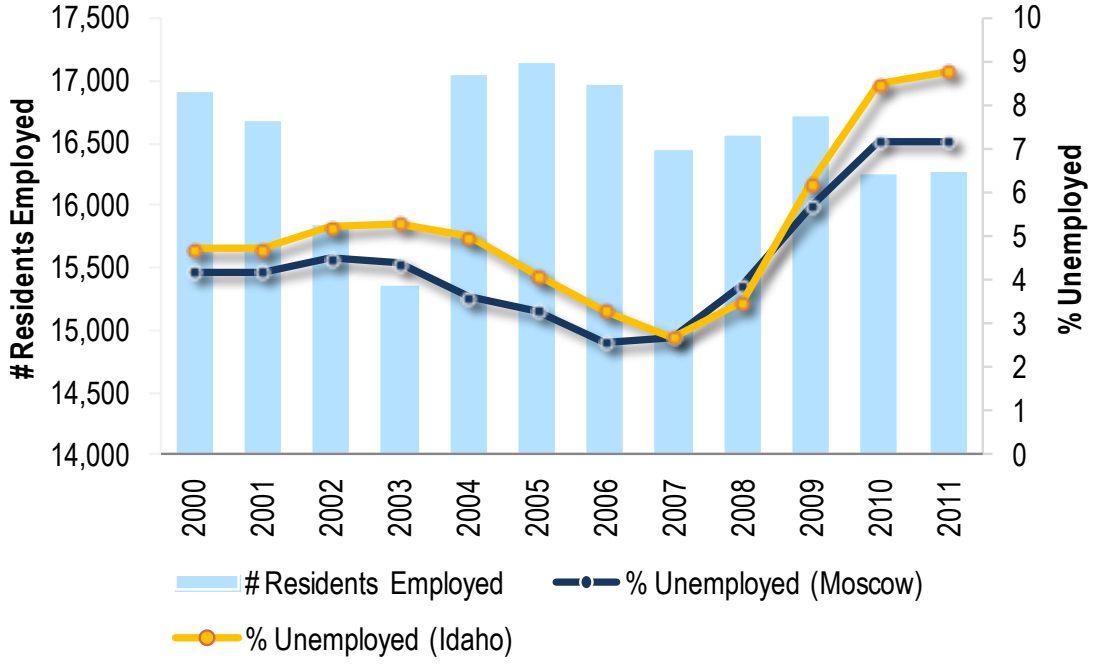
As shown in Figure 3-2, the number of employed residents in Moscow has fluctuated considerably in the last ten years. In 2011, the Moscow unemployment rate was almost a full percentage point below the state of Idaho.

Figure 3-1 Historic & Projected Population in Moscow, 1900-2030



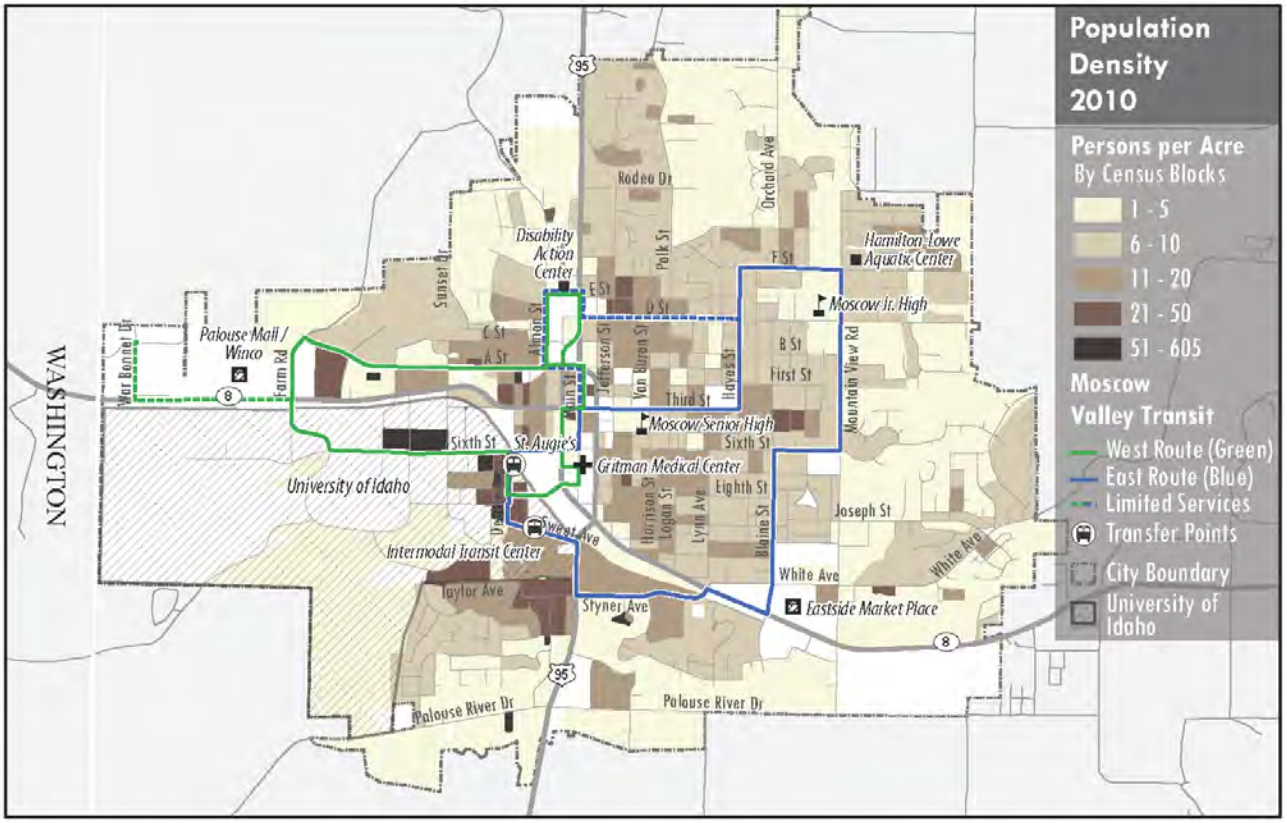
Source: City of Moscow Comprehensive Plan (2009)

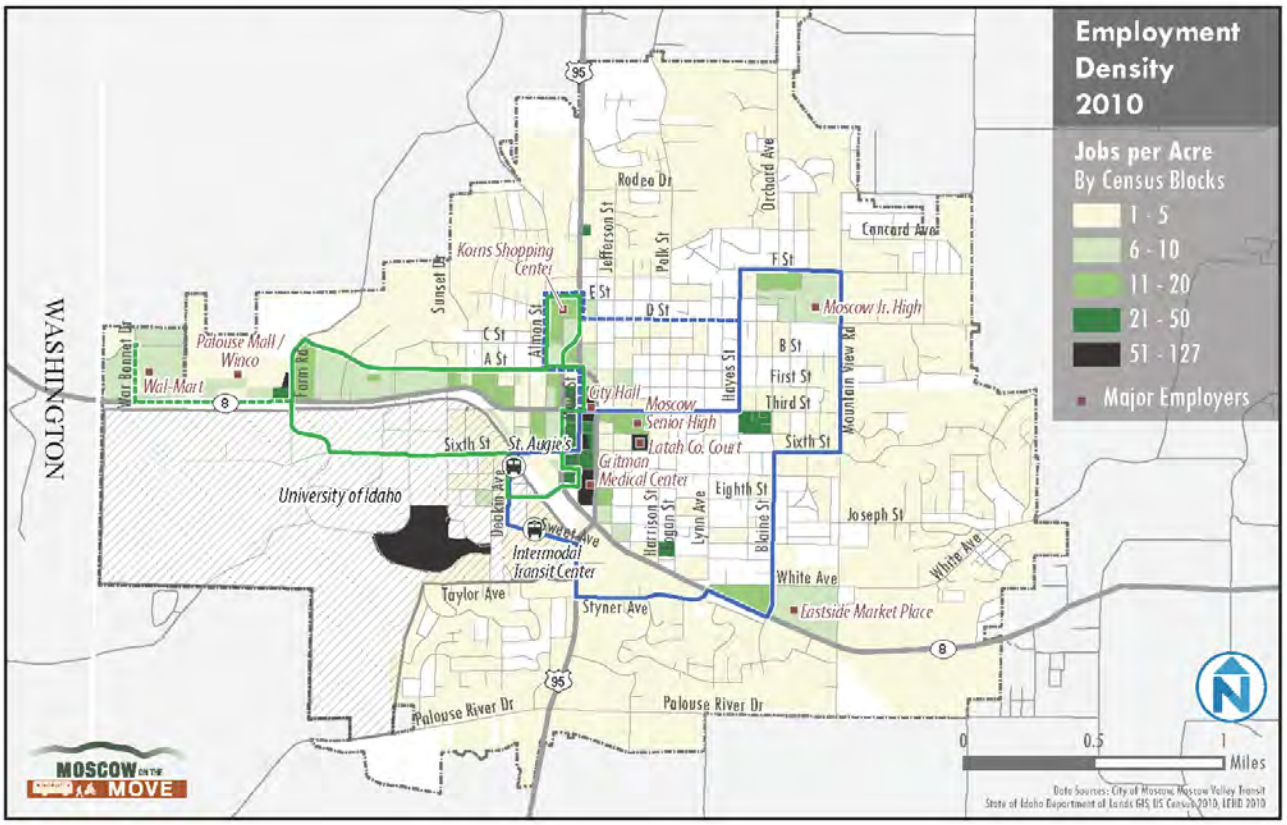
Figure 3-2 Moscow Employment Trends, 2000 - 2011



Source: Bureau of Labor Statistics Local Area Unemployment Statistics

Figure 3-3 Population and Employment Density, 2010





FUTURE LAND USES AND GROWTH AREAS

Since incorporation in 1891, Moscow's city boundaries have grown commensurate with the pace of population and University growth. This section highlights future land uses and growth areas.

Future Land Uses

In 2009, the City of Moscow adopted its current Comprehensive Plan—a 20-year plan that envisions sustainable population and economic growth while maintaining and enhancing Moscow's unique small-city character. Maintaining the character of the city and its neighborhoods and providing for the needs of all its residents were of paramount importance.

Moscow's population is forecast to grow from 23,519 in 2010 to 31,761 in 2030—a 35% increase. Residential use is currently the dominant land use in the community. The Comprehensive Plan envisions a Moscow that:

- Protects existing neighborhood identity and character
- Provides a mix of housing that meets the needs of the diverse population
- Preserves and enhances special areas of the community
- Guides the expansion of downtown development while considering the needs for parking and the desire to maintain the existing historic character
- Provides a continuum of land uses that allow a variety of uses and housing types to meet the needs of the community

Figure 3-4 on the following page maps future land use and growth plans for the City of Moscow. The Comprehensive Plan has designated a substantial portion of the city as "neighborhood conservation" land. Urban mixed-use development is slated for parcels immediately northeast and east of the University spanning along the west side of US-95 from A Street and Sweet Avenue. Neighborhoods north of the University are planned for Auto-Urban Commercial uses. Figure 3-5 on page 3-7 illustrates the expansion of Moscow's city boundaries and summarizes key future growth areas.

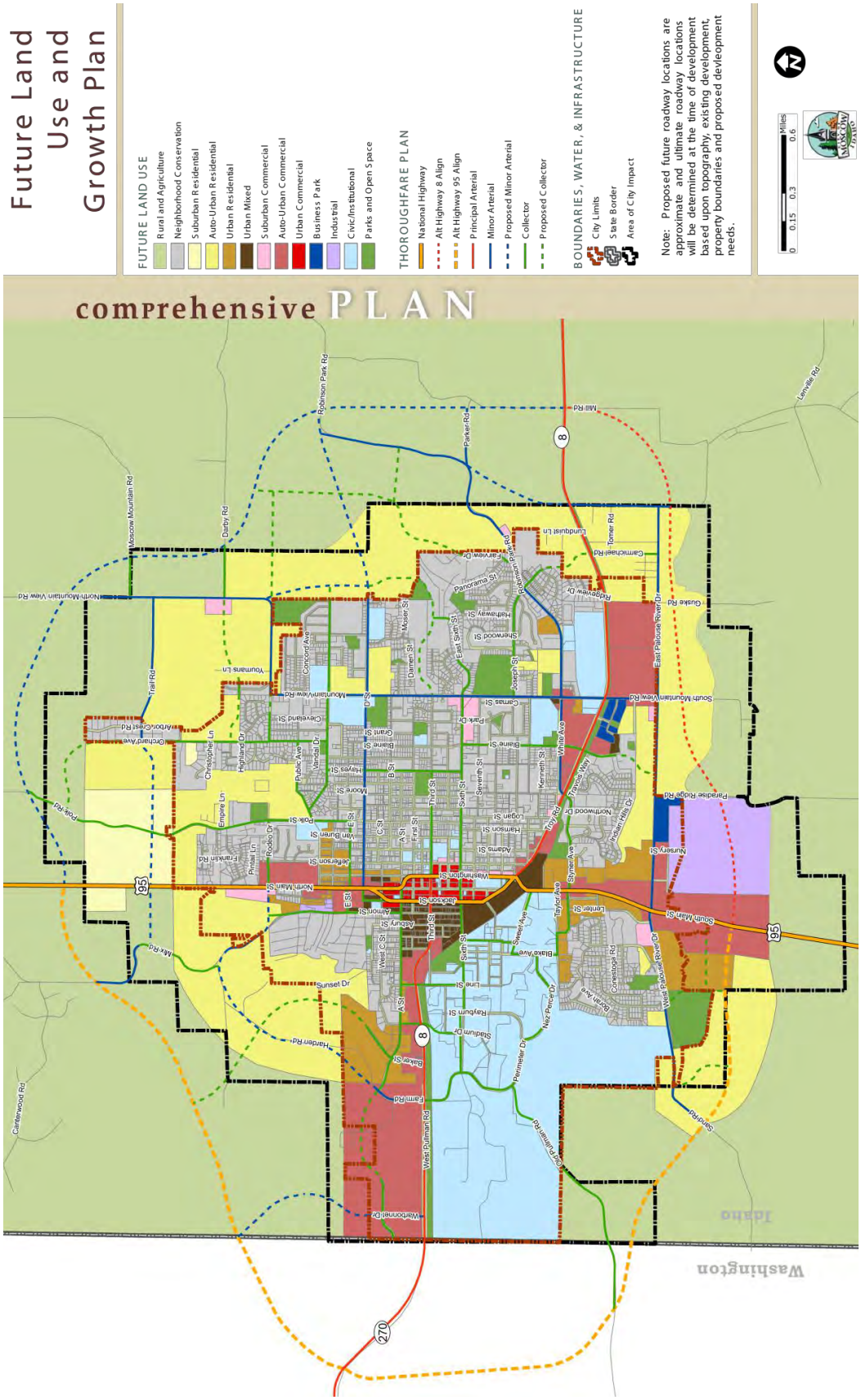
University of Idaho

Long-Range Campus Development Plan

The footprint of University of Idaho's 1,585 acre campus encompasses a major portion of southwest Moscow. The goal of the University of Idaho Long-Range Campus Development Plan (LRCDP) is to optimize land use, preserve historic qualities and features, and improve the experience for students. Increased density within the existing land area of campus will allow the campus enrollment to reach 15,000-17,000 before new clusters of buildings are needed in areas beyond the central area.

The University envisions a "compact academic core" that will accommodate much of the growth. Infill sites within the existing campus have been identified. The University has also reserved the "West Farm" area to accommodate growth after infill development has been maximized. As the University grows, surface parking will be replaced with residential and academic buildings. Providing a range of travel options for faculty, students, and staff will help the University meet its growth projections while providing a safe and attractive transportation system that meets the needs of everyone.

Figure 3-4 Future Land Uses, Moscow Comprehensive Plan



Future Growth Areas

The following is an overview of areas within Moscow's existing city limits that are slated to absorb future population and job growth. Figure 3-5 displays the spatial distribution of these growth areas.

Downtown

Downtown Moscow is the cultural and economic heart of Moscow. Friendship Square is located in the middle of the city, providing benches, a fountain, a playground, and central bus connections. The 2002 Downtown Revitalization Plan, an earlier planning study that was not adopted by the City, envisions downtown Moscow as a "vibrant, mixed-use district with attractive streetscape, public spaces, and buildings serving the regional population's needs and desires for shopping, eating, entertainment, government services, education, culture, recreation, medical, and other professional services." The 2009 Comprehensive Plan sets a vision for an urban mixed-use and commercial center from the University east to Jefferson Street and from B Street south to where S Main Street meets S Washington Street (the south couplet).

Urban Renewal Areas

The Moscow Urban Renew Agency was formed in 1995 to encourage redevelopment of designated areas. Since its inception, two urban renewal areas have been established.

Alturas Technology Park

The Alturas Technology Park Urban Renewal District was established in 1996 to encourage business development south of SH-8/Troy Road and west of Mountain View Road. Today, Alturas is home to a growing cluster of high-tech companies that benefit from their proximity to the University of Idaho and Washington State University. The urban renewal area has increased the value of property considerably. In 1996, when the area was formed, the assessed value of property within the revenue allocation area was approximately $6.4 million. Improvements and developments made as a result of the Alturas Research and Technology Park Urban Renewal Plan have helped increase property values to more than $22 million. This District is due to expire in 2015.

Legacy Crossing

The formation of the Legacy Crossing Urban Renewal District came about from the community's desire to eliminate conditions impeding the City's economic growth between Moscow's historic downtown and the University of Idaho campus. The Legacy Crossing project is important because it reinforces the connection between downtown and the University. A well-designed redevelopment project at Legacy Crossing provides an opportunity to develop dense, urban residential development and prime retail space for students and faculty at the University and visitors to downtown.

Southeast Industrial Corridor

As described in the Comprehensive Plan, the area between the Indian Hills subdivision and the Palouse River between South Main Street and Carmichael Road would provide opportunities for residential, commercial, and industrial development. Adjacent to the industrial corridor, the Southeast Moscow Industrial Park Project Plan, completed in 2010, provides a vision for 68-acres of industrial land. The proposed plan includes 22 business park parcels ranging from 0.60 to 1.5 acres each and 18 Industrial Park parcels ranging in size from 1.1 to 4.1 acres.

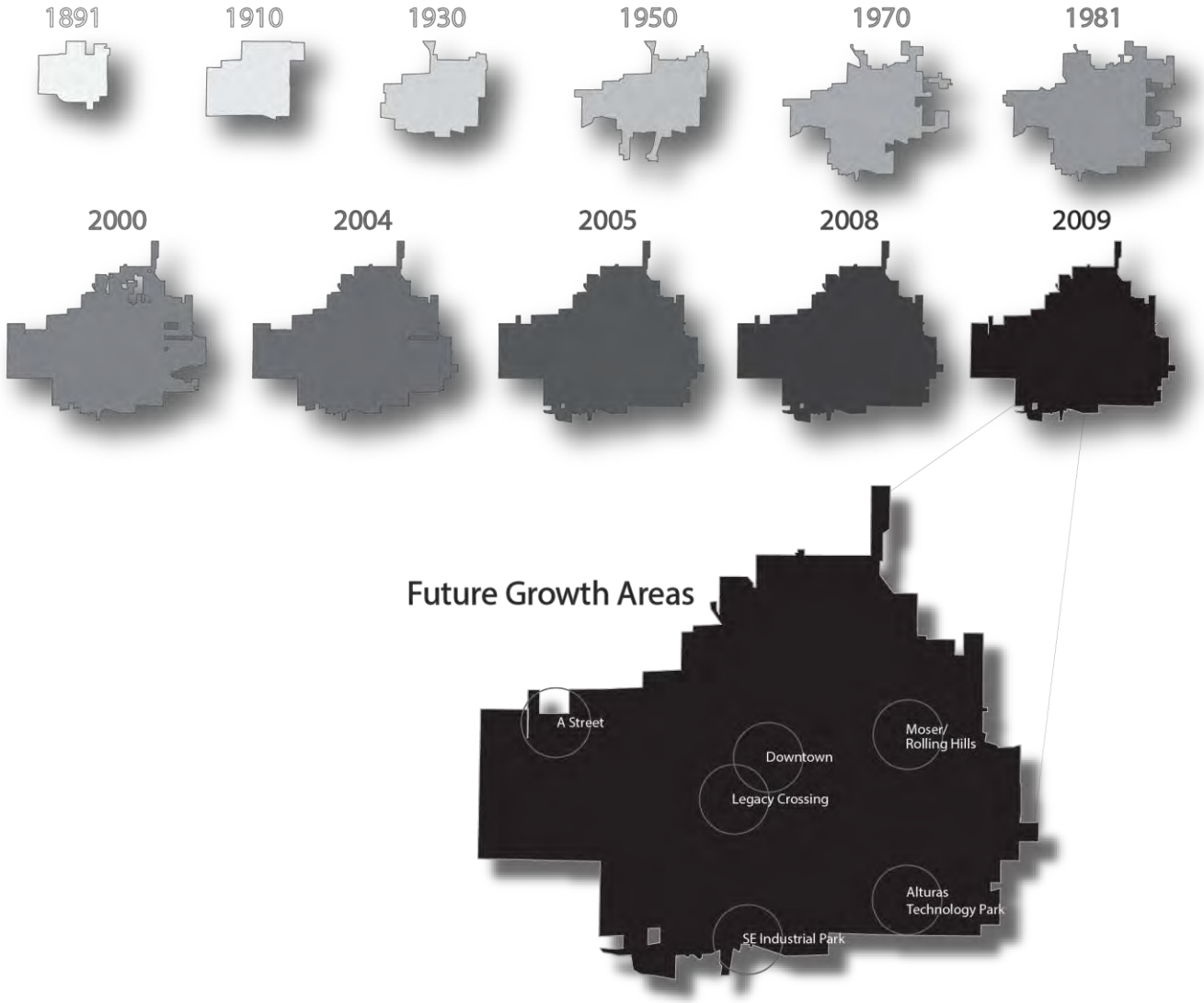
Other Targeted Areas

In recent years, the City has targeted two other areas for growth:

- "A" Street between Warbonnet Drive and Farm Road; and
- Mountain View Road between the Moser and Rolling Hills neighborhoods.

Without a change in transit routing to serve new development near the A Street extension, portions of this growth area would require about a one-quarter mile walk to existing transit service on Pullman Road or Warbonnet Drive; development of the area between Moser and Rolling Hills would have easy access to existing transit service along North Mountain View Road.

Figure 3-5 Historical growth patterns and future growth areas



PLANNED TRANSPORTATION IMPROVEMENTS

Since 2006, the City has made major improvements to Moscow's transportation system, including road improvements, installation of sidewalks and bicycle lanes, and bus infrastructure improvements. As the federal transportation funding picture shifts, Moscow will need to develop new funding mechanisms and tap into a variety of different funding sources to implement planned improvements. Planned projects in Moscow that have received funding include:

Pedestrian improvements planned for 2013-2020

- Sidewalks and asphalt path improvements on D Street to improve walking routes to school
- Installation of new ADA compliant pedestrian ramps along SH-8 and US-95
- Sidewalk improvements at US-95 and Sweet Avenue North Main Street, and on Hatley Way
- Installation of sidewalks on west side of North Polk Street and south side of Public Avenue
- Improvements to the downtown streetscape including installation of vintage lighting, street trees, artwork, benches, and bicycle racks
- Additional pedestrian or ADA "hotspot" projects

Roadway improvements planned for 2013-2020

New roadway projects, or projects that increase capacity, encourage outward growth. Planned transportation improvements in Moscow aim to expand roadway capacity and improve signalized intersections on key roadways, including A Street and Mountain View Road, in future growth areas. Most roadway improvements include pedestrian improvements and bicycle facilities. Pedestrian-specific improvements are focused on downtown, the University campus, and along SH-8 and US-95 (part of an ITD ADA ramp program). Projects include:

- Reconstruction—including widening, curb, gutter, and sidewalk construction, and striping bike lanes—of several streets including A Street from Peterson Drive to Home Street, Mountain View Road from Fairgrounds to Sixth Street, including a potential roundabout at Sixth/Mountain View, and Mountain View Road from White Avenue to SH-8

The recent bus stop and sidewalk enhancement project was funded through the American Recovery and Reinvestment Act.

Image from Nelson\Nygaard

AUTO TRAFFIC, 20 YEARS FROM NOW

Moscow on the Move addresses existing system needs and additional facilities that are required to serve future growth in the forecast year 2035. A transportation forecast model was created to determine future traffic volumes in Moscow. This forecast model translates assumed land uses (such as residential and commercial) into trips per person, allocates travel modes (such as walking, biking, and driving), and assigns motor vehicles to the roadway network. These traffic volume projections form the basis for identifying potential roadway deficiencies and for evaluating improvements.

Travel demand modeling uses computer software to replicate the "real world" transportation system around us (roads, intersections, traffic control devices, congestion delays, use of a transit system, pedestrian-bicycle use, etc.). Model inputs include land use, socioeconomic data, local travel behavior data, and roadway information to estimate travel patterns and roadway traffic volumes.

Land use is a key factor in developing a functional transportation system. The amount of land that is planned to be developed, the type of land uses, and how the land uses are mixed together have a direct relationship to expected demands on the transportation system. Understanding the amount of development and type of land use is critical to taking actions to maintain or enhance transportation system operation. Projected land uses were developed for the study area with support from City staff, creating projections for the year 2035.

At the existing level of land development, the transportation system generally operates without significant motor vehicle deficiencies in the study area. As land uses are changed in proportion to each other (e.g., there is a significant increase in employment relative to household growth), there will be a shift in the overall operation of the transportation system. Retail land uses generate higher numbers of trips per acre of land than residences or other land uses. The location and design of retail land uses in a community can greatly affect transportation system operation. Additionally, if a community is homogeneous in land use character (e.g., all employment or all residential), the transportation system must support significant trips coming to or from the community rather than within the community. Typically, there should be a mix of residential, commercial, and employment type land uses so that some residents may work and shop locally, reducing the need for residents to travel long distances.

The key inputs and assumptions for the Moscow base and future year travel demand models are summarized in Figure 3-6, including the source of the data used to develop the models. Future traffic growth is an outcome of planned development within both the city and the region. The City plans for a 61% increase in employment and 37% increase in population by 2035. The University of Idaho plans for a modest 27% enrollment growth throughout its entire campus system by 2035. When these growth factors are combined with development throughout the region, regional and local trip generation is influenced.

Figure 3-6 Comparison of Primary Base and Future Year Assumptions

Element	2012	2035	Change	Source/Notes
General Demographics				
Approximate population	25,500	35,000	**+37%**	Sewer Master Plan
Citywide jobs (regardless of employee home location)	9,716	13,600	**+40%**	City Staff
UI system enrollment	11,178	14,180	**+27%**	Historical Growth Trends
Non-auto mode split	26%	27%	**+1%**	Based on Team Discussion
Regional Trips (Round Trips)				
Trips originating from outside Moscow	12,675	17,300	**+40%**	Relative to Moscow Employment Growth
Trips originating from Moscow	11,250	13,726	**+22%**	Regional Growth
Trips through Moscow	3,345	4,084	**+22%**	Regional Growth

The future travel demand model also incorporated an estimate of potential freight vehicle increases in Moscow generated by the proposed expansion of the Port of Lewiston facilities, approximately 30 miles to the south. The freight vehicle increase was based on the project description and assumptions for regional freight vehicle travel patterns.

The travel demand model provides a foundation for analyzing and comparing the performance of potential plans, aiding decision making and strategic development. However, it is important to note that future-year traffic projections are based on numerous assumptions about how population, employment, automobile operating costs, roadway system, and other factors will change over time. Although the model is a tool used to guide the analysis process, it requires careful interpretation.

Future 2035 Forecasts

Travel demand models were developed for *Moscow on the Move* for 2012 base and 2035 future conditions based on relevant local data (land use, demographics, transportation system, etc.). The model was used to determine the future traffic volumes on streets, assess system deficiencies, and test network alternatives to address the identified needs. Figure 3-6 on the previous page provides an overview of the assumptions included in the development of future 2035 Moscow travel demand model. These model inputs were developed in coordination with City staff.

Once the traffic forecasting process was complete using the travel demand model, 2035 volumes were developed to determine the areas of the street network that are expected to be congested and that may need future investments to accommodate growth and to assess the benefit of future roadway connections. Figure 3-7Figure 3-7 also shows a comparison of existing and future daily traffic volumes at primary gateways into the City. Although the highest daily volumes would remain on SH-8 to the west, the highest growth percentage is expected to occur on US-95 south of the City.

The future evening peak hour traffic volumes at study intersections are shown in Figure 3-8. The SH-8 intersections at Farm Road, Line Street, Jackson Street, and US-95 continue to serve the highest volume of vehicles during the evening peak hour. The intersections with the highest forecasted growth in volume from 2012 to 2035 are SH-8 at Mountain View, US-95, and Styner Avenue.

Figure 3-7 Forecast Average Daily Traffic at Primary Gateways to Moscow (2035)

City Gateway	2012	2035	Percent change	Source/Notes
SH-8 – West Gateway	14,700	17,300	17.7%	Historical Trend* is 12%
SH-8 – East Gateway	7,900	9,400	19.0%	Historical Trend* is 9%
US-95 – North Gateway	5,900	6,800	15.3%	Historical Trend* is 21%
US-95 – South Gateway	6,100	7,500	23.1%	Historical Trend* is 12%

Source: ITD/ DKS Associates

*Trend based on automatic traffic recorder (ATR) data and prorated to 23 year planning horizon.

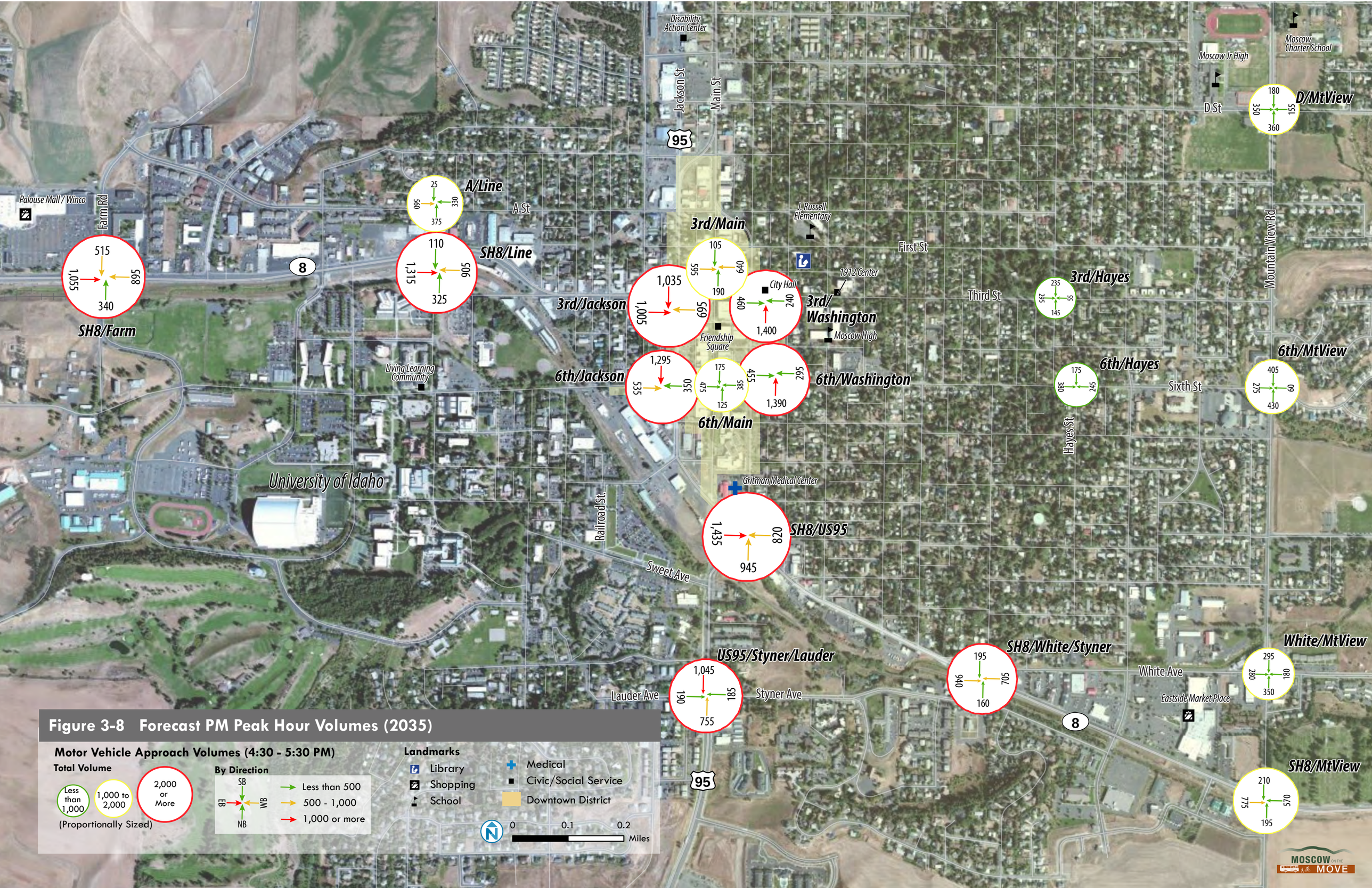


Figure 3-8 Forecast PM Peak Hour Volumes (2035)

Motor Vehicle Approach Volumes (4:30 - 5:30 PM)

Total Volume

Less than 1,000 | 1,000 to 2,000 | 2,000 or More

(Proportionally Sized)

By Direction

SB, EB, WB, NB

Less than 500

500 - 1,000

1,000 or more

Landmarks

Library

Shopping

School

Medical

Civic/Social Service

Downtown District

0 0.1 0.2 Miles

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MOSCOW MOVE

ESTABLISHING MULTI-MODAL STRATEGIES | CHAPTER 4

Roadway & Traffic Operations Strategy

To serve planned growth, the future transportation system needs multi-modal improvements and strategies to manage the forecasted travel demand. This chapter presents a detailed strategy to improve Moscow's roadway network and traffic operations over the next 20 years, including network connectivity options, regional circulation enhancements, intersection modifications, and multi-modal street design guidelines.

NELSON NYGAARD

CITY OF MOSCOW IDAHO

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4 ROADWAY & TRAFFIC OPERATIONS STRATEGY

Supporting the guiding principles of *Moscow on the Move*, the Roadway & Traffic Operations Strategy strives to provide a truly multi-modal transportation system and improve safety, access, and mobility for all street users by identifying strategies, policies, and projects that help achieve Moscow's vision for mobility and access. This strategy of *Moscow on the Move* identifies opportunities to retrofit existing streets in Moscow and develops the street grid to improve citywide connectivity for motor vehicles, pedestrians, bicyclists, and transit users. This strategy specifically provides an overview of the existing traffic conditions and how conditions might change by 2035, a street network plan, various design tools that could be applied throughout the city, and descriptions of recommended street projects.

This Transportation Commission "check mark" icon signifies which actions have unanimous support from the Commission. The icon is a way to illustrate the level of support for implementation.

FUTURE DEFICIENCIES AND NEEDS

Existing and future roadway and traffic operation conditions were assessed to determine the needs and deficiencies of the system. The key areas projected to require improvement or to present future challenges are summarized below.

Roadway Connectivity

Within the city limits, Moscow has a fairly well-connected street network overall; however, the area adjacent to the City limits, just inside and outside, will require new minor arterial and collector connections. As development occurs, future connections will need to be made to the existing street network. Considering Moscow as four quadrants, divided by US-95 in the north-south direction and SH-8 in the east-west direction, there are some connectivity issues, particularly in the northwest and southwest quadrants.

- In the northwest quadrant, there are no arterial streets connecting US-95 and SH-8. A Street is a minor arterial that is used as an alternative to SH-8, but it is primarily residential in nature. The only other street providing connectivity between these routes is C Street, a local street that is not an appropriate route for providing connectivity between a national highway and a principal arterial.
- In the southwest quadrant, connectivity is limited by the University of Idaho campus. There are no arterial routes connecting SH-8 and US-95, and the collectors that connect these key routes go through the University campus.
- There is limited development in the southeast quadrant with large parcels used for agriculture.
- With the exception of Third Street, connectivity in the northeast quadrant is relatively good, with several arterials and collectors providing east-west connectivity and Mountain View Road providing north-south connectivity. Connections north of SH-8 are partially blocked by the cemetery. A parallel route to Mountain View Road further to the east would be beneficial.

Neighborhood Traffic

With the lack of arterial and collector street connectivity described above, motor vehicles are likely to use travel routes that are not desirable for through traffic, such as local streets in residential areas.

Intersection Operations

With planned growth both in the City of Moscow and the region through 2035, there is need for capacity improvements at select study intersections. The forecasted 2035 growth was first evaluated for a baseline network condition that assumes the existing transportation system plus reasonably fundable improvements would be in place. This provides a future baseline condition to compare to other scenarios and measures the benefits of roadway improvements. Reasonably fundable improvements may not have a dedicated funding source today but are considered likely to be constructed by the 2035 horizon year. Roadway projects identified as reasonably fundable by 2035 within the City include:

- A Street/Line Street – relocate stop signs with A Street uncontrolled and Line Street stop sign controlled, add separate northbound right turn lane with eastbound receiving lane on A Street, and close north leg of intersection
- Sixth Street/Mountain View Road – considering roundabout installation
- Mountain View improvements including the Mountain View/SH8 signal
- A Street extension

Several locations in the transportation system do not have adequate roadway capacity to serve the expected 2035 travel needs. The Idaho Transportation Department (ITD) requires Level of Service (LOS) C at intersections within urban areas. LOS C is a relatively high standard to apply in an urban environment and may trigger the need for transportation investments (such as wider roadways) that do not support local goals. LOS D was used to evaluate City study intersections, which would allow slightly higher vehicle delay and potentially support complete street projects.

Intersections studied for Moscow on the Move

The following 18 intersections were evaluated while developing this Plan:

- SH-8/Farm Road
- A Street/Line Street
- SH-8/Line Street
- Third Street/Jackson Street
- Sixth Street/Jackson Street
- Third Street/Main Street
- Sixth Street/Main Street
- Third Street/Washington Street
- Sixth Street/Washington Street
- SH-8/US-95
- US-95/Styner Avenue/Lauder Avenue
- SH-8/White Avenue/Styner Avenue
- Third Street/Hayes Street
- Sixth Street/Hayes Street
- SH-8/Mountain View Road
- SH-8/Mountain View Road
- Sixth Street/Mountain View Road
- D Street/Mountain View Road

In general, study intersections would experience an increase in traffic volume, which would result in higher vehicle delays. Under the 2035 baseline scenario, several study intersections are expected to operate below standard (LOS D at signalized intersections and LOS E at unsignalized intersections) during the evening peak hour:

- SH-8/US-95 (South Couplet) would operate at LOS D
- US-95/Styner Avenue/Lauder Avenue would operate at LOS F on the side street
- SH-8/Styner Avenue/White Avenue would operate at LOS F on the side street
- Sixth Street/Mountain View Road would operate at LOS E on the side street
- White Avenue/Mountain View Road would operate at LOS E on the side street
- Line Street/A Street would operate at LOS F on the side street

The remaining study intersections would operate at LOS C or better during the evening peak hour.

Safety

A review of historic ITD collision data reporting and a survey of the city's roadway system were conducted to help identify motor vehicle safety needs. The locations with the highest number of vehicle collisions recorded were on SH-8 intersections at Farm Road (37 collisions reported in five years), at Peterson Drive (35 collisions reported in five years), and in the section from Lilly Street to Jackson Street. An overall contributing factor is that SH-8 west of downtown carries the highest volume of traffic in the City. A field survey of the Farm Road and Peterson Drive intersections on SH-8 was conducted and found no apparent contributing factors to indicate inherent safety issues. Both intersections provide adequate sight distance, appropriate intersection geometry, and roadway signals, signing, and striping are in good condition for all users.

A field survey of SH-8 between Lilly Street and Jackson Street found several factors that could be contributing to safety issues (more than 50 collisions reported in five years). There are many active alleys and driveways along the corridor located close to intersections and other driveways. A moderate number of vehicles were observed entering and exiting the driveways, which resulted in potential vehicle conflicts and reduced the capacity of SH-8. Pedestrians were observed crossing SH-8 both at the designated crossings and mid-block where there are no pedestrian crossing treatments.

A field survey of the roadway striping on Sixth Street at Jackson Street currently has the eastbound through lane aligned with the westbound left turn lane, which is likely contributing to a safety issue (24 collisions reported in five years). This intersection configuration requires eastbound through traffic to maneuver from the center lane to the outside lane over a short distance within an intersection. The safety concern is non-attentive drivers traveling eastbound through the intersection may not transition to the appropriate lane and a head-on collision could occur.

Existing roadway striping on Sixth Street at Jackson Street Has the eastbound through lane aligned with the westbound left turn lane, which could lead to a head-on collision.

RECOMMENDED STRATEGIES

To serve planned growth, the future transportation system needs multi-modal improvements and strategies to manage the forecasted travel demand. The extent and nature of the needed multi-modal improvements for Moscow are significant. The impact of future growth will be significant without investment in transportation improvements. Strategies for meeting automobile facility needs include the following:

- **Network Connectivity Improvements**
- **Regional Circulation Enhancements**
- **Intersection Modifications**
- **Multi-modal Street Design Standards**

The following sections outline the type of improvements necessary for a long-range transportation plan. Phasing of implementation will be necessary since all of the improvements cannot be done at once. This will require prioritization of projects and periodic updating of the plan to reflect current needs. Most importantly, it will be understood that the improvements are a guide to managing the impact of growth in Moscow as it occurs over the next 20 years.

Network Connectivity Improvements

There are a number of locations in Moscow where, due to the lack of alternative routes, traffic is channeled through a single street, corridor, or neighborhood access. A well-connected transportation network ensures that travel by motorists, bicycles, pedestrians, and transit is direct and reduces vehicle miles traveled within the city. Several roadway extension projects are recommended to:

- Reduce vehicle miles traveled (VMT) by limiting out of way travel patterns for all modes
- Disperse traffic levels between various streets
- Limit traffic cut-through on the University of Idaho campus
- Provide an adequate roadway system for future local development
- Reduce emergency vehicle response times and improve public safety

A poorly-connected street system can result in the need for wider roads, traffic signals, and turn lanes, which can negatively impact overall traffic flow.

A number of potential arterial and collector street connections that were identified in the Thoroughfare Plan and discussed at public meetings were tested in the travel demand model to determine how much traffic is likely to use each route. Routes were evaluated based on the Motor Vehicle Evaluation Criteria developed for this plan (presented in Chapter 8). The potential roadway connections evaluated are summarized below. The potential Third Street Bridge at Paradise Creek (west of Mountain View Road) was evaluated separately and is presented in the following section.

- Trail Road: Orchard Avenue to Mix Road
- Darby Road: Mountain View Road to Orchard Avenue
- Thatuna Avenue: Extend east to Mountain View Road
- Third Street: Mountain View Road to D Street and Mountain View Road extension (from west to east, then south to north)
- D Street: Extend to Robinson Park Road
- F Street: Extend east to Third Street extension
- Carmichael Road: SH-8 to Notting Hill Drive
- Blaine Street: Palouse River Drive to SH-8
- A Street: Farm Road to Warbonnet Drive
- Farm Road: A Street to Mix Road
- Baker Street: A Street to Farm Road
- Rodeo Drive: Main Street (US-95) to Almon Street

A potential Thatuna Avenue extension looking west from Mountain View Road was one of the road sectons evaluated.

Image from DKS Associates

The daily forecast 2035 traffic volumes for the street network with the potential roadway connections in place are shown in Figure 4-1. These potential roadway connections were found to help disperse both existing traffic volumes and traffic growth forecasted for 2035. Figure 4-2 assesses future daily volumes on the future connections and existing roadways.

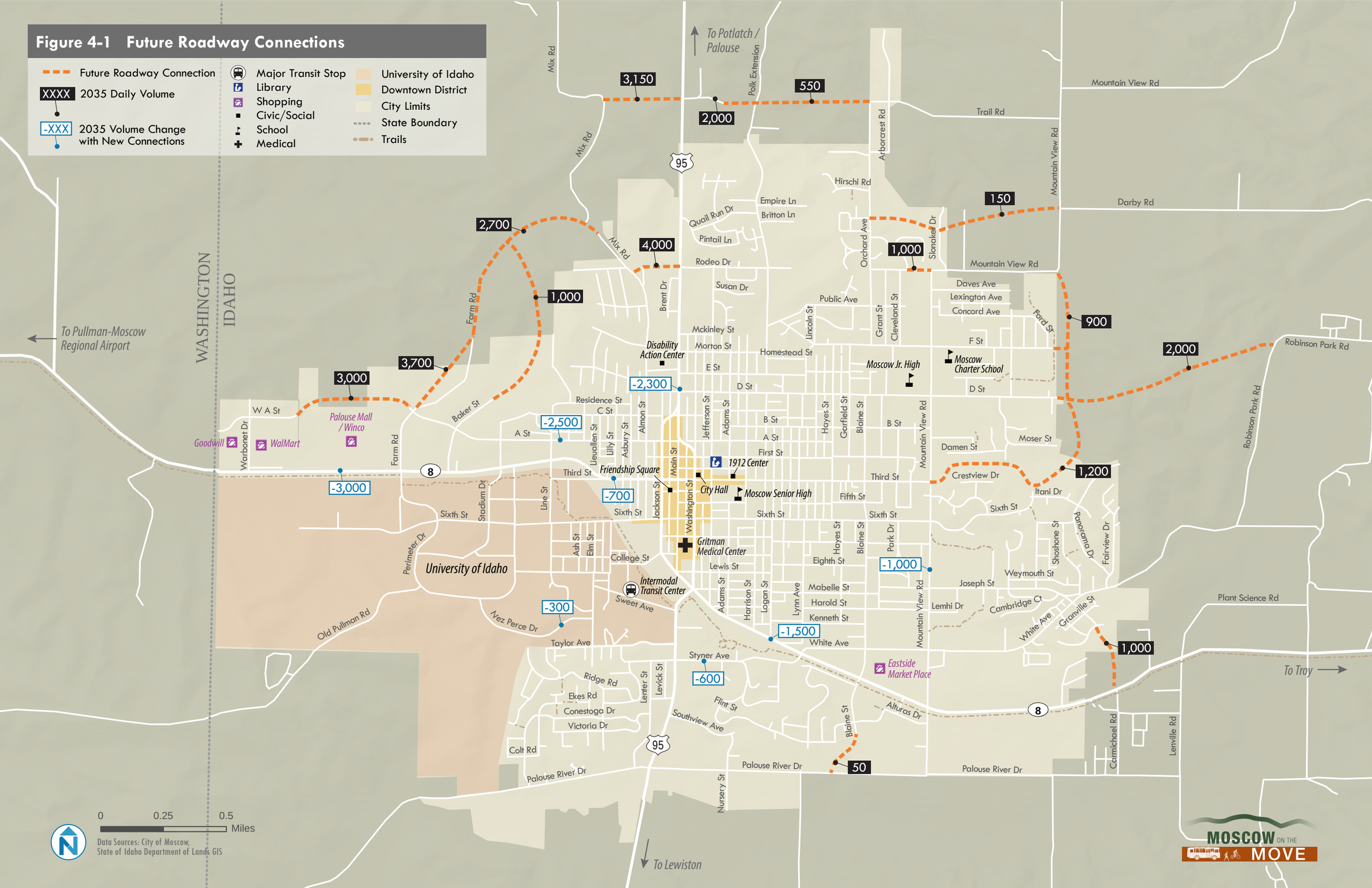
Figure 4-1 Future Roadway Connections
Future Roadway Connection
XXXX 2035 Daily Volume
-XXX 2035 Volume Change with New Connections
Major Transit Stop
Library
Shopping
Civic/Social
School
Medical
University of Idaho
Downtown District
City Limits
State Boundary
Trails
To Potlatch / Palouse
To Pullman-Moscow Regional Airport
To Troy
To Lewiston
WASHINGTON
IDAHO
3,150
2,000
550
150
2,700
4,000
1,000
3,700
3,000
900
2,000
1,200
1,000
50
-2,300
-2,500
-3,000
-700
-300
-1,000
-1,500
-600
Mix Rd
Polk Extension
Mountain View Rd
Trail Rd
Arborcrest Rd
Hirschi Rd
Empire Ln
Britton Ln
Quail Run Dr
Pintail Ln
Rodeo Dr
Susan Dr
Orchard Ave
Slonaker Dr
Darby Rd
Daves Ave
Lexington Ave
Concord Ave
Ford St
Public Ave
Grant St
Cleveland St
Lincoln St
Brent Dr
Mckinley St
Morton St
Homestead St
Disability Action Center
Moscow Jr. High
Moscow Charter School
F St
E St
D St
Robinson Park Rd
Farm Rd
Baker St
W A St
Goodwill
WalMart
Palouse Mall / Winco
Warbonet Dr
Residence St
C St
A St
Almon St
Lieuallen St
Lilly St
Asbury St
Jefferson St
Adams St
B St
Hayes St
Garfield St
Blaine St
Damen St
Moser St
First St
Third St
Fifth St
Sixth St
Friendship Square
1912 Center
City Hall
Moscow Senior High
Main St
Washington St
Jackson St
Crestview Dr
Itani Dr
Panorama Dr
Shoshone St
Fairview Dr
Stadium Dr
Line St
Perimeter Dr
University of Idaho
Ash St
Elm St
College St
Gritman Medical Center
Intermodal Transit Center
Sweet Ave
Nez Perce Dr
Old Pullman Rd
Taylor Ave
Harrison St
Logan St
Lynn Ave
Mabelle St
Harold St
Kenneth St
White Ave
Eighth St
Park Dr
Joseph St
Weymouth St
Lemhi Dr
Cambridge Ct
Granville St
Plant Science Rd
Styner Ave
Ridge Rd
Ekes Rd
Conestoga Dr
Victoria Dr
Lenter St
Levick St
Flint St
Southview Ave
Colt Rd
Palouse River Dr
Nursery St
Eastside Market Place
Alturas Dr
Carmichael Rd
Lenville Rd
0 0.25 0.5 Miles
Data Sources: City of Moscow, State of Idaho Department of Lands GIS
MOSCOW ON THE MOVE

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Figure 4-2 Daily Forecast Volumes on Proposed Roadway Connections (2035)

Location	Existing Daily Volume	2035 Daily Volume	2035 Daily Volume with Connections
Proposed Connections			
Trail Road Extension	-	-	550 east of Polk 2,000 west of Polk 3,150 west of US-95
Darby Road Extension	-	-	150
Thatuna Avenue Extension	-	-	1,000
Third Street Extension	-	-	900 – 1,200
D Street Extension	-	-	2,000
F Street Extension	-	-	50
Carmichael Road Extension	-	-	800 – 1,000
Blaine Street Extension	-	-	50
A Street Extension	-	-	3,000
Farm Road Extension	-	-	2,700 – 3,700
Baker Street Extension	-	-	1,000
Rodeo Drive Extension	-	-	4,000
Existing Roadways			
A Street east of Line Street	8,200	13,000	10,500
SH-8 east of Farm Road	21,000	24,000	21,000
Mountain View Road south of Sixth Street	8,500	9,200	8,200
SH-8 west of White Avenue	13,500	17,300	15,800
Third Street west of Almon Street	18,600	23,000	22,300
Main Street north of D Street	18,000	21,000	17,700
Nez Pierce Drive west of Blake Avenue	5,400	6,500	6,200
Styner Avenue east of US-95	5,800	8,500	7,900

Source: City of Moscow historic count data, DKS Associates travel demand model forecasts

The key findings from the future roadway assessment include:

- The proposed F Street, Darby Street, and Blaine Street connections are not expected to carry significant traffic volumes but would provide an important connection for pedestrians, bicyclists, and local motor vehicle trips
- The extensions of Trail Road, Farm Road, A Street, D Street, and Rodeo Road would serve significant traffic volumes (over 2,000 vehicles per day in 2035)
- Several existing roadways would operate with current traffic levels in 2035 with the connections in place, such as portions of SH-8, Mountain View Road, and Main Street

RECOMMENDED ACTIONS FOR MOSCOW

Action RT1. Improve roadway connectivity for all users by expanding the collector and minor arterial street system with the high priority roadway projects described in the Action Manual (Chapter 8).

Third Street Bridge

Third Street is designated as a collector west of Hayes Street in the City's Thoroughfare Plan. It provides connectivity between downtown and residential neighborhoods, terminating at Paradise Creek just west of Mountain View Road, a minor arterial providing key access north and south on the east side of Moscow. Third Street has a gap approximately 250 feet west of Mountain View Road and traffic traveling between downtown and the east side of Moscow must divert to parallel routes such as D Street approximately 2,000 feet to the north and Sixth Street approximately 1,000 feet to the south. Sixth Street is classified as a collector, D Street is classified as a minor arterial and both provide a direct link between downtown and Mountain View Road. If Third Street were to be connected, it would provide a direct connection between downtown Moscow and Mountain View Road and neighborhoods on the east side of town. It would also provide a key connection for pedestrians and bicyclists in an area where east-west connectivity is lacking. The connection would require an approximately 60-foot bridge between Roosevelt Street and Mountain View Road. Key issues and concerns to address in the evaluation include:

- Connecting Third Street may attract additional traffic volume to the route from B Street or Sixth Street at the east end of the route (likely between Hayes Street and Mountain View Road)
- Third Street is fronted by residential (single- and multi-family) property
- Lena Whitmore Elementary School is located on Blaine Street approximately 100 feet north of Third Street
- East City Park is located on Third Street between Hayes Street and Monroe Street

The Third Street Bridge project was evaluated under three alternatives to allow a comparison of findings, such as future traffic volumes and changes in neighborhood travel patterns. A description of the alternatives with potential benefits and impacts are described below.

Third Street looking east at Paradise Creek, west of Mountain View Road, is one opportunity to improve connectivity between residential neighborhoods and downtown Moscow.

Image from DKS Associates

Alternative 1: Pedestrian and bicycle connection only

- Provides a much needed pedestrian and bicycle connection, reducing out-of-direction travel for these modes significantly.
- Currently, pedestrians and people on bicycles near Roosevelt Street/ Third Street trying to reach Mountain View Road/Third Street are required to divert via one of the following routes:
  - North: travel via Cleveland Street and B Street to access Mountain View Road (approximately 3,250 feet versus 400 feet with the connection).
  - South: travel via Cleveland Street (south), a pedestrian and bicycle connection to Sixth Street and Sixth Street to Mountain View Road (approximately 2,700 feet versus 400 feet with the connection).

Alternative 2: Full access multi-modal connection providing facilities for motor vehicles, pedestrians, and bicycles.

- Provides a much needed pedestrian and bicycle connection, reducing out-of-direction travel for these modes significantly.
- Attracts new users for all travel modes (motor vehicle, pedestrian, bicycle).
- Encourages vehicular traffic to use the Third Street collector route (versus B Street, a local facility), and would minimize out-of-direction travel for all modes.
- Improves motor vehicle connectivity and keeps motor vehicles on a route designated as a collector.
- Reduces turn movements at Sixth Street with the extension.
- Currently, people driving motor vehicles near Hayes Street/Third Street trying to reach Mountain View Road/Third Street are required to divert via one of the following primary routes:
  - North: travel via Hayes Street and B Street to Mountain View Road (~4,300 feet versus ~2,100 feet with the Third Street connection).
  - South: travel via Hayes Street and Sixth Street to Mountain View Road (~3,750 feet versus ~2,100 feet with the Third Street connection).

Alternative 3: Full access multi-modal connection providing facilities for motor vehicles, pedestrians, and bicycles with traffic calming measures implemented on Third Street.

- Although this alternative would attract new traffic from all travel modes, the intent is that the traffic calming measures would encourage some traffic to continue to use D Street and Sixth Street to access the east side of Moscow and Mountain View Road.
- Traffic calming measures that would be considered for Third Street east of Jefferson include horizontal deflection techniques such as curb extensions, chicanes, neckdowns, and other pedestrian crossing enhancements. These improvements can reduce speeds by between 7-11% and features like chokers/neckdowns can decrease volumes by up to 20%.

The alternatives were assessed using the travel demand model to forecast 2035 volumes. The travel demand model used included the future roadway connections previously discussed. The existing and future forecast volumes on key roadways in the Third Street Bridge study are illustrated in Figure 4-3. These volumes depict the potential change in vehicle travel patterns as a result of the new vehicular connection.

Example of a chicane (top) and a curb extension/neckdown (bottom).
Images from Nelson\Nygaard

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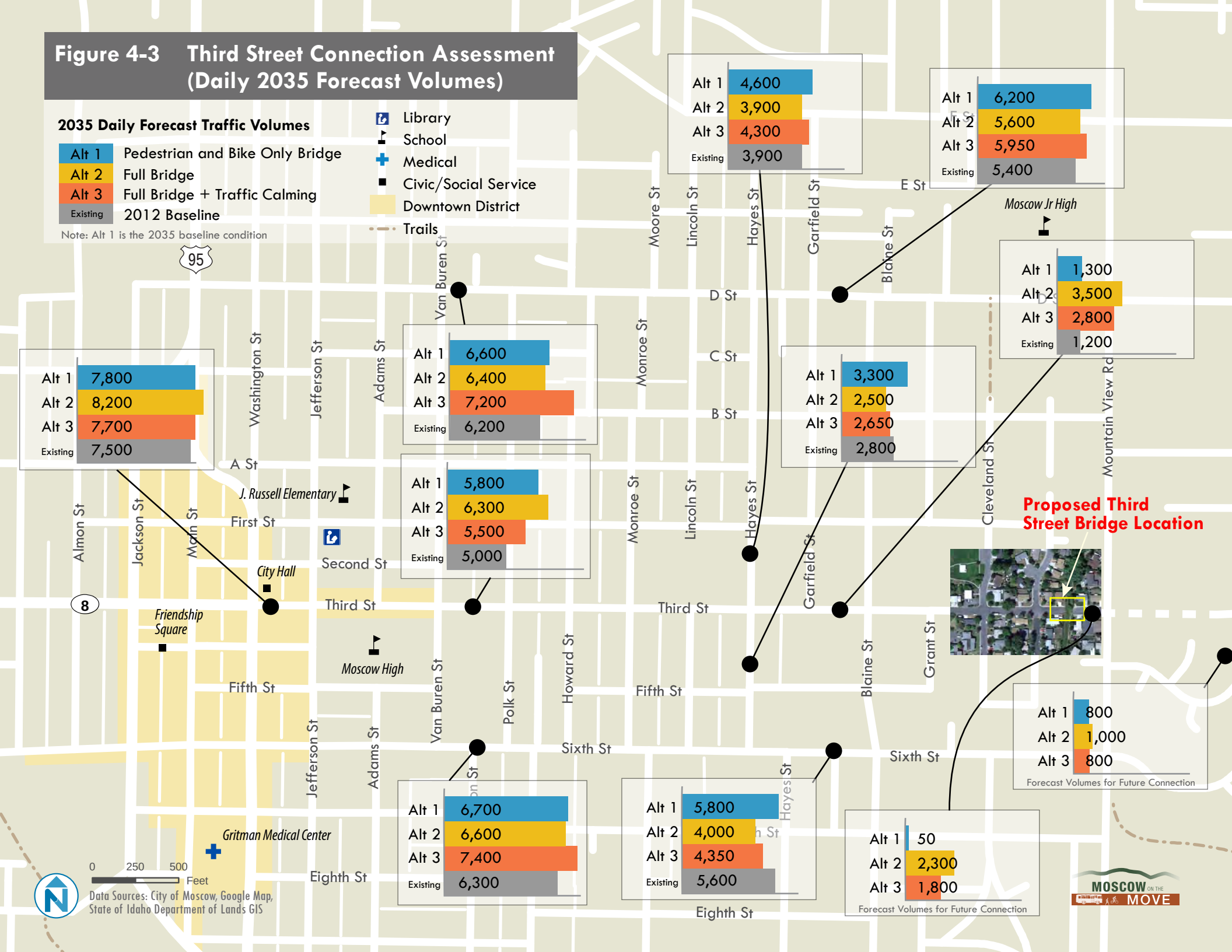
Figure 4-3 Third Street Connection Assessment (Daily 2035 Forecast Volumes)

2035 Daily Forecast Traffic Volumes

- Alt 1 — Pedestrian and Bike Only Bridge
- Alt 2 — Full Bridge
- Alt 3 — Full Bridge + Traffic Calming
- Existing — 2012 Baseline

Note: Alt 1 is the 2035 baseline condition

- Library
- School
- Medical
- Civic/Social Service
- Downtown District
- Trails



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Evaluation criteria were developed as a means to ensure that the *Moscow on the Move* Guiding Principles and Goals are reflected in transportation decisions. Figure 4-4 summarizes the evaluation of alternatives against project criteria pertaining to the proposed Third Street extension. The evaluation findings provide a comparison against the current Third Street roadway with no bridge provided.

Figure 4-4 Third Street Bridge Alternatives Evaluation

Guiding Principle/Goals	Roadway and Traffic Operations Evaluation Criteria	Alternative 1 (Active Modes Only)	Alternative 2 (Full Access)	Alternative 3 (Full Access + Traffic Calming)
Mobility and Access	Facilitate multi-modal access	Improves pedestrian and bicycle access only	Improves access for all modes	Improves access for all modes
	Maintain minimum level of service	No benefit or impact	Reduces vehicle delay at intersections on D Street and Sixth Street	Reduces vehicle delay at intersections on D Street and Sixth Street
	Proximity of facility to truck route	No benefit or impact	Improves goods movement and delivery access by all modes	Improves goods movement and delivery access by all modes
Land Use, Design, and Quality of Life	Level of impact to existing land uses/property	Project within available right of way	Project within available right of way	Project within available right of way
	Level of impact to residential street traffic	Increases pedestrian and bicycle trips on Third Street (collector west of Hayes Street); negligible impact to vehicular traffic	Increases vehicle, pedestrian and bicycle trips on Third Street (collector west of Hayes Street); redistributes residential street traffic	Increases vehicle, pedestrian and bicycle trips on Third Street (collector west of Hayes Street); redistributes residential street traffic
Safe Streets	Improve street segment/intersection safety	No benefit or impact	Reduces overall vehicle miles traveled in neighborhood	Reduces overall vehicle miles traveled in neighborhood
	Level of impact to vehicle speeds	No impact	No impact	Reduces speeds on Third Street
Active and Healthy Living	Provides facilities for active transportation	Fills walking and bicycle network gap	Fills walking and bicycle network gap	Fills walking and bicycle network gap
	Improves access to basic services	Improves walking and biking access to Lena Whitmore Elementary School	Improves walking, biking, and motor vehicle access to Lena Whitmore Elementary School	Improves walking, biking, and motor vehicle access to Lena Whitmore Elementary School

RECOMMENDED ACTIONS FOR MOSCOW

Action RT2. Construct a full access multi-modal bridge over Paradise Creek to provide a connection to Third Street and provide traffic calming measures on Third Street from the new bridge west to Jefferson Street. Traffic calming recommended for use includes curb extensions, chicanes, and/or neckdowns. Traffic calming should extend east of Mountain View Road when the current street end is constructed into a full street connection. The final proposed traffic calming features and their location will be determined by a future design and community outreach process.

Regional Circulation Enhancements: Ring Road Concept

The Idaho Transportation Department (ITD), in association with the City of Moscow, conducted a study of US-95 and SH-8 through Moscow in 2004. The purpose of the study was to determine whether ITD should plan improvements to the existing corridors or the future construction of an alternate highway route (ring road concept).

Three potential alternate routes were considered:

- South-West connection
- North-West-South connection
- East-South-West connection

The study concluded that the projected 2035 traffic needs did not appear to justify a bypass. The capacity needed to accommodate future traffic volumes could be provided through widening and signalization improvements to the existing US-95 and SH-8 corridors outside downtown. If a bypass were to be built, it would not eliminate the need for improvements to the downtown corridors such as striping parking and possibly narrowing sidewalks.

Since a bypass route was included in the Moscow Comprehensive Plan, further analysis was conducted to evaluate the long-term merits of a bypass or ring-road system, including the use of a detailed travel demand forecasting model to evaluate changes in land use patterns and potential street system improvements.

Bypass Case Studies

A number of studies have been completed nationwide regarding potential bypass impacts on communities where they are built. The bypass studies reviewed are listed below:

- California Bypass Study (2006)
  - Presented nine case studies of highway bypasses around the US – communities in Danville, VA, Richmond, CA, Fort Wayne, IN, Appleton, WI, Roanoke, VA, Imperial Valley, CA, Lewistown, MT, and Stonewall, OK
- Economic Impacts of Highway Bypasses on Communities (1998)
  - Presented an assessment of bypasses in 17 communities in Wisconsin with populations ranging from 300 to 28,000 people
- Case Studies of the Economic Impacts of Highway Bypasses in Kansas (January 2004)

Lessons from Similar Bypass Case Studies

A number of bypass studies have been conducted to determine the impacts a bypass has on a community.

Case Study #1 (South Corvallis Bypass, OR)

This bypass was built to provide an alternate route for through traffic and to reduce congestion, improve safety, and reduce noise and air pollution in the downtown area. The bypass:

- Allowed additional development and infill of industrial lands in South Corvallis by providing better access.
- Decreased traffic in the downtown Corvallis couplet by 20%.
- Was generally viewed as positive by businesses and residents for reasons of access, capacity, safety, and appearance.

Source: Oregon Department of Transportation

Case Study #2 (Danville, Virginia, I-785 Bypass)

Before-and-after comparison demonstrated that the bypass:

- Reduced downtown truck traffic and increased local vehicles (no decrease in ADT)
- Provided no evidence of negative impacts on downtown businesses
- Resulted in major negative impact on new industrial sites near bypass interchanges.

Source: California Bypass Study, May 2006

Case Study #3 (Hollister, CA, SR-156 in San Benito County, 1997)

The motivation for the bypass in this agricultural and residential community was to reduce traffic congestion and trucks and improve safety. The bypass:

- Did not hurt the local agricultural and bedroom community economy.

Source: California Bypass Study, May 2006

  - Presented an assessment of bypasses in nine communities in Kansas
- Oregon Department of Transportation Bypass Case Studies (2002)
  - Presented an assessment of bypasses in 16 communities in Oregon

The following findings were generally consistent among many of the bypass studies reviewed.

- In most communities, highway bypasses have little adverse impact on overall economic activity. The economies of smaller communities (populations less than 2,000) have a greater potential to be adversely impacted by a bypass.
- Over the long term, average traffic levels on the "old routes" in medium and large bypassed communities are close to or higher than pre-bypass counts, indicating continued strong economic activity in those communities and the opportunity for retail trade to flourish.
- Very little retail flight has occurred in bypassed communities, meaning that few businesses have relocated or developed new operations in areas adjacent to the bypass route.
- Communities view their bypasses as beneficial overall and understand that further action is required after construction of the bypasses to achieve their overall goals; such as implementing new/revised ordinances and improving existing infrastructure.
- Bypasses are seldom either devastating to or highly beneficial to a community's downtown business district, at least in terms of business access or retail spending.
- The locational shift in traffic can cause some existing businesses to turn over or relocate, but the net economic impacts on the broader community are usually relatively small (positive or negative).
- Common benefits are better overall traffic flow and congestion relief. The elimination of trucks and seasonal traffic from local streets make traffic patterns safer and more predictable in a community.
- No concrete conclusions can be drawn from case study research regarding safety impacts; however, the expectation is that traffic safety would be improved or at least not worsened.
- Interviews indicated the potential to increase the "perception of pedestrian safety," even if it's not measurable, which may be just as important to the public.
- Traffic impact depends on the distance from original facility and time savings.

Ring Road Assessment

An assessment of the Ring Road project was conducted to forecast the demand for future users on the facility and identify potential local benefits such as lower auto and truck volumes downtown and better connectivity on the edge of the city. The Ring Road concept was based on the characteristics shown in Figure 4-5. The Ring Road would be located outside the Moscow city limits and would be located in Washington State on the western edge of the project. The assessment of the Ring Road project included supporting roadway connections in addition to the future roadway connections. All future connections are shown in Figure 4-6.

The future roadway connections previously described and the Ring Road concept were modeled together to forecast future 2035 traffic volumes. Overall, the Ring Road attracted daily volumes ranging from 6,500 vehicles on the SW Roadway and to 1,200 vehicles on the NE Roadway. With the Ring Road, future daily traffic volumes would be reduced on several key roadways:

- Downtown roadways reduced up to 1,300 vehicles (65 freight trucks) on Washington Street and 2,300 vehicles (115 freight trucks) on Jackson Street
- SH-8 west of downtown reduced by 3,500 vehicles
- US-95 north of downtown reduced by 1,000 vehicles
- SH-8 east of downtown reduced by 2,000 vehicles

- Future Trail Road Extension (west of US-95) reduced by 2,500
- Future Farm Road Extension reduced by 3,000

Figure 4-5 Ring Road Concept

Location	Classification	Speed	Lanes	Access Control	Access Spacing	Roadway Connections
SW Roadway	ITD Highway Design	55 mph	2 mainline	Uncontrolled	None	US-95; SR-270 (WA); Palouse River Drive; Old Pullman Road (grade separated)
NW Roadway	Arterial	45 mph	2 mainline + center turn lane	Traffic signals	¼ to ½ mile	SR-270 (WA); Warbonnet Drive; Baker Street; Mix Road; US-95
NE Roadway	Arterial	45 mph	2 mainline + center turn lane	Traffic signals	¼ to ½ mile	US-95; Polk Road; North Mt. View Road; Moscow Mt. Road; Darby Road; Robinson Park Road; Parker Road; SH-8
SE Roadway	Arterial	45 mph	2 mainline + center turn lane	Traffic signals	¼ to ½ mile	SH-8; Mill Road; Lenville Road; South Mt. View Road; Paradise Ridge Road; US-95

Key findings from the future 2035 operations assessment are summarized below:

- The Ring Road is not expected to have significant impacts to local freight routing. Trucks could use the west side roadways to avoid urban conflicts (such as on-street parking maneuvers and pedestrians) and congestion downtown during peak hours. However, traveling through town north to south or east to west would take more time using the Ring Road compared to the existing highway system.
- The southwest quadrant of the Ring Road would serve the highest traffic demand with up to 6,500 daily vehicles.
- The addition of the Ring Road does not significantly improve intersection operations downtown or on parallel routes. The intersection of Third Street/Washington Street would continue to serve a high northbound left turn volume and operate at LOS B during the evening peak hour.
- Preliminary cost estimates based on the Ring Road concept would range from $110 to $140 million including right of way.
- With new NW/SW roadways in place (no east side Ring Road), the future Ring Road would experience a 10 to 20 percent reduction in demand compared to the current forecast and downtown would remain the same (compared to the full Ring Road).

RECOMMENDED ACTIONS FOR MOSCOW

Action RT3. Conduct a transportation study of the Ring Road Southwest quadrant corridor based on federal requirements to identify potential impacts and select the preferred project (alignment, cross-section, and access). Once a corridor alignment has been selected, work towards obtaining project right-of-way.

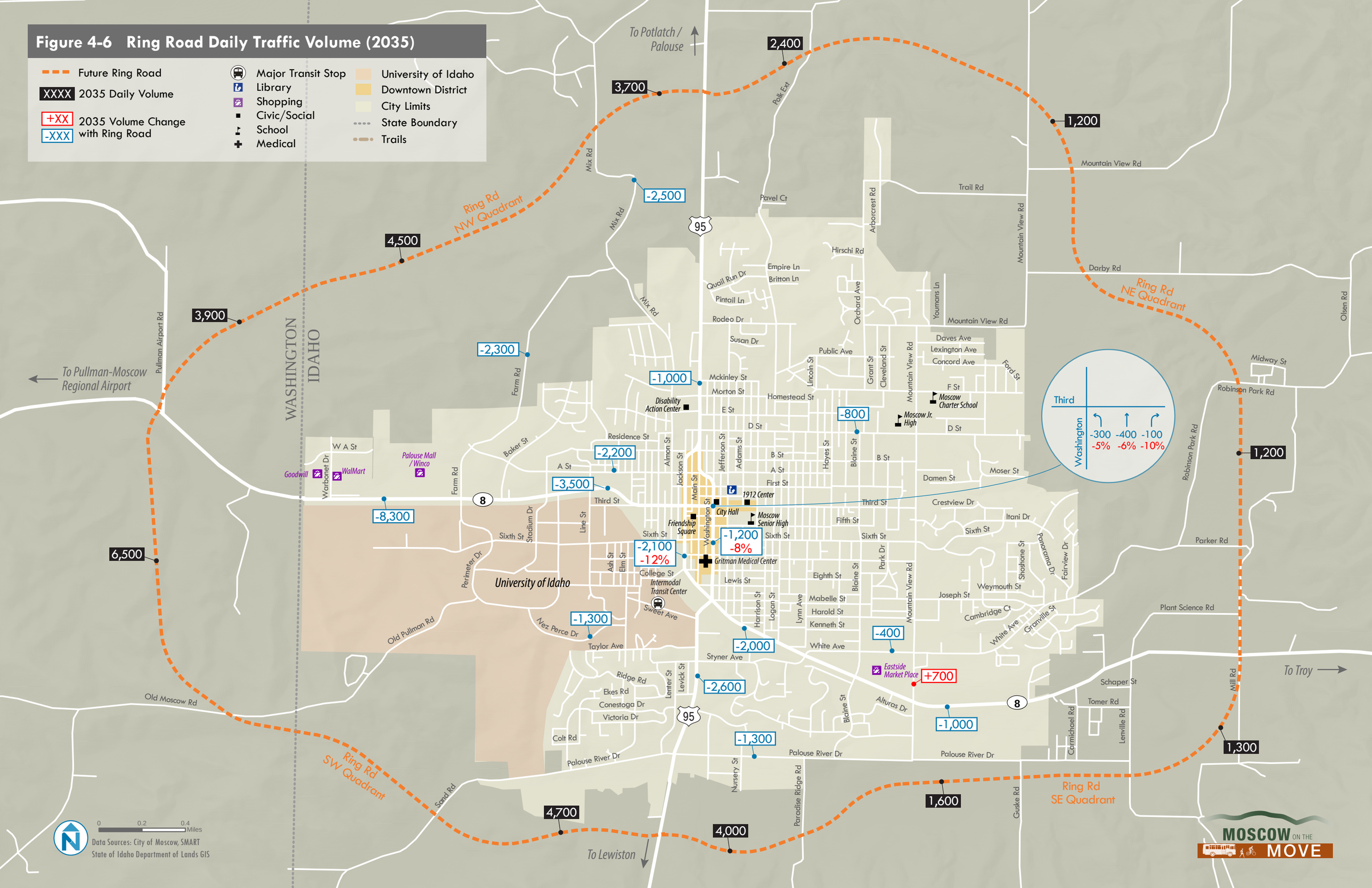
Figure 4-6 Ring Road Daily Traffic Volume (2035)
Future Ring Road
XXXX 2035 Daily Volume
+XX -XXX 2035 Volume Change with Ring Road
Major Transit Stop
Library
Shopping
Civic/Social
School
Medical
University of Idaho
Downtown District
City Limits
State Boundary
Trails
Ring Rd NW Quadrant
Ring Rd NE Quadrant
Ring Rd SW Quadrant
Ring Rd SE Quadrant
To Potlatch / Palouse
To Pullman-Moscow Regional Airport
To Troy
To Lewiston
WASHINGTON
IDAHO
University of Idaho
Third
Washington
-300 -400 -100
-5% -6% -10%
2,400
3,700
1,200
4,500
3,900
6,500
1,200
1,300
1,600
4,000
4,700
-2,500
-2,300
-1,000
-800
-2,200
-3,500
-8,300
-2,100
-12%
-1,200
-8%
-1,300
-2,000
-400
+700
-2,600
-1,300
-1,000
Disability Action Center
1912 Center
City Hall
Friendship Square
Moscow Senior High
Gritman Medical Center
Intermodal Transit Center
Moscow Charter School
Moscow Jr. High
Eastside Market Place
Palouse Mall / Winco
Goodwill
WalMart
Data Sources: City of Moscow, SMART
State of Idaho Department of Lands GIS
0 0.2 0.4 Miles
MOSCOW ON THE MOVE

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Multi-modal Street Design Standards

Moscow's streets have always served a variety of functions—including mobility, retail access, civic action, and more. Likewise, streets in Moscow have always accommodated a variety of street users, which has created challenges as vehicle ownership and use increased up until the beginning of the 21st Century. In Moscow today, more people are traveling by walking, bicycle, and transit than in the recent past as residents and University affiliates expand the ways they access their daily needs. Because of these shifting demands, Moscow's streets need to balance mobility requirements with mode choice and the community-serving functions that streets have traditionally provided.

Street types by function

Two criteria are used to assess functional classification: the extent of connectivity and the frequency of the facility type. The frequency or need for regional, city, and neighborhood facilities of certain classifications is not routine or easy to package into a single criterion. Although traditional spacing standards call for arterial spacing of a mile, collector spacing of a quarter to a half-mile, and neighborhood connections at an eighth to a sixteenth of a mile, this does not form the only basis for defining functional classification. Changes in land use, environmental issues or barriers, topographic constraints, and travel demand also influence the required spacing. Spacing standards can be a guide, but other features and potential long term development in the area must also be considered.

The current roadway functional classifications provided in the Thoroughfare Plan were reviewed based on the criteria described above and forecasted growth areas in the city. Based on the review, only one revision to the roadway classifications is recommended:

Blaine Street – From Palouse River Drive to Sixth Street, Blaine Street should be classified as a collector.

Further modifications to the functional classification system are being considered by the City. These are shown in the Figure 4-7 but have yet to be accepted by ITD.

Blaine Street, south of E White Avenue, should be classified as a collector.

Image from Google

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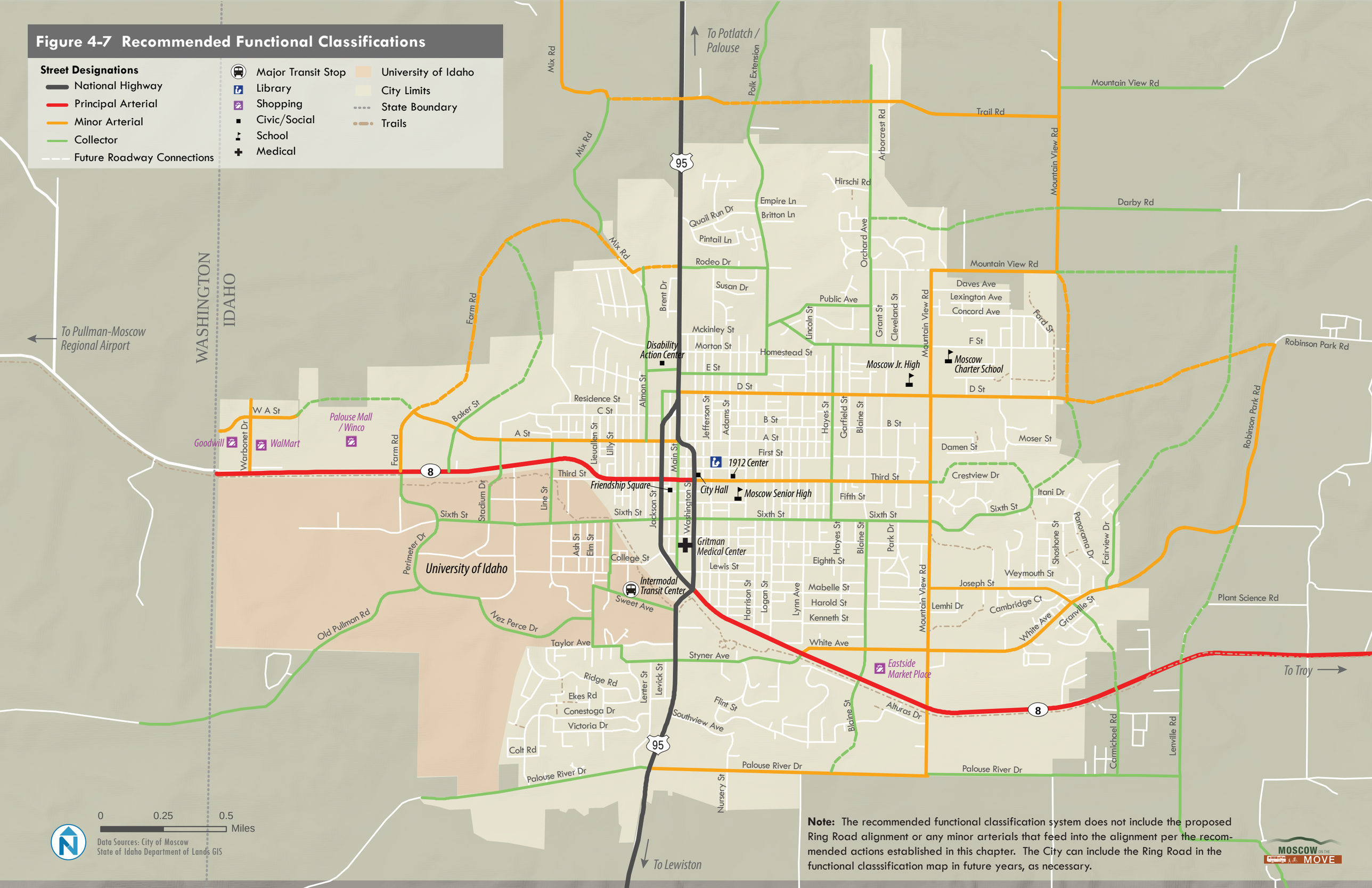
Figure 4-7 Recommended Functional Classifications



Note: The recommended functional classification system does not include the proposed Ring Road alignment or any minor arterials that feed into the alignment per the recommended actions established in this chapter. The City can include the Ring Road in the functional classsification map in future years, as necessary.

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Design standards for citywide application

A review of roadway cross-sections by functional classification was conducted to establish appropriate design characteristics for motor vehicle, bicycle, pedestrian, and transit needs. Because the actual design of a roadway can vary from segment to segment due to adjacent land uses and demands, the objective was to define a system that allows standardization of key characteristics to provide consistency. It also provided criteria for application that offers some flexibility, while meeting the design standards.

The design standards reviewed for this plan are the City's 2012 draft standards as proposed by the Transportation Commission and will soon be in the adoption process. Figure 4-8 shows a summary of draft design standards by functional classification.

Additional design elements should be considered for the draft street design standards. Recommendations are summarized below:

- Minor Arterial standard - require 6-foot bike lanes with option for 8-foot buffered bike lane
- Add a Minor Arterial standard cross-section with options for bike lane buffering
- Mid-block pedestrian crossings standards
- Disallow single family driveways on Collector and Arterial facilities, if alley access is a feasible alternative

RECOMMENDED ACTIONS FOR MOSCOW

Action RT4. Make revisions to the draft citywide street design standards based on the recommendations listed above.

Figure 4-8 Summary of 2012 Citywide Street Design Standards

Street Design Element	State Highways	Principal Arterials	Minor Arterial w/ Left Turn Lane	Minor Arterial	Collector w/ Left Turn Lane	Collector	34' Local Street	28' Local Street	Large Lot Subdivision Street
Right-of-way	100-120'	100-120'	90' (min.)	90' (min.)	80' (min.)	70' (min.)	60' (min.)	60' (min.)	60' (min.)
Curb-to-curb width	Varies	22-36'	48'	34'	46'	34'	34'	28'	28'
Design/posted speed	Max Safe Speed – (ITD Design Manual)	25-45 mph Posted	35 mph	35 mph	30 mph	30 mph	25 mph	25 mph	25 mph
Lane per direction	Varies	Varies	1	1	1	1	1	1	1
Travel lane dimensions	Varies	9-12'	12' 14' (with median)	12' 14' (with median)	12' 14' (with median)	12' 14' (with median)	9' (18' two-way)	10'	14' with 2' shoulders
Median widths	Varies	Varies	Center median option (10' minimum Residential, 11' minimum Commercial Industrial)– Requires travel lane increase of 2' adjacent to median	Center median option (10' minimum Residential, 11' minimum Commercial Industrial)– Requires travel lane increase of 2' adjacent to median	Center median option (7' minimum) – Requires travel lane increase of 2' adjacent to median	Center median option (7' minimum) – Requires travel lane increase of 2' adjacent to median	N/A	N/A	N/A
Bicycle lanes (BL) / Shared lane markings (SLM) / Neighborhood greenways (NG)	Minimum 6' BL SLM not appropriate	Minimum 6' BL SLM not appropriate	Minimum 5' BL SLM not appropriate	Minimum 5' BL SLM not appropriate	NG only for short segments	NG only for short segments	SLM and NG preferred	SLM and NG preferred	SLM and NG preferred
On-street parking	Allowed in urban areas	Allowed in urban areas	9-10'	9-10'	9-10'	9-10'	8' both sides	8' one side	Not Allowed
Sidewalk width	Varies	Varies	6' minimum (Residential) 8' minimum (Commercial/Industrial)	6' minimum (Residential) 8' minimum (Commercial/Industrial)	5' minimum	5' minimum	5' minimum	5' minimum	None 2' shoulder
Furniture zone/planting	Varies	Varies	Varies (8' minimum)	Varies (8' minimum)	Varies (can be narrowed to 5')	Varies (can be narrowed to 5')	8' (can be narrowed to 5')	10.5' (can be narrowed to 5')	8'

Note: Standards based on City's 2012 draft standards that are currently in the adoption process.
There is no adopted standard for Principal Arterials. Consider for adoption when revising the City's Street Design Standards in future years.

Neighborhood Traffic Management toolbox

As the result of continued growth in the community, there is potential for neighborhoods to be impacted by increased traffic volumes and speeding. In many cities, no one issue generates more citizen comment than traffic on residential streets.

A Neighborhood Traffic Management (NTM) toolbox is a set of measures that can be used to address the negative impacts of unchecked speed and volume on neighborhood streets. Successful application of these tools can help to fix existing traffic issues, and also avoid simply shifting the problem to another area. NTM should be applied along with strategies that ensure adequate arterial and collector capacity and connectivity are in place to serve future travel needs.

This plan addresses the need for future capacity and/or lack of connectivity that can result in traffic infiltration through neighborhoods. With a well-planned functional classification system in place, streets should be designed and built to operate at their designated speed and volume. NTM projects in Moscow will use appropriate tools that match the designated street category (no speed humps on arterials, for example). Measures will also enhance safety and not impede the multi-modal use of the streets (i.e., measures respect the demands and needs of transit, emergency response, school buses, delivery vehicles, pedestrians, and bicycles as well as maintenance activities).

The *Moscow on the Move* Bicycle and Pedestrian Design toolbox provides the community with a variety of means to either slow, discourage, or redirect traffic away from certain routes. A variety of NTM tools are available for various route types. For example, a tool that might be effective in reducing traffic on a residential street would likely not be appropriate on a cross-town collector route. An Institute of Transportation Engineers (ITE) survey measured performance on a variety of NTM measures. Figure 4-9 summarizes the results of the survey and indicates public satisfaction with each measure.

Figure 4-9 Surveyed Neighborhood Traffic Management Performance

Measure	No. of Studies	Speed Reduction (MPH)			Volume Change (ADT)			Public Satisfaction
		Low	High	Average	Low	High	Average	
Speed Humps	262	1	11.3	7.3	0	2,922	328	79%
Speed Trailer	63	1.8	5.5	4.2	0	0	0	90%
Diverters	39	-	-	.4	85	3,000	1,102	72%
Circles	26	2.2	15	5.7	50	2,000	280	72%
Enforcement	16	0	2	2	0	0	0	71%
Neighborhood traffic or speed watch program	85	.5	8.5	3.3	0	0	0	98%
Chokers	32	2.2	4.6	3.3	45	4,100	597	79%
Narrow Streets	4	5	7	4.5	0	0	0	83%

Source: Survey of Neighborhood Traffic Management Performance and Results, ITE District 6 Annual Meeting, by R S. McCourt, July 1997.

The functional classification of the street can help guide the use of the most appropriate traffic calming measure. The City of Moscow Thoroughfare Plan shows highway and arterial routes that should carry the majority of through traffic in Moscow. Ideally, local streets would serve only to provide access to adjacent land use. Moscow does have a relatively well-connected grid system in the core of the city, which makes it easier for cross-town trips to use some local streets. Those routes that are more likely to attract cross-town trips are prime candidates for NTM. Specific areas in the city that may benefit from NTM projects are the University of Idaho campus and neighborhoods east of downtown. The types of NTM measures that would be appropriate for each of the functional classifications in Moscow are described below:

National Highway/Principal Arterial/Minor Arterial

These routes provide regional connections to and through Moscow and adjacent cities/areas. These would be appropriate routes for access control to preserve capacity. These routes primarily carry through traffic. All of these routes are emergency and snowplow routes, which limits the spectrum of NTM measures that would be appropriate. Some NTM measures that may be appropriate for these routes (primarily the minor arterials) include:

- Curb Extensions/Medians
- Pavement Texture
- Landscaping/Street Trees

Collector

These routes provide both access and circulation within residential and commercial/industrial areas providing more of a citywide circulation function. They do not require as extensive control of access as the National Highway/Principal Arterial/Minor Arterial group (but still should have some access management). These routes penetrate residential neighborhoods, distributing trips to the local street system. Some collectors are emergency or snowplow routes which would require special consideration. Some NTM measures that may be appropriate for these routes include:

- Pavement Texture
- On-Street Parking
- One-Way Streets
- Curb Extensions/Medians
- Chicanes
- Landscaping/Street Trees

Local

These routes provide access to fronting properties. Some NTM measures that may be appropriate for these routes include:

- Chicanes
- Diverters
- Speed Humps
- Speed Cushions
- Pavement Texture
- On-Street Parking
- One-Way Streets
- Curb Extensions/Medians
- Landscaping/Street Trees

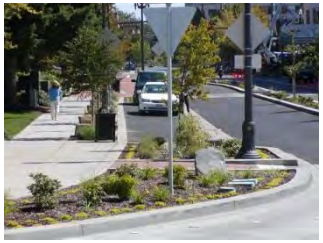
For **new construction** (not retrofit), also consider:

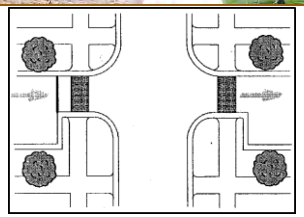
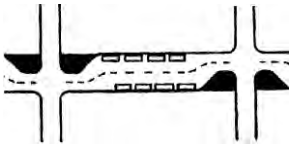
- Curvilinear Street Design
- Street Grid
- Shared Space (i.e., slow, curbless streets that allow mixing of pedestrians, bicycles, and motorists; more detailed guidance should be developed for inclusion as a street type; currently, a developer would need to apply for a variance to construct this type of street.)

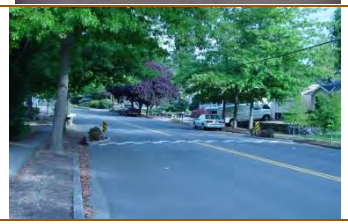
The needs and priorities for applying NTM to roadways are based on a number of criteria. These factors need to be evaluated to determine if NTM is justified and appropriate for a roadway. This includes collecting data for existing conditions, assessing the street system and nearby land uses and estimating future conditions with NTM solutions in place. A transportation analysis should be conducted to assess these criteria to help define the issues and potential solutions.

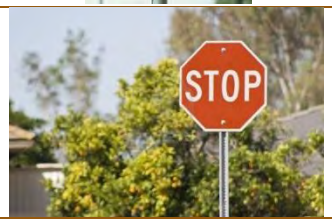
- Traffic Speed (average and 85th percentile)
- Traffic Volume (existing or estimated future)
- Proximity to Schools and Parks (designated School Zone)
- Pedestrian Activity
- Bicycle Activity and Classification (neighborhood greenway)
- Cut Through Traffic (existing or estimated)
- Safety/Accident History

Figure 4-10 Neighborhood Traffic Management Toolbox

Tool	Sample	What is it?	What does it do?	How much does it cost?
Chicanes		Channelization or curb extension that realigns the straight path of a street; deflects straight vehicle movement.	Speed reduction (3 - 4 MPH) Low volume reduction and diversion	$3,000 to $20,000
Curb Extensions/ Medians		A roadway narrowing. This could be a curb extension at an intersection (also called bulb outs) to reduce the roadway width at a selected location. This could be a median placed in the middle of the roadway. Medians can be used for pedestrian refuge and/or access control to restrict turning movements.	Speed reduction (3 MPH) Moderate volume reduction and diversion	$5,000 to $15,000
Diverters		Channelization or islands that restrict movements at an intersection. Typically, allows right turns, not through traffic. There are full and partial diverters depending upon the number of movements restricted or diverted at an intersection.	Speed reduction (1 MPH) High volume reduction, high diversion impact	$3,000 to $15,000
Enhanced Corridor Performance		Providing adequate capacity, spacing, and connectivity for arterials and collectors allows longer trips to stay on these facilities and not on neighborhood routes. Coordinated traffic signals can be effective in keeping through traffic on arterials.	Moderate speed reduction in neighborhoods can be attained by facilitating travel on arterials and collectors Can significantly reduce volume where congestion exists	Cost depends on the type and extent of enhancement. However, street improvements are very expensive. Typically not considered NTM projects.

Tool	Sample	What is it?	What does it do?	How much does it cost?
Landscaping/ Street Trees		Provides a visual narrowing of the street and separates the sidewalk from the vehicle travel lane.	Speed reduction varies Limited volume reduction	$10,000 to $20,000/block
One-Way Streets		Takes the entry to a neighborhood area and makes the access road one-way (typically out). Similar in some respects to a diverter. Can be used in connection with entry treatments.	Speed reduction (no data) Significant volume reduction and diversion	$5,000 to $30,000
Pavement Texture/Markings		Instead of smooth pavement surface, create roughness by using raised markers, pavers, colored concrete with patterns. Can be used to emphasize pedestrian crossing location or create channelization or narrowing. May not be compatible with snow routes.	Limited speed reduction Limited volume change Increases driver awareness of changed conditions (entering a neighborhood or pedestrian zone)	$1,000 to $15,000
Parking On-street		Many streets less than 32' do not allow parking on one or both sides. By allowing parking, the traveled way is narrowed. Speeds must be slow for safe sight distance.	Moderate speed reduction Limited volume reduction	$0 - $10,000/block
Part Time Restrictions		Uses signs to limit vehicle movements during key times (typically school times or peak hours). Can be turn restrictions, truck restrictions, through traffic restrictions, etc. Difficult and expensive to enforce and can have high violation rates.	Moderate speed reduction (if through traffic removed) Moderate volume reduction (if restrictions enforced)	$500 - $5,000

Tool	Sample	What is it?	What does it do?	How much does it cost?
Road Closure		Uses islands or barricades to close the end of a street. Creates a cul-de-sac for vehicles; can remain open for pedestrians and bicyclists. Contrary to emphasis on vehicular connectivity.	Speed reduction limited to site of closure Significant volume reduction and diversion	$2,000 - $15,000
Shared Space "Woonerf"		A concept where there are no curbs in the roadway right-of-way. The road area is shared among various users, using bollards, chokers, and landscape elements to help define user areas.	Speed reduction Significant volume reduction and diversion	$10,000 - $50,000
Speed Cushions		A device similar to a speed hump, but designed to allow buses or emergency vehicles with larger wheel bases to pass over without impact.	Speed reduction (7 MPH) Low volume reduction or diversion	$1,500 - $3,000
Speed Humps		Raising of pavement surface about 3" over about 10 to 20 feet. Similar to this measure are speed tables, raised pedestrian crossings, and raised intersections.	Speed reduction (7 MPH) Low volume reduction or diversion	$3,000 to $5,000

Tool	Sample	What is it?	What does it do?	How much does it cost?
Speed Trailer		A trailer unit with a reader board that indicates the approaching vehicle speeds. Portable and can be moved from site to site. Can be reinforced with actual police enforcement on a selective basis.	Speed reduction (4 MPH) however, reduction occurs only when trailer is present No volume reduction	$10,000 - $25,000 purchase + labor
Speed Zone Changes		Typically, for collector and arterial streets, the 85th percentile speed is used as a guide. Past studies have proven that unrealistically low speed zones are ignored by drivers.	Little speed or volume change (without enforcement)	$20,000 (for signs and studies)
Stop Signs		Warrants determined by MUTCD. Significant research on unwarranted stop signs and their negative impact. MUTCD specifically indicates stop signs are not to be used for speed control.	Mixed findings on speed reduction (some up some down) Low volume reduction and diversion A device for traffic control and safety, generally not NTM	$250 - $2,500 (including studies, staff time and installation)

Sources:

Traffic Calming, American Planning Association, Planning Advisory Service, Report Number 456, July 1995.

Handbook for Walkable Communities, Burden & Wallwork.

Civilised Streets: A Guide to Traffic Calming, Environmental & Transport Planning, Brighton, Great Britain, 1992.

Note: Cost Estimates are in 2010 dollars. Average construction cost inflation per year based on 10-year data is 2-3% per year.

The traffic calming toolbox provides the City and community with resources to manage traffic and improve neighborhood livability by reducing vehicle speeds, reducing traffic volumes, and addressing other traffic-related issues. As neighborhood traffic issues arise, the City should work with the community to understand the needs and consult the toolbox for guidance on appropriate solutions. It is important that traffic calming projects are supported by initial community education and follow up enforcement.

RECOMMENDED ACTIONS FOR MOSCOW

Action RT5. Education – Provide citizens information and tools necessary to make informed decisions regarding neighborhood traffic concerns.

Action RT6. Engineering – Implement traffic calming solutions when appropriate based on engineering principles and community input.

Action RT7. Enforcement – Support community-identified solutions by targeted police and parking enforcement.

Access spacing standards

Access management is a broad set of techniques that balance the need to provide efficient, safe, and timely travel with the ability to allow access to individual properties. Proper implementation of access management techniques will deliver reduced congestion, reduced crash rates, less need for roadway widening, conservation of energy, and reduced air pollution.

Access management refers to the control of vehicular access to and from land uses located on arterial and collector facilities; it is important to maintain the capacity of the facilities and preserve their functional integrity. Numerous driveways can erode the capacity of arterial and collector roadways. Preservation of capacity is particularly important on higher volume roadways for maintaining traffic flow and mobility. Whereas local and neighborhood streets function to provide access, collector and arterial streets serve greater traffic volume. Numerous driveways or street intersections increase the number of conflicts and potential for collisions and decrease mobility and traffic flow. Moscow, as with every city, needs a balance of streets that provide access with streets that serve mobility.

New development and roadway projects located on City street facilities should meet access spacing standards. Access points include public streets (including alleys), private streets, and private commercial or residential driveways. A variation to the access spacing standards may be granted by the City in areas with limited property frontage and/or environmental constraints. It is recommended that any variation to these spacing standards would require an access management plan to be approved by the City Engineer.

With higher traffic volume in the future, the need for access control on all arterial and, potentially, collector roadways is critical – the outcome of not managing accesses properly is additional wider roadways which have much greater impact to the community than access control.

The general criteria used for providing local connections for new residential or mixed-use developments are:

- Every 330 feet, a connection for pedestrians and bicycles
- Every 660 feet, a connection for automobiles

To protect existing neighborhoods from potential traffic impacts of extending stub end streets, connector roadways should incorporate neighborhood traffic management strategies into their design and construction. All stub streets should have signs indicating the potential for future connectivity (e.g., “This Road Will Be Extended In The Future”). Additionally, new development that constructs new streets, or street extensions, should provide a proposed street map that:

- Provides full street connections with spacing of no more than 660 feet between connections except where prevented by barriers
- Provides bike and pedestrian access ways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers

- Limits use of cul-de-sacs and other dead-end street systems to situations where barriers prevent full street connections
- Includes no dead-end street longer than 200 feet or having no more than 10 dwelling units

RECOMMENDED ACTIONS FOR MOSCOW

Access management strategies to improve local access and mobility include:

Action RT8. Implement access spacing standards shown above.

Action RT9. Implement specific access management plans for arterial streets (such as Third Street west of downtown) to maximize the capacity of the existing facilities and protect functional integrity.

Action RT10. Work with land use developers during the development application process to consolidate driveways where feasible.

Action RT11. Provide left turn lanes where warranted for access onto cross streets.

Action RT12. Construct raised medians to provide for right-in/right-out driveways as appropriate.

Intersection Modifications

Intersection Mobility and Signal Standards

Traffic operations at City intersections are generally described using a measure known as "level of service" (LOS). Level of service represents ranges in the average amount of delay that motorists experience when passing through the intersection. As shown in Figure 4-11, LOS is measured on an "A" (best) to "F" (worst) scale. At signalized and all-way stop-controlled intersections, LOS is based on the average delay experienced by all vehicles entering the intersection. At two-way stop-controlled intersections, LOS is based on the average delay experienced by the critical movement at the intersection, typically a left-turn from a stop-controlled street.

Figure 4-11 Summary of Intersection Level of Service Conditions

Level of Service	Average delay per vehicle	Traffic flow characteristics
LOS A	Less than 10 seconds; most vehicles do not stop at all	Virtually free flow; completely unimpeded
LOS B	10.1 to 20 seconds; more vehicles stop than LOS A	Stable flow with slight delays; reasonably unimpeded
LOS C	20.1 to 35 seconds; individual cycle failures may begin to appear	Stable flow with delays; less freedom to maneuver
LOS D	35.1 to 55 seconds; individual cycle failures are noticeable	High Density, but stable flow. Common goal for urban streets during peak hour.
LOS E	Font size55.1 to 80 seconds; individual cycle failures are frequent; poor progression	Operating conditions at or near capacity; unstable flow. Common standard in larger urban areas, where some roadway congestion is inevitable.
LOS F	More than 80 seconds; not acceptable for most drivers	Forced flow, breakdown conditions

The City of Moscow does not have adopted transportation performance standards. Therefore, the following minimum motor vehicle operating standards are recommended to be applied to City streets and intersections:

LOS D is considered acceptable at signalized and all-way stop controlled intersections if the volume to capacity ratio (v/c) is not higher than 1.0 for the sum of critical movements. **LOS E** is considered acceptable for the poorest operating approach at two-way stop intersections.

The operating standards should be flexible based on specific project goals, adjacent land use function, and corridor function at the discretion of the City Engineer. Lower mobility standards should be considered with amendments to comprehensive plans that promote City goals such as allowing a mix of uses or targeted density within a set area boundary. These relaxation factors are critical to ensure the City makes context-sensitive and cost-effective investments that ensure the needs of pedestrians and bicyclists are not jeopardized.

Traffic signal spacing standards are also important to consider when evaluating potential intersection control options. Appropriate traffic signal spacing depends on a variety of factors, including adjacent land use, facility type, speed, and traffic volume. Traffic signals that are spaced too closely on a corridor can result in poor operating conditions and safety issues due to the lack of adequate storage for vehicle queues. Optimum traffic signal spacing allows for the coordination of traffic signals along a corridor resulting in reduced overall vehicle delay.

The City will update the minimum traffic signal spacing for minor arterials and collector facilities to 1,000-feet and 600-feet, respectively, as urban conditions permit. Signal spacing closer than 1,000 feet is not desirable as they start to queue back to the next signal and create capacity and safety issues. A variation to the traffic signal spacing

standard may be granted in areas with limited property frontage and/or environmental constraints. Any variation to the traffic signal spacing standard requires the approval of the City Engineer.

Potential Intersection Improvements

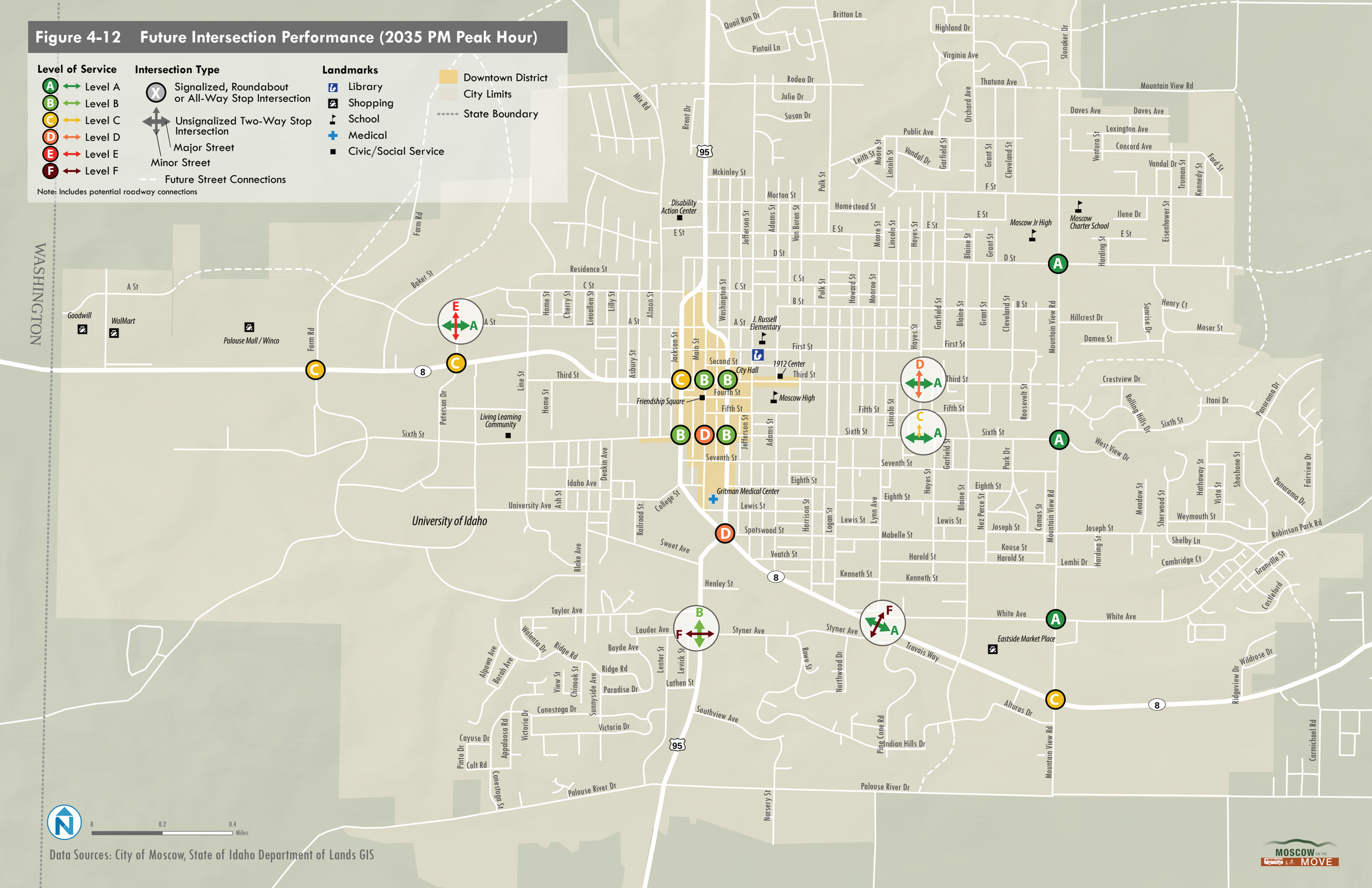
With the addition of the proposed roadway extensions described in the previous sections, the 2035 preferred scenario was developed to forecast study intersection volumes. The operational analysis found that some improvements would be required at the study intersections to accommodate forecast traffic growth.

A number of solutions can be used to solve operational problems at intersections. The following are typical treatments and situations where they would normally apply:

- **Turn lanes:** Installation of dedicated turn lanes, particularly left turn lanes, may improve operations and/or queuing at an intersection by separating left turning traffic from through and/or right turning traffic, allowing turn movements to operate simultaneously.
- **Traffic control:** A number of methods of traffic control may be used to improve traffic operations at an intersection.
  - **All-way-stop control:** This treatment would typically be installed where a two-way stop controlled intersection has a high volume of left turning traffic relative to the through traffic on the mainline. This type of intersection control typically works best where traffic volumes are balanced between intersection approaches, but volumes are not so high as to warrant a traffic signal.
  - **Traffic signals:** A traffic signal would typically be installed when Manual on Uniform Traffic Control Devices (MUTCD) traffic signal warrants are met. These warrants evaluate various conditions to determine if a traffic signal is justified at a specific location. Typical conditions would include a high volume of left turning traffic from the side street conflicting with high mainline traffic volume.
  - **Roundabouts:** This treatment should be considered where a traffic signal would be warranted, but traffic volumes are reasonably balanced between approaches or where left turning traffic volumes are high.
- **Traffic signal timing and coordination:** Optimized traffic signal timing may improve operations at an intersection by allocating the signal green time based on the vehicle demand and reducing overall delay. Signal coordination maximizes vehicle throughput in a corridor with reduced overall stops and delay; however, side street traffic typically experiences longer wait times.
- **Intersection geometrics:** Design treatments can be applied at intersections to improve operations and safety for all users. Treatments vary widely depending on the specific need and intersection characteristics. Examples include design treatments for access management, traffic calming, heavy vehicles, and non-traditional intersection layouts.

Under the 2035 preferred scenario with the future roadway connections in place, several study intersections are expected to operate below standard during the evening peak hour (LOS C or better on ITD facility and LOS D or better on City facility). The 2035 future performance at the study intersections is illustrated in Figure 4-12.

Figure 4-12 Future Intersection Performance (2035 PM Peak Hour)



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The future 2035 intersection performance and recommended projects to improve below-standard intersections are summarized below.

- With the planned reasonably funded improvements, **Line Street/A Street** would operate at LOS E on the side street approach (Line Street only) due to a high volume of northbound right turning vehicles and the short length of the receiving lane on A Street. Although the northbound right turn movement is free (not stop sign controlled), vehicles would need to merge with eastbound through traffic. During peak traffic periods, the eastbound traffic flow may not allow continual merging for northbound right turning vehicles and congested conditions may occur. The intersection would not meet peak hour signal warrants based on the forecast 2035 volumes. No improvements are recommended.
- **SH-8/US-95/Washington Street (South Couplet)** would operate at LOS D overall and LOS F (volume to capacity (v/c) over 1.0) for the eastbound through movement. Eastbound through traffic is currently served with one lane at the intersection (double eastbound right turn lanes also provided). The addition of a second eastbound through lane would improve overall intersection operations to LOS C and reduce the eastbound through movement v/c to under 1.0. This improvement would require significant widening on SH-8 to provide two eastbound through lanes through the intersection (approximately 1,000 feet to the west and east) and retain the existing double right turn lanes. The roadway widening would require additional right-of-way and, depending on how far east the new lanes extend, impact fronting buildings on the south side of the highway. *Improvements to this intersection will require coordination between the City and ITD.*
- **Mountain View Road/White Avenue** would operate with LOS D on the side street which does not trigger required improvements. However, the 2035 forecasts indicate that the approach volumes would be fairly balanced and that two-way stop sign control may not be the most effective treatment. A roundabout controlled intersection would reduce overall vehicle delay and eastbound/westbound approach queues in the future. As intersection traffic operations degrade, the installation of a roundabout is recommended over a traffic signal due to the close spacing to the planned signal at SH-8/Mountain View Road. The future forecasts indicate that roundabout control would provide adequate operations well beyond the 2035 horizon year.
- **US-95/Styner Avenue/Lauder Avenue** would operate at LOS F on the side street approaches but would not meet signal warrants in the future. Although the side street delay would be high, it only occurs for a small number of mostly right turning vehicles.[1] A traffic signal is not recommended but a pedestrian signal should be considered to improve the safety of crossing US-95. *Improvements (including a potential HAWK signal) to this intersection will require coordination between the City and ITD.*
- **SH-8/Styner Avenue/White Avenue** would operate at LOS F on the side street approaches but would not meet signal warrants in the future. Although the side street delay would be high, it only occurs for a small number of vehicles. The intersection currently provides separate northbound and southbound right turn lanes which allow the highest side street movements to turn right without being blocked by the left and through movements. No at grade improvements are recommended, but a bicycle and pedestrian undercrossing is proposed in the Active Transportation Strategy (Chapter 5).

An additional roadway project is recommended that would affect operations at study intersections. These projects and impacts to future 2035 operating conditions are summarized below. The downtown couplet improvement project would remove the outside vehicle travel lanes on Jackson Street from C Street to College Street and Washington Street from Lewis Street to Second Street. Jackson Street (one-way southbound) and Washington Street (one-way northbound) would be reconfigured to a two-lane cross-section with a bike lane and on-street parking. The Jackson Street and Washington Street signals at Third Street and Sixth Street would operate at LOS C or better with the reduction of vehicle capacity.

[1] The side street's left turning vehicles would have higher delay than right turning vehicles. However, right turn volumes are much higher than the left turn volumes. Thus, a new signal would benefit only a small number of vehicles.

Traffic Control Plan

A traffic control plan was developed for the City to show future needs for various traffic control methods at key intersections. The recommendations are based on 2035 forecast volumes and two levels of analysis. Future intersection turn movement volumes were available for the study intersections; therefore, a detailed level of analysis was conducted at those locations. Preliminary traffic signal warrants[2] were evaluated at all unsignalized study intersections under year 2035 preferred scenario. Intersections meeting evening peak hour traffic signal warrants will be analyzed at a future date based on Eight Hour Warrants before installation of a traffic signal occurs. Meeting traffic signal warrants does not guarantee that a signal will be installed but provides criteria to be utilized along with engineering judgment. The installation of a roundabout or four-way stop sign control was also considered for each unsignalized study intersection with substandard performance.

For other key intersections in the City, a high level analysis of future roadway approach volumes (not detailed turn movement volumes) was conducted to approximate the need for traffic signals, roundabouts, and stop signs. Changes in intersection traffic control are recommended at several intersections in 2035 based on the analysis to improve traffic operations and safety for both motor vehicle operators and pedestrians. Recommendations are summarized in Figure 4-13.

Further considerations in determining appropriate intersection traffic control are:

- Traffic signals and roundabouts are both used for traffic control at higher traffic volume locations.
- Roundabouts should be considered where they are expected to perform better than other control modes. Key performance considerations are vehicle delay, safety due to conflicting vehicle movements or other operational problems.
- Roundabouts tend to work better when traffic volumes are evenly balanced on all approaches and where there are a high number of left turning vehicles.
- Traffic signals can cause unnecessary delay for many reasons. Some of the reasons include:
  - The need to provide minimum green time to every movement, every cycle, regardless of whether there are vehicles entering the intersection on that movement.
  - There is "lost time" associated with startup and termination of a green phase.
  - Left turns in shared lanes can impede other movements in the shared lane.
  - Heavy left turn demands can rob signal time from other major movements.
  - Signals are dependent upon power, which may fail on occasion or may not be available at an intersection.

RECOMMENDED ACTIONS FOR MOSCOW

Action RT13. Intersection Improvements – Construct recommended solutions to mitigate future operational problems at intersections.

Action RT14. Traffic Control Plan – Implement the plan as future intersection volumes increase and capacity improvements are needed.

Action RT15. Intersection Mobility Standards – Adopt intersection mobility standards with flexibility under specific conditions.

Action RT16. Traffic Signal Spacing – Require a minimum signal spacing of 1,000-feet on minor arterials and 600-feet on collectors.

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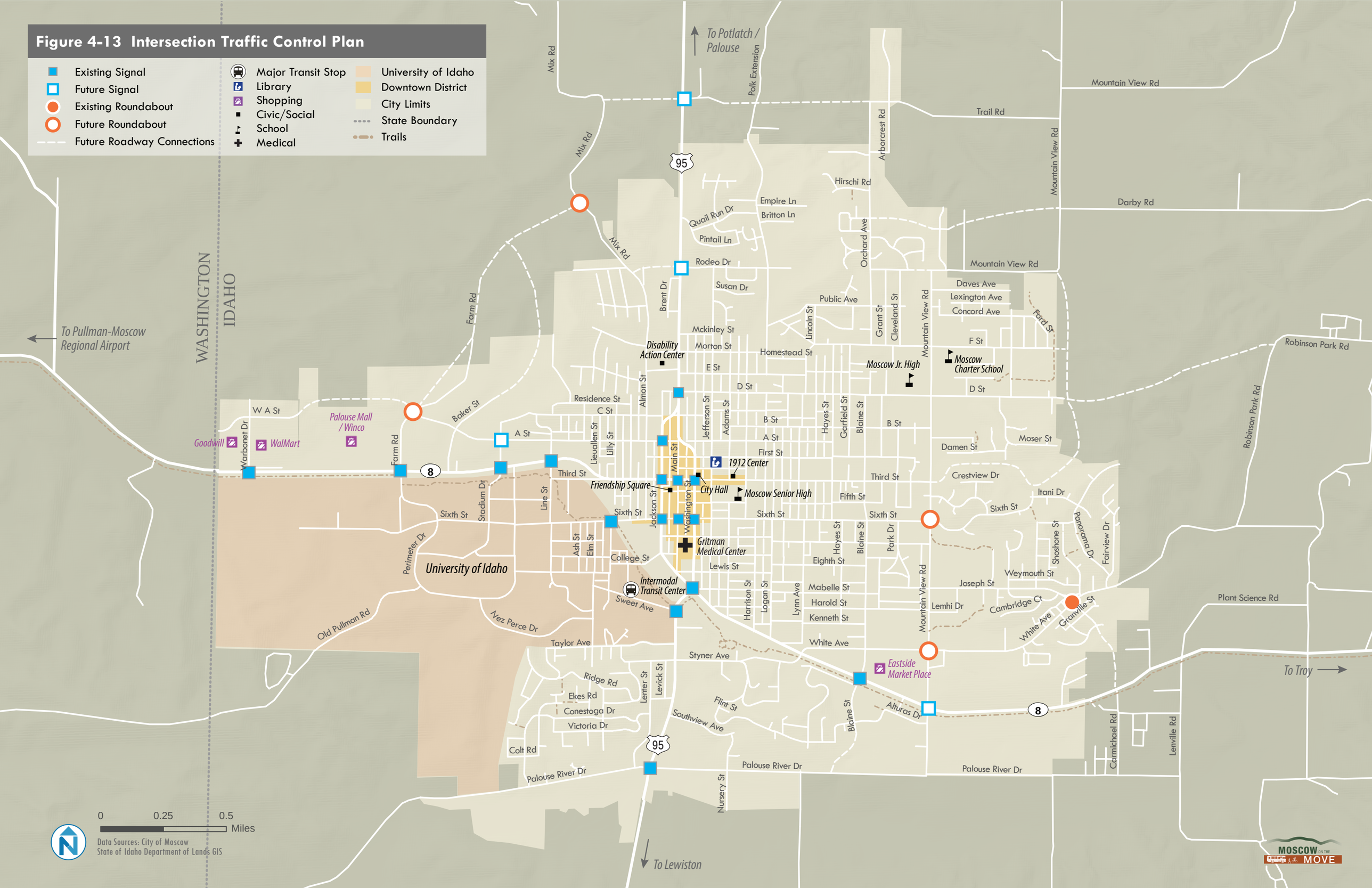
[2] Preliminary Signal Warrants, MUTCD Warrant 3 (Peak Hour Vehicular Volume).

Figure 4-13 Intersection Traffic Control Plan



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Networked Street Improvement Approach

Moscow on the Move recommends that the City of Moscow pursue a network strategy comprised of a "patchwork" of smaller projects to address peak hour traffic congestion, manage roadway capacity issues, improve street connectivity, and address safety issues. These projects would build out the street grid in partially developed or undeveloped areas and improve connectivity in more established neighborhoods. A key outcome of this approach is to expand opportunities for all modes of travel on streets that are currently designed for automobiles only.

The alternate approach that many cities have tried is to expand the capacity of individual roadways through widening and adding lanes. Although some street projects may be recommended for capacity improvements in *Moscow on the Move*, using this approach as a blanket tool often yields diminishing returns. The congestion-reduction benefits of this scenario is typically short-lived as the capacity attracts additional vehicle trips from other routes, times, and modes of travel. Such roadways become less attractive to walking and bicycling and eventually evolve into significant barriers within a community. *Moscow on the Move* aims to keep traffic moving, but in a way that does not detract from the livability of Moscow's neighborhoods or the economic health of its downtown and business areas.

Roadway and traffic operations project types

Using the street improvement patchwork approach, the roadway and traffic operation improvement projects recommended in *Moscow on the Move* can be categorized into six primary project types. The project types include corridor improvements and operational improvements at intersections. The project types include:

- **Reasonably Funded Projects (F):** Reasonably funded improvements may not have a dedicated funding source today but are considered likely to be constructed by the 2035 horizon year. This project type is separated to allow comparison between future baseline conditions and other street improvement scenarios.
- **Complete Street (CS):** Complete Streets are streets that safely and comfortably accommodate all modes of travel, including pedestrians, bicycles, transit, motor vehicles, and freight depending on the unique role and requirements of each street. Complete Streets are streets and intersections planned, designed, and operated to consider the needs of all travelers, including people of all ages and abilities who are taking public transit, biking, walking, or driving. The City of Moscow should formally adopt a Complete Streets policy and design standards as an implementation tool of *Moscow on the Move*. It is recommended that all street projects – new and retrofits – for all street classes be developed using Complete Street policies and standards.
- **Retrofits/Road Diet (RD):** "Road Dieting" is a tool used to reconfigure or redesign streets with excessive capacity that do not integrate well with their surrounding land use context, or that pose significant safety concerns spurring from speeding. Road diets are typically conducted on streets with traffic volumes less than 20,000 ADT (average daily traffic). The highest daily volumes in Moscow are on SH-8 west of downtown which serves approximately 15,000 vehicles a day. A common example is to reconfigure a four lane arterial or collector down to three lanes – one travel lane in each direction with a center turn lane and bike lanes. The center turn lane increases safety and compensates for the loss of a through travel lane, since turning vehicles no longer block a travel lane of traffic, and turning drivers have better visibility of oncoming vehicles. Depending on the roadway function and surrounding land use context, the street can be restriped to introduce on-street parking. A common benefit derived from road diets is that reconfigured lanes may be narrower than existing lanes, which, combined with on-street parking and other arterial traffic calming features, can result in lower motor vehicle speeds.
- **Grid Connectivity Improvements (GC):** In parts of Moscow that have already been developed with cul-de-sacs or where topography or creeks create barriers to efficient travel, poor street connectivity increases walking times and distances, making it less attractive to walk to retail establishments or to access transit.

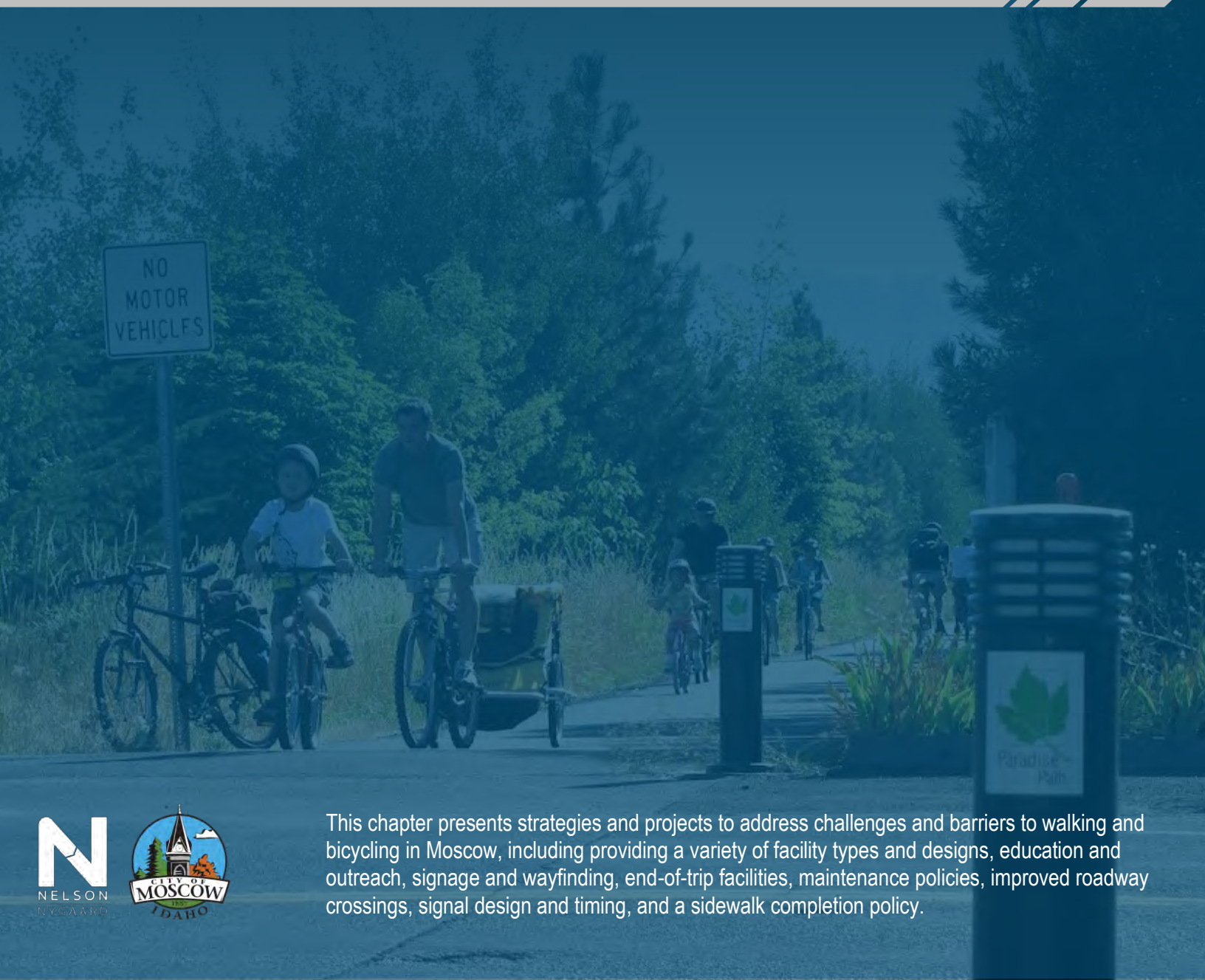
This plan identifies street connections that expand travel options by all modes – car, bicycle, walking, and transit. In parts of Moscow that are planned for development, particularly in areas south of Troy Highway and east of Mountain View Road, street connectivity guidelines developed in the sections above should guide street network expansion.

- **Traffic Calming Projects (TC):** Traffic calming is a set of measures used to address the negative impacts of unchecked speed and volume on neighborhood streets. Traffic calming projects enhance safety and do not impede the multi-modal use of the streets (measures should not limit the use of the street by public transit, emergency response, maintenance activities, school buses, delivery vehicles, pedestrians, or bicycles). Ideal locations for traffic calming treatments are roadways that are used for through trips to avoid using a parallel route that would take more time and roadways with active pedestrian and bicycle use.
- **Intersection Improvement (II):** Intersection improvement projects can include new traffic control (signals, roundabouts, and all-way stop), signal timing optimization, and other signal system/traffic management improvements. The intersection improvement needs in Moscow are primarily triggered by future capacity and safety deficiencies.
- **Downtown Streetscape Improvements (DS):** Projects that target investments in downtown placemaking and streetscape beautification features such as decorative street lighting, bollards, curb extensions, and street trees.

All projects are prioritized and phased for implementation in the Plan's Action Manual. See the Capital Improvement Program in Chapter 8 for a detailed list of projects and a comprehensive project map.

ESTABLISHING MULTI-MODAL STRATEGIES | CHAPTER 5

Active Transportation Strategy



This chapter presents strategies and projects to address challenges and barriers to walking and bicycling in Moscow, including providing a variety of facility types and designs, education and outreach, signage and wayfinding, end-of-trip facilities, maintenance policies, improved roadway crossings, signal design and timing, and a sidewalk completion policy.

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5 ACTIVE TRANSPORTATION STRATEGY

The City of Moscow has all of the ingredients to become a great walking and bicycling city. The city has walkable and bikeable distances (i.e., no point within the city limit is farther than 1¾-miles from downtown Moscow or the University of Idaho), a well-used trail system, and an active bicycle advocacy community.

This Transportation Commission "check mark" icon signifies which actions have unanimous support from the Commission. The icon is a way to illustrate level of support for implementation.

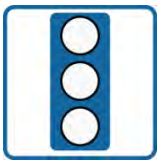
This Active Transportation Strategy provides potential strategies and recommendations to address challenges and barriers, and to improve the walking, bicycling, and access to transit experience in Moscow. This strategy seeks to remove the element of apprehension associated with walking and bicycling in Moscow by implementing measures that will reinforce walking and bicycling as pleasant and reasonable choices for short trips for a sizable segment of the City's population. The Active Transportation Strategy will help the City maintain its current bicycle and walking commute mode share (over 25% of all commute trips by bike or on foot) and increase the number of non-commute trips (e.g., shopping, medical, recreation trips) made on foot or by bicycle. These are not only key City objectives, but also indicators of community walk- and bicycle-friendliness.

Images from Jen Heiber (top), Latah Trail Foundation (left), and Nelson\Nygaard (right)

CORE ACTIONS: CREATING A WALKABLE AND BIKEABLE CITY

Chapter 2, Getting Around Moscow Today, and more comprehensively, the Transportation Fact Book, clearly lay out the issues and challenges related to navigating Moscow's streets on foot and by bike. These challenges range from topography to difficulty crossings of arterials and highways. Based on these unique issues, the Active Transportation Strategy establishes a core group of solutions that will enhance walking and bicycling conditions for people of all ages and abilities. Figure 5-1 summarizes these solutions and the sections below illustrate how each solution address issues that impact the walking and bicycling experience in Moscow.

Figure 5-1 Core Active Transportation Actions for Moscow

Core Actions	
Variety of Facility Types and Designs. Not all bicyclists want, or have the skill level, to use bike lanes on Moscow's major streets. Providing a variety of facilities, from bike lanes to shared lanes markings (sharrows) to neighborhood greenways to trails allows users of all ages and abilities to reach many destinations on foot or by bike.	
Education and Outreach. Education and outreach about sharing the road safely, and about the resources available to all roadway users, can be conducted in a variety of ways. The City should identify the most effective way to reach the community and help educate them.	
Signage/Wayfinding Plan. Wayfinding signs displaying destinations, distances, and "riding/walking time" can dispel common misperceptions about bicycle travel time and distance while increasing users' comfort and understanding of the non-motorized network. Wayfinding signs also alert motorists that they are driving along a bicycle route and should use caution.	
End-of-Trip Facilities. Bicycle parking is an important component in encouraging people to use their bicycles for everyday transportation. Studies have shown that people are willing to bicycle more frequently if better end-of-trip bicycle facilities are provided.	
Maintenance Policies. The quality and condition of bicycle and pedestrian facilities are essential to the long term success of the networks. If the systems are well maintained and cared for, it will ensure both the safety and enjoyment of the residents and visitors who use them. This includes the need to maintain key bicycle and pedestrian routes during snow events.	
Improved Roadway Crossings/Pedestrian-Friendly Intersections. Improvements of major crossings are an important part of overcoming barriers. The City should prioritize and pursue improvements whenever possible. High-visibility markings, lights, and other visual cues can be effective. Crossings may also include a refuge island.	
Signal Design & Timing. Accommodating bicyclists and pedestrians at traffic signals can be challenging for traffic engineers as the needs and characteristics of bicycles, pedestrians, and motor vehicles vary. The difference in acceleration and speed provides some challenges that can be addressed with signal timing	
Sidewalk Infill/Completion Policy. Completing sidewalk gaps improves pedestrian connectivity by providing a continuous, barrier-free walkway easily accessible for all users. The City should prioritize and pursue sidewalk improvements whenever possible.	

Facility Variety

Sidewalks, shared-use paths, bike routes, and crosswalks should facilitate the mobility of residents of all ages and abilities. The pedestrian and bicycle network should employ principles of universal design (i.e., designing for older adults, youth, and persons with mobility and cognitive impairments). Bicyclists have a range of skill levels, and facilities should be designed with a goal of providing for inexperienced and recreational bicyclists (especially children and seniors) to the greatest extent possible. See the Active Transportation Toolkit (Appendix B) for additional guidance on the design and application of a variety of bicycle and pedestrian facilities.

Bicycle Facility Types

Shared Roadways are bikeways where bicyclists and motorists operate within the same travel lane, either side by side or in single file depending on roadway configuration. This facility provides continuity with other bicycle facilities (usually bike lanes), or designates preferred routes through high-demand corridors.

Shared roadways may also be designated by pavement markings, signage, and other treatments including directional signage, traffic diverters, chicanes, chokers and/or other traffic calming devices to reduce vehicle speeds or volumes. Such treatments often are associated with **Neighborhood Greenways**—a key component of Moscow's future bicycle network.

Separated bikeways, such as **bike lanes**, use signage and striping to delineate the portion of the roadway where bicyclists have priority and where general purpose travel lanes are present. Bike lanes encourage predictable movements by both bicyclists and motorists.

Cycle Tracks are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.

Shared Use Paths are facilities separated from roadways for use by bicyclists and pedestrians.

Expanding Moscow's Bicycle Network

Currently, the City of Moscow has a limited number of bicycle facilities that make up the bulk of the bicycle network—consisting of bike lanes on the highway and several sections of major roadways, the Paradise Path, and signed bike routes—and limited sidewalk coverage particularly in areas outside of downtown. Identifying and providing a more complete bicycle and pedestrian network that incorporates Neighborhood Greenways and expands the bike lane and sidewalk network will provide greater connectivity and opportunity for biking and walking. See Figure 5-14 on page 5-23 for Moscow's planned bikeway network at build out.

Figure 5-2 Facility Variety Benefits

Issue/Challenge Addressed	Benefits/Improvements
Rethinking Auto-Centric Street Design	Using the Active Transportation Toolkit (Appendix B) and the updated Street Standards, Moscow should explore the opportunity to modify the cross-sections of certain existing roads (within the curb-to-curb width), as well as roadways programmed for improvements (including right-of-way acquisition) to provide bicycle facilities. Identified roads include: ▪ White Avenue (west of Mountain View Road) ▪ Line Street ▪ Farm Road ▪ Jackson Street/Washington Street couplet Conversion of underutilized roadways can enhance vehicular safety and provide an opportunity to add on-street bicycle lanes/buffered bicycle lanes.
Overcoming Topography	Pedestrians and cyclists alike select their route based on topography. As such, identifying a connected network of Neighborhood Greenways to provide low-traffic, low-stress routes for bicyclists and pedestrians that follow the topographic lines will provide routes that have easier grades and encourage active transportation in Moscow. Identified roads include: ▪ Lynn Avenue /Monroe Street /Lincoln Street ▪ Park Drive/Cleveland Street ▪ E Street ▪ Second Street/Van Buren Street/B Street The City should implement a pilot neighborhood greenway to familiarize citizens to the design features and benefits of this type of bicycle and pedestrian improvement. The pilot project can include lower cost, temporary installations before investing in more costly permanent traffic calming features. In addition, some of the trail connections throughout town are stairways, and the opportunity to retrofit the stairways with runnels or wheel gutters wherever feasible should be explored. Runnels are wheel channels installed on the side of stairways to facilitate carrying a bicycle up or down stairs.
Expanding Connections and Sidewalk Coverage	Providing a variety of facilities will help Moscow fill in gaps in the existing bicycle network. See the recommended network map for all proposed facilities and how they form a connected network. The City of Moscow has worked consistently over the last several years to implement the Mobility Task Force's 2010 recommendations for priority sidewalk segments. Additional recommendations on addressing the priority sidewalk infill needs are addressed further in the next section.
Facilitating Downtown Access/Commercial Center Access	Providing safe bicycle access through a variety of facility types – bike lanes, sharrows, neighborhood greenways, and the path system – will allow bicyclists of all abilities to ride to and from downtown and other commercial and activity centers on a facility they are comfortable riding on.
Expanding Bikeways with City Expansion	As the City of Moscow expands, the bikeway network must expand with it. As a general matter of policy, new street connections that are to be classified as collector and arterial roadways—or that will effectively serve a function of thoroughfare connection, regardless of their classification—should be equipped with on-street bicycle lanes. These roads include: ▪ Mountain View Road ▪ Palouse River Drive ▪ D Street ▪ F Street ▪ Third Street

RECOMMENDED ACTIONS FOR MOSCOW

TC **Action AT1.** Utilize the Active Transportation Toolkit to develop a variety of facilities useable by people of all ages and abilities.

TC **Action AT2.** Retrofit existing stairway connections with wheel channels to facilitate moving bikes up and down stairways.

TC **Action AT3.** Expand the bicycle network as the city's collector and arterial street network expands.

Education & Outreach

The infrastructure recommendations in this strategy will provide safer, more comfortable places for further growth in bicycling, walking, and trail use. However, while improving infrastructure is critical to increasing non-motorized transportation rates, the importance of outreach, education, and evaluation efforts should not be underestimated.

Bicycling and walking programs are an essential and effective complement to infrastructure investments. The goals of education and encouragement programs are to:

- Disseminate walking and bicycling information widely to residents and visitors
- Increase expertise, knowledge, and acceptance of walking and bicycling
- Raise Moscow's profile within its resident population as a great place to walk, bicycle, and use trails
- Support a sustainable tourism industry based on active recreation
- Foster a culture of bicycling and walking as safe, convenient modes of transportation.

Programs can ensure that more residents will know about and use new and improved facilities, learn about the benefits of bicycling and walking, and receive positive reinforcement about why and how to integrate bicycling and walking into their everyday lives. In essence, these efforts market bicycling and walking to the general public and provide the maximum "return on investment" in the form of more people bicycling and walking and a higher degree of safety and awareness around non-motorized transportation.

Expanding Active Transportation Education and Awareness Campaigns

The City of Moscow has the opportunity to increase education and outreach materials available to all residents through citywide efforts and partnership efforts with established groups/organizations like the University of Idaho, the Paradise Path Task Force, Safe Routes to School Moscow, and Smart Growth Idaho.

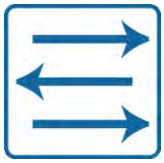
Figure 5-3 Education & Outreach Benefits

Issue/Challenge Addressed	Benefits/Improvements
Rethinking Auto-Centric Street Design	Sharing facilities with other road users requires education of all the users about their rights and responsibilities, as well as how to behave courteously, safely, and visibly. Due to the growing need to address concerns of both cyclists and drivers as they use Moscow roads and multiuse paths, a citywide “Share the Road” campaign is recommended. A citywide campaign utilizing Public Service Announcements (PSAs), billboards, advertising on transit vehicles and benches, signage; as well as other outreach methods, will communicate the “Share the Road” message to all roadway users.
Improving Bicyclists’ Behavior	Moscow can work with partners to develop an outreach effort aimed at bicyclists. Educating bicyclists on being courteous to other roadway users and lawful riding will address behavior issues (perceived and actual) such as wrong way riding, sidewalk riding, and safe riding habits (clothing, helmets, etc). Potential partners include: local bike shops, Safe Routes to School Moscow, the University of Idaho, Bike for Life, and various employers in the city.
Improving Legibility	In conjunction with a citywide wayfinding system (Action AT3 above), provide maps and educate all residents about what different bicycle facilities look like. Exposing citizens to Neighborhood Greenways, how they perform, and how they connect throughout the city will be important to increasing active transportation use.
Cultivating Public Awareness	Communicating the connected nature of the variety of bicycle and pedestrian facilities through different outreach methods- PSAs, specific events and celebrations, booths at citywide gatherings (Farmer’s Market, etc) – and letting residents and visitors know about the active transportation network and how to use it is a key step to seeing more people out walking and biking.

RECOMMENDED ACTIONS FOR MOSCOW

Action AT4. Expanding upon recent safety and Safe Routes to School efforts, develop a branded and coordinated Active Transportation education, encouragement, and public awareness campaign with community partners.

Signage/Wayfinding Plan



Navigating through Moscow by bicycle or on foot should be facilitated by wayfinding aids that help orient people to new routes or modes of travel. Placing signs throughout Moscow indicating to bicyclists the location of destinations and the riding time/distance to those destinations will increase users' comfort and accessibility to the bicycle system. Wayfinding signs also alert motorists that they are driving along a bicycle route and should use caution.

Signs are typically placed at key locations leading to and along bicycle routes, including intersections. Signage can serve both wayfinding and safety purposes including:

- Familiarizing users with the bikeway system
- Helping users identify the best routes to destinations
- Addressing misperceptions about time and distance
- Overcoming a "barrier to entry" for people who do not bicycle often (i.e., 'interested but concerned' cyclists)

Wayfinding signs are a cost-effective means of improving the walking and bicycling environment. A community-wide Bicycle Wayfinding Signage Plan would identify sign locations along existing and planned bicycle routes and sign design (e.g., information related to destinations to be highlighted on each sign and approximate distance and riding time to each destination).

Defining Bicycle Routes and Improving Network Understanding

As noted earlier, one of the strategies for addressing challenges to walking and biking, such as topography, indirect connections, and auto-centric street design, is to provide a variety of facilities for users of all abilities. Developing a comprehensive signage and wayfinding system to complement that network of facilities should be a priority for the City of Moscow. More information on developing a signage/wayfinding plan can be found in the Active Transportation Toolkit (Appendix B).

Figure 5-4 Signage/Wayfinding Plan Benefits

Issue/Challenge Addressed	Benefits/Improvements
Improving Highway Crossings	As noted in the previous section, crossing SH-8 and US-95 can be a difficult endeavor for bicyclists and pedestrians. A wayfinding and signage system could direct non-motorized users to enhanced or signalized crossings, making the crossing easier and safer for all roadway users.
Expanding Direct Connections	With the topographic challenges and gaps in the connectivity of the street network, providing a comprehensive wayfinding plan will provide a branding or identity for the overall bicycle network while communicating to all roadway users the most direct route along the various bicycle facilities.
Facilitating Commercial Center Access	People seeking to access commercial centers outside of downtown, such as the Eastside Marketplace or the Palouse Mall, by bicycle or on foot will be aided greatly by a comprehensive wayfinding system that identifies the most bicycle- and pedestrian-friendly routes with travel times.
Improving Legibility	Attracting new users to a bicycle network becomes easier when the bicyclist is confident of navigating throughout the city. A potential option to improve system legibility is to install a network of wayfinding that communicates to cyclists the safest and quickest routes to key destinations.

RECOMMENDED ACTIONS FOR MOSCOW

Action AT5. Produce a Bicycle Wayfinding Signage Plan identifying sign locations, sign information, and an attractive brand/sign design. Implementing this plan should be an interim implementation step to building the 20-year bikeway network.

End-of-Trip Facilities

Just as car trips vary in purpose and duration, so too do bicycle trips. Because of the varied nature of bicycle trips, different types of bicycle parking should be provided to accommodate these needs. These needs can be met by providing both short-term and long-term bicycle parking. The Association of Pedestrian and Bicycle Professionals (APBP) addresses the distinction between short- and long-term parking in the *Bicycle Parking Guide, 2nd Edition, 2010*.

Communities use different metrics for assigning appropriate levels of bicycle parking, including:

- Unit count
- Percentage of building square footage
- Building occupancy
- Percentage of car parking

The recently updated APBP Guidelines recommend decoupling bike parking supply from car parking supply. The reason for this is that using percentage of car parking supply is not necessarily a good measure of the number of cyclists who would be expected to travel to a particular destination, especially in densely urbanized areas or where multiple travel options exist. We recommend a land use-based approach with location-specific measures of supply such as parking spaces per square footage of retail.

Expanding End-of-Trip Facilities in Moscow

At present, a large amount of bicycle parking is provided in Downtown Moscow, but parking options are limited in many areas outside of downtown and demand is beginning to surpass available supply in key locations. To expand bike parking options and availability, Moscow should consider adopting general bicycle parking requirements that extend to all land uses. Since this has been a difficult issue in the past, the City of Moscow should engage in a citywide (or perhaps downtown district-wide) discussion focused on the benefits of additional bike parking (e.g., how more bike parking can benefit local businesses) with the goal of cultivating business-led bicycle parking improvements with the potential to develop a future bicycle parking ordinance. In the near-term, the City should serve as the lead implementer of downtown bicycle parking. The expansion of bicycle parking will encourage more trips to be made by bicycle.

Figure 5-5 End-of-Trip Facility Benefits

Issue/Challenge Addressed	Benefits/Improvements
Overcoming Topography	With topographic challenges clearly identified as an issue for many potential bicycle users in Moscow, the ability to maintain access to a bicycle at a second location (work, school, etc) for completing trips around town becomes a way to support active transportation in Moscow. Having secure, covered, long-term bike parking would allow residents to have access to a bike when needed, but still walk, drive or take transit as part of their work commute.
Facilitating Downtown/Commercial Center Access	As the city of Moscow's bicycle network develops (including wayfinding signage to direct people to destinations throughout town), the need for secure short- and long-term parking at those destinations increases. Bike parking serves both employee and employers by providing an incentive to bicycle to work. The knowledge that there will be a safe and secure location to lock-up a bicycle at their work or shopping destination also encourages residents to consider biking to work or shopping.

RECOMMENDED ACTIONS FOR MOSCOW

Action AT6. Conduct an extensive education and engagement process with the community and business stakeholders to adopt a downtown bicycle parking improvement program and/or a citywide bicycle parking ordinance.

Action AT7. Create a supply of covered bicycle parking in downtown and at other commercial centers.

Maintenance Policies

The quality and condition of bicycle and pedestrian facilities are essential to the long term success of the networks. If the systems are well maintained and cared for, it will ensure both the safety and enjoyment of the residents and visitors who use them. A proper maintenance program will reduce long-term costs by extending the life of the components and it will also win the continued support of the residents, homeowners, and businesses.

Improving City Response to Maintenance Needs

As with any community, the City of Moscow must continually address reduced quality in bicycle and pedestrian facility conditions. Some streets of Moscow exhibit potential hazards, such as sidewalk cracking, pavement drift, and exposed railroad tracks, that need to be addressed through regular maintenance programs and policies. Responsibility for sidewalk maintenance, including repair and snow removal, primarily lays with property owners, and in some cases the City. The City should catalog all existing maintenance needs to better understand maintenance priorities and reevaluate available tools to make improvements. The City is actively pursuing this maintenance catalog.

Figure 5-6 Maintenance Policy Benefits

Issue/Challenge Addressed	Benefits/Improvements
Ensuring Regular Maintenance	On- and off-street walkways and bikeways require regular maintenance and repair. Walkway maintenance includes fixing potholes, sidewalk decay, damaged benches, and re-striping crossings. Sidewalk repair is usually the responsibility of individual property owners and the City of Moscow sponsors a sidewalk improvement program to assist property owners with repairs and encourage a more functional system. On-street bikeways are typically maintained as part of standard roadway maintenance programs. Extra emphasis should be put on keeping bike lanes and roadway shoulders clear of debris and keeping vegetation overgrowth from blocking visibility or creeping into the roadway.
Repairing/Replacing Damaged Sidewalks	Sidewalk surfaces become degraded over time, with tree roots, weather, and other factors creating an uneven surface. Moscow should continue its program of repairing and replacing damaged and deteriorated sidewalks where surfaces have cracked or pavement has heaved. Areas that have high pedestrian use or where the condition of sidewalks is particularly problematic should be targeted for improvements first.
Maintaining Facilities During Winter	Winter weather conditions can create challenges both in terms of cyclist and pedestrian use and system maintenance. Frequent snow events require plowing of major roadways after most snow falls to make the roadways traversable for all users. Frequent plowing reduces the lifetime of paint and other materials used to mark bicycle lanes or shared roadways, unless the roadway surface is ground out and markings installed below the level of the plow blade. Sidewalks require specialized equipment to remove the snow efficiently, so sidewalk snow removal should be prioritized along with the vehicle snow routes, with priorities based on the sidewalk infill criteria established in the following section. Additional strategies are located in the Snow Removal section below.

RECOMMENDED ACTIONS FOR MOSCOW

Action AT8. Develop a maintenance database that catalogs all existing maintenance needs to better understand maintenance priorities and reevaluate available tools to make improvements.

Crossings & Intersections

Crossing beacons and signals facilitate crossings of roadways for pedestrians and bicyclists. Beacons make crossing intersections safer by clarifying when to enter an intersection and by alerting motorists to the presence of pedestrians and bicyclists. Flashing amber warning beacons can be utilized at unsignalized intersection crossings. Push buttons, signage, and pavement markings may be used to highlight these facilities for pedestrians, bicyclists, and motorists.

Enhancing Pedestrian and Bicycle Crossings at Highways and Arterials

Crossings at various locations along SH-8 and US-95 have limited visibility, sightline issues, and signal delay for pedestrians. In addition, clear and legible connections to the regional trails were identified as a challenge by residents of Moscow during outreach activities. Determining which type of signal or beacon to use for a particular intersection depends on a variety of factors. These include speed limits, traffic volumes, and the anticipated levels of pedestrian and bicycle crossing traffic. If any of those identified factors preclude the use of an at-grade crossing, then the feasibility of an over- or undercrossing should be explored.

Troy Highway has two such locations where the presence of a grade separated crossing would provide a critical non-motorized system link by connecting the businesses and neighborhoods north of the highway with the Paradise Path. Those locations are identified below, along with additional potential crossing improvements. More information on crossing types may be found in the Active Transportation Toolkit in Appendix B.

Key Principles of Bicycle and Pedestrian-Friendly Intersection Design

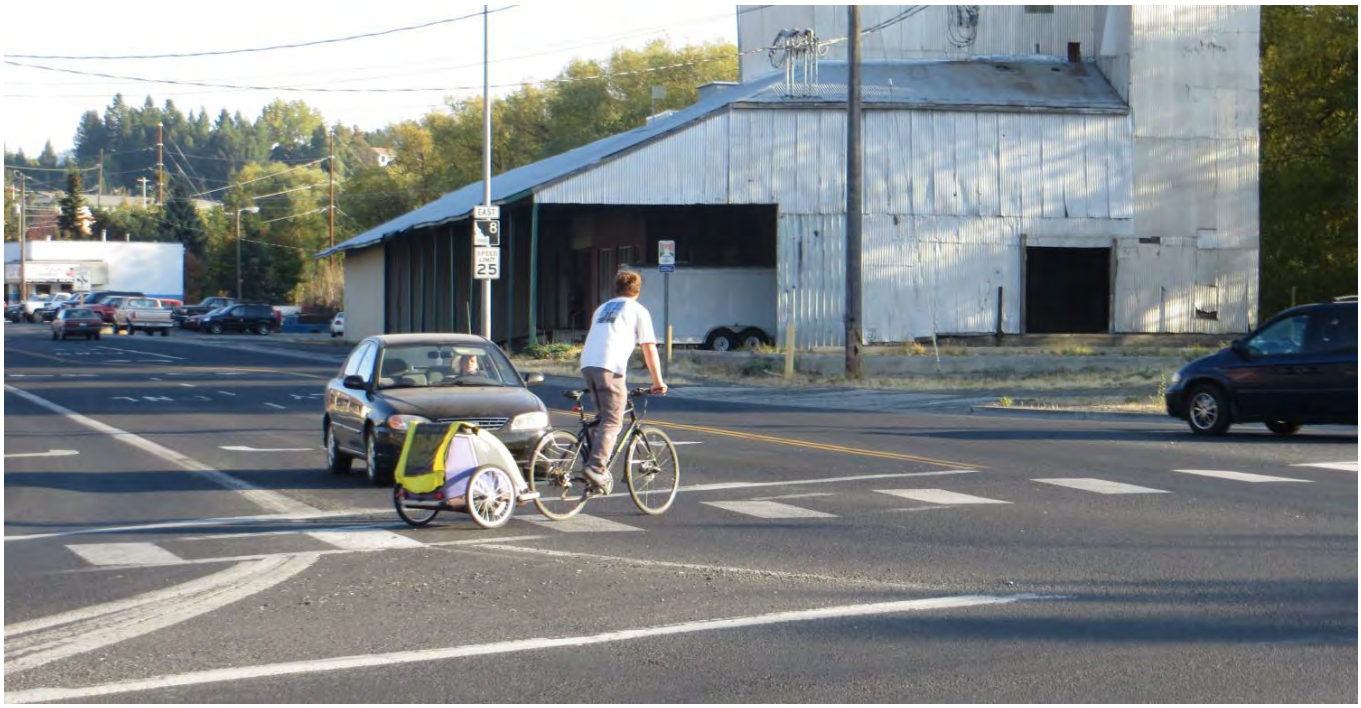
Attributes of bicycle and pedestrian-friendly intersection design include:

- **Clear Space:** Corners should be clear of obstructions. They should also have enough room for curb ramps and for transit stops where appropriate.
- **Visibility:** It is critical that pedestrians on the corner have a good view of vehicle travel lanes (depending on traffic speeds) and that motorists in the travel lanes can easily see waiting pedestrians.
- **Legibility:** Symbols, markings, and signs used at corners should clearly indicate what actions pedestrians and bicyclists should take.
- **Accessibility:** All corner features, such as curb ramps, landings, call buttons, signs, symbols, markings, and textures, should meet accessibility standards and follow ADA or universal design principles.
- **Separation from Traffic:** Sidewalks should be furnished with buffers from traffic including planter strips (widths vary by land use, traffic speeds, and volume) and /or on-street parking.
- **Lighting:** Adequate lighting is an important aspect of visibility, legibility, and accessibility at crossings.

These attributes will vary with context but should be considered in all design processes.

A popular, yet challenging highway crossing at S Washington Street and Lewis Street.

Image from Nelson\Nygaard



Establishing more comfortable crossings at highways and arterials is a key element of *Moscow on the Move's* Active Transportation Strategy.
Image from Nelson\Nygaard

Figure 5-7 Crossings & Intersections Improvement Benefits

Issue/Challenge Addressed	Benefits/Improvements
Improving Highway Crossings/Trail Connections	The state highways (SH-8 and US-95) act as a barrier to bicycle and pedestrian travel with their high-traffic volumes, higher speed vehicles (except in the downtown couplet), limited number of protected crossing opportunities, and short crossing times at some signalized intersections. Potential solutions include developing well-lit and signed grade separated crossings and installing high visibility crossings with user actuation. Signalized crossings should support walking speeds of 3.5 feet per second during green walk phases. Highway crossing improvements and potential types were identified for the following locations: ▪ US-95 at E Street (median island with new signage) ▪ US-95 at Styner/Lauder Avenue (bicycle/pedestrian signals with countdown signal head) ▪ SH-8 at White/Styner Avenue (grade-separated undercrossing) ▪ South Couplet (signal phase timing adjustment)
Facilitating Downtown Access	Along with the highway crossings, several crossings of local roadways were also identified for improvements, to coordinate with the expanded bicycle and pedestrian network. Those locations include: ▪ Asbury Street at Third Street (Rectangular Rapid Flash Beacons [RRFBs] with signage and pedestrian refuge; see the Active Transportation Toolbox for more information on this signal type) ▪ Almon Street at Third Street (RRFBs with signage and pedestrian refuge) ▪ Almon Street at A Street (RRFBs with signage and pedestrian refuge) ▪ Liueallen Street at Pullman Road (RRFBs with signage and pedestrian refuge) ▪ Sixth Street at Main Street (install green left turn queue box [pictured] on the southeast corner of the intersection to facilitate eastbound left turns onto Main Street; this will require a right turn on red restriction for northbound traffic on Main Street) 

Signal Design and Timing

Bicyclists and pedestrians have unique needs at signalized intersections. Pedestrians typically travel more slowly than motor vehicles and can find themselves with inadequate time to clear an intersection before the conflicting green phase begins if the signal time is not adequate. Depending on signal phasing through a corridor, bicyclists may travel at the same rate as motor vehicles. To incorporate bicyclists and pedestrians into signal design and timing, the time allowed for reacting to the change in signal, starting up and accelerating to free flow speed, plus the time to clear the width of the intersection, must be accommodated within the combined time of the green plus amber change intervals. The duration of both the green and amber intervals of signals is typically determined by the expected motor vehicle startup, acceleration, and speed through an intersection, which may be faster than the average cyclist speed when signal phasing prioritizes motor vehicle throughput. Methods for better accommodating bicyclists and pedestrians once they have been detected at an intersection include:

- Increase the minimum green interval to allow bicyclists and pedestrians to clear the last conflicting lane. Bicyclists may have slower speeds and accelerations than motor vehicles and even if they are at the head of the vehicle queue when a green light is given, the bicyclist may still lack sufficient time to clear the intersection during the green. This is particularly important at highway crossings.
- Install pedestrian countdown heads at all future signalized crossings. These countdown signals provide immediate feedback to the pedestrian or bicyclist, indicating the amount of crossing time still available.
- Lengthen the amber change interval of the intersection slightly to allow for the slower acceleration and speed of bicyclists. This should be only part of the solution as longer amber intervals can also encourage motor vehicles to enter intersections under this phase.
- Lengthen the 'all red' clearance interval of the intersection. This allows any pedestrians, motorists, or bicyclists still in the intersection to clear before a green interval is given to opposing traffic. The maximum length of the 'all red' phase should not generally be greater than three seconds.
- If demand warrants, rest the signal in green on the street that serves the high priority bicycle network.
- Time coordinated signals in the urban core to keep travel speeds relatively low, such as 20 miles per hour, which will also accommodate bicyclists traveling 10 miles per hour. This strategy makes it possible to alter signal timing to provide 'green waves' for bicyclists without significantly impeding motor vehicle flow.
- Install "bicycle only" traffic signals in areas of high conflict or unique geometry to trigger a bicycle only phase.
- Use signal detection to detect moving bicyclists. Video detection technology can be programmed to detect the presence of bicyclists and trigger a bike phase or extend the green phase based on their presence in a bike lane.

An example of a pedestrian countdown head.

Image from Nelson\Nygaard

Designing Multi-modal Traffic Signals

Pedestrian and bicyclist safety and accessibility in Moscow could be improved through modifying signal design and timing. For example, downtown signals at Jackson Street and Washington Street force pedestrians to actuate the signal instead of providing an automatic WALK phase, contributing to pedestrian delay.

Figure 5-8 Signal Design and Timing Improvement Benefits

Issue/Challenge Addressed	Benefits/Improvements
Reducing Pedestrian Delay in Downtown and Along Highways	The state highways (SH-8 and US-95) act as barriers to bicycle and pedestrian travel with their high-traffic volumes, higher speed vehicles (except in the downtown couplet), limited number of protected crossing opportunities, and short crossing times at the signals. Along with the recommendations in the previous strategy and the guidelines identified above, Moscow should identify the high-use signalized crossings within the city and change the operations of the pedestrian signals from pedestrian actuation to having an automatic WALK phase. Intersections recommended for this improvement include: ▪ Third Street @ Jackson Street ▪ Third Street @ Washington Street ▪ Sixth Street @ Jackson Street ▪ Sixth Street @ Washington Street ▪ D Street @ Main Street

RECOMMENDED ACTIONS FOR MOSCOW

Action AT9. Apply methods for better accommodating bicyclist and pedestrian detection at intersections in the downtown core when adjusting signalized intersection timing.

Sidewalk Infill/Completion Policy

The Sidewalk Infill Program places emphasis on completing sidewalk gaps along major pedestrian routes and near major pedestrian destinations. Completing some sidewalk links can be challenging, especially in older residential areas where residents have developed fencing and landscaping within the public right-of-way and may consider those areas to be part of their property. In addition, some residents may not want traditional sidewalks due to the look of their neighborhoods and potential impacts to mature landscaping and trees. *Regardless, the public right-of way that is generally located on either side of the paved driving and parking area is intended for walking, whether or not a sidewalk currently exists.*

The primary method for sidewalk development in new development or redevelopment is through requiring the property developer to provide sidewalks that conform to the municipal code. Because the Americans with Disabilities Act (ADA) requires non-single family development to address accessibility needs, there is particular precedent for requiring properly-constructed sidewalk infill when a property is improved. Although developer requirements are an important mechanism for constructing sidewalks, this mechanism alone is generally inadequate for addressing sidewalk infill needs, as there is no correlation between important gaps in the sidewalk network and the likelihood of a property redeveloping. Most communities will find that additional measures will be needed that allow for greater control over where and how sidewalk infill happens.

It is important to note that a pedestrian environment that is strategically built to be accessible for people with disabilities is also more accessible for all other users. Curb ramps, for instance, can accommodate strollers, shopping carts, and dollies for the movement of goods. Accessible intersection crossings can increase safety for people regardless of ability. In recognition of this, the City's philosophical approach is to create pedestrian environments that are attractive, functional, and accessible to all people.

Asbury Street is a key university access route for students, faculty, and staff, but it offers no sidewalks and limited separation from traffic.
Image from Nelson\Nygaard

Expanding Moscow's Sidewalk Network

In Moscow today, a large number of gaps in the sidewalk network present a challenge for pedestrians traveling to destinations within the city, including transit users trying to access SMART Transit and those with mobility or visual impairments. The City should continuing the existing Sidewalk Infill Program with updated investment criteria based on the Mobility Task Force's recommendations (see Action AT12).

Figure 5-9 Sidewalk Infill/Completion Benefits

Issue/Challenge Addressed	Benefits/Improvements
Expand Direct Connections and Sidewalk Coverage	Moscow should continue its existing Sidewalk Infill Program, whereby City staff periodically inventory the street network to identify sidewalk gaps and develop strategies, project prioritization criteria, and funding sources for completing these gaps. This Active Transportation Strategy also includes additional input on sidewalk gap prioritization in the Supporting Actions section.

SUPPORTING ACTIONS

Building on the challenges discussed and strategies identified in the sections above, the following section makes recommendations to improve and expand Moscow's active transportation environment, including a recommended Complete Streets policy and strategies related to pedestrian and bicycle network development, transit access, and winter snow removal.

Complete Streets in Moscow

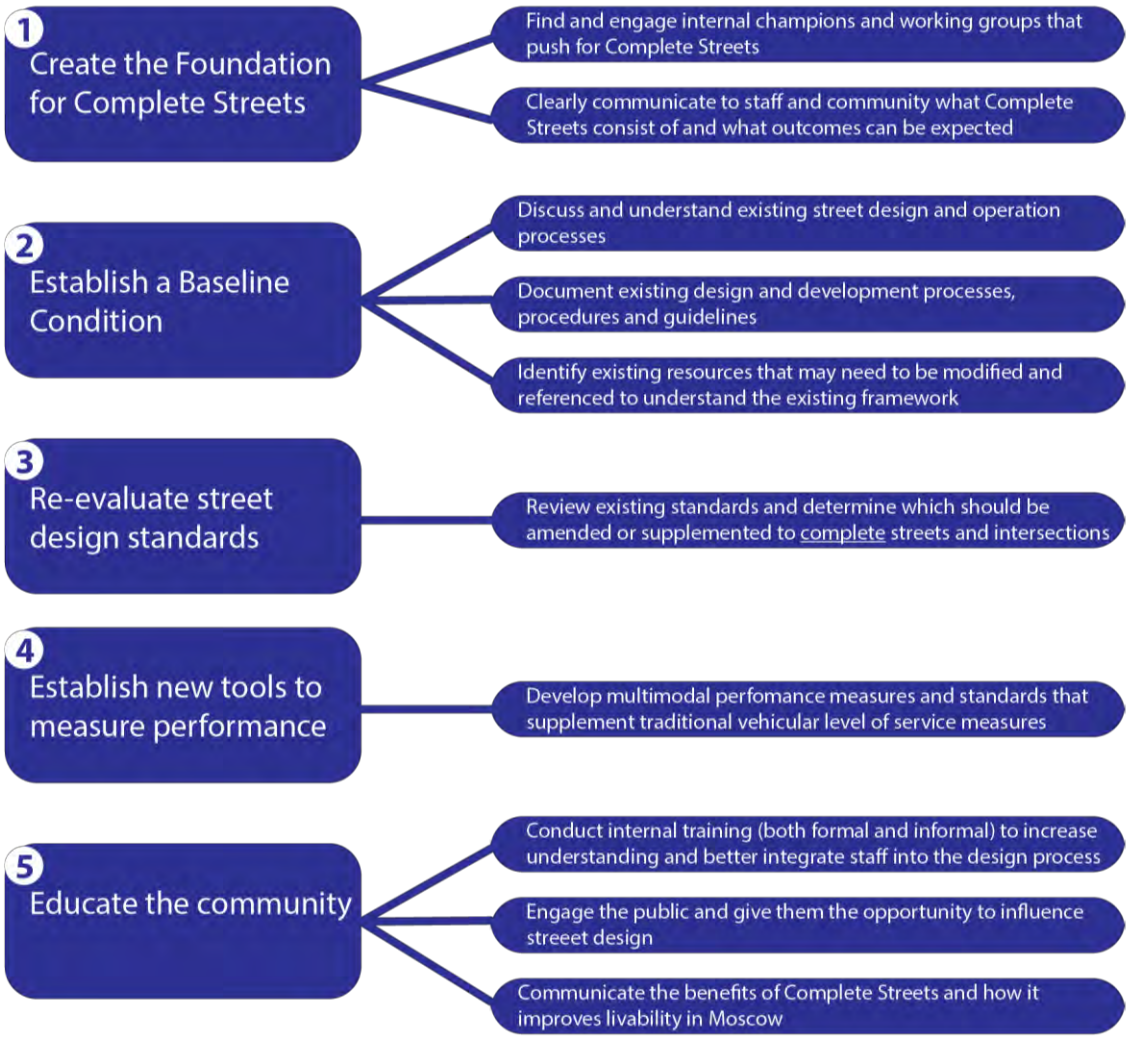
Moscow should adopt a Complete Street policy to ensure its streets can accommodate all modes of travel. Developing a Complete Streets policy or codified ordinance in Moscow will formalize the City's intent to plan, design, and maintain streets so they are safe for users of all ages and abilities. This type of policy would direct City staff from all departments that have a stake in the design and operation of streets to consistently design and construct the right-of-way to accommodate all anticipated roadway users, including pedestrians, bicyclists, public transportation users, motorists, and freight vehicles.

In practice, a Complete Street is a street that, in addition to general purpose vehicular travel lanes, allocated space for sidewalks, bike lanes or shoulders, bus lanes, transit stops, crosswalks, median refuges, curb bulbouts, appropriate landscaping, and other features that add to the usability and livability of the street as determined by context. Legislation on the subject has been passed in 25 states and almost 300 other jurisdictions throughout the country. In addition to making streets in Moscow more livable, safe, and accessible, developing a Complete Streets ordinance can make many of the projects proposed in this plan eligible for new state and federal funds that prioritize Complete Streets or livability projects. According to the National Complete Streets Coalition, an ideal policy should:

- Include a vision for how and why the community wants to complete its streets.
- Specify that 'all users' includes pedestrians, bicyclists, and transit passengers of all ages and abilities, as well as operators of trucks, buses, and automobiles.
- Apply to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire right-of-way.
- Make any exceptions specific and set a clear procedure that requires high-level approval of exceptions.
- Encourage street connectivity and aim to create a comprehensive, integrated, connected network for all modes.
- Be adoptable by all agencies to cover all roads.
- Direct the use of the latest and best design criteria and guidelines while recognizing the need for flexibility in balancing user needs.
- Ensure that Complete Streets solutions will complement the context of the community.

Developing and implementing a Complete Streets policy will require a collaborative process with private and public actors that have a stake in the public right-of-way. Figure 5-10 illustrates five steps (post-policy adoption) needed to understand and modify Moscow's existing processes and standards that govern how streets are planned, designed, and built. The City is already achieving several of these steps, particularly in the areas of staff and community education and establishing stakeholder working groups.

Figure 5-10 Complete Streets Implementation Process (Post-Policy Adoption)



The City has recently developed draft amendments to its Street Design Standards, which generally incorporate principles of Complete Streets design. However, additional detail related to intersection, transit, and bicycle facility design could be included to ensure all modes are safely accommodated, particularly where potential conflicts could arise between modes. Changes to consider include elements of intersection design, bus bulb outs and other transit priority features, bike lane widths exclusive of gutter pan widths, standards for continuing bike lanes through intersections, and considerations for lane widths that are less than 12' wide on collectors and minor arterials.

A Complete Street Design Overlay is another street design tool that requires multi-modal street design, while considering key dimensional, operational, and modal priority tradeoffs. The Overlay is placed "over" the base street design standards to modify its regulating ability. The recently released NACTO Urban Street Design Guide could provide additional guidance in developing the Overlay. The Draft Street Design Standards should be adopted now and any additional street design standards based on Complete Street principles can be included as a Complete Streets Overlay or supplement after the City's formal Complete Streets policy is adopted.

RECOMMENDED ACTIONS FOR MOSCOW

Action AT10. Adopt a Complete Streets policy to build out transportation facilities for all users.

Action AT11. Complement the City's street design standards with a Complete Street Design Supplement to ensure all users are accommodated along and across the street (including intersection design).

Pedestrian Network Development

One of the ways in which communities can promote walking is through infrastructure improvements that complete the pedestrian network – often referred to as sidewalk infill.[1] The goal of sidewalk infill programs is to connect fragmented segments of a community's existing sidewalk network through the construction of new sidewalks as a means of improving the network's continuity and connectivity.

Sidewalk Infill Project Criteria

Moscow's Sidewalk Infill Program is helping make progress toward a safe, complete sidewalk network within the city. Funds expended through this program should be targeted to result in greater community benefit by using criteria to guide investment decisions.

Strategic sidewalk infill consists of performing inventory and analysis of the community's existing sidewalk network to identify network gaps, prioritizing gaps based on community needs and funding requirements, and filling in these gaps as funding becomes available. Figure 5-11 provides recommended sidewalk infill criteria for the City of Moscow. In addition to the infill criteria, Moscow should pursue the recommendations and implementation considerations from the Mobility Taskforce's 2010 Report to the Transportation Commission.

Figure 5-11 Sidewalk Infill Project Criteria

Guiding Principle/Goal	Criteria
Mobility and Access	▪ Within 1/4-mile of transit stop ▪ Any gap along an arterial/collector roadway ▪ Any gap along identified neighborhood greenway ▪ Any gap along a city identified snow route
Downtown and University Public Spaces	▪ Any gap in the downtown core ▪ Within 1/8-mile of the University of Idaho
Land Use, Design, and Quality of Life	▪ Within 1/4-mile of a school ▪ Within 1/4-mile of a community center ▪ Within 1/4-mile of a medical center ▪ Within 1/4-mile of a senior center ▪ Within 1/4-mile of a multi-family development

RECOMMENDED ACTIONS FOR MOSCOW

Action AT12. Use Sidewalk Infill Project Criteria to guide investment decisions of the Sidewalk Infill Program.

[1] Sidewalk infill is a program that specifically seeks to eliminate gaps in the citywide sidewalk network.

Bicycle Network Expansion and Improvements

The City of Moscow's existing bicycle network (illustrated in Figure 5-12) is comprised of the local and regional trail system, bike lanes located throughout the city, and streets identified as bike routes (typically signed with little infrastructure improvements). The City is currently working with the Transportation Commission to further develop a connected bicycle network to better serve bicyclists in Moscow. In addition to this, the community participated in two *Moscow on the Move* open houses and developed maps identifying existing deficiencies within the current bicycle network and where new facilities/connections were desired. Each of these efforts helped to inform the recommended bicycle network and crossing improvements proposed in this section. The desired connections and linkages identified by the community are shown in Figure 5-13.

Community members suggest potential bicycle, pedestrian, and roadway projects in Moscow during a public workshop. The active transportation suggestions stemming from this workshop are summarized in Figure 5-13.

Image from Nelson\Nygaard

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Figure 5-12 Existing Bicycle Network

Bicycle Network
- Bike Lanes
- Bike Routes
- Trails

Landmarks
- Civic
- Social Service
- Library
- Shopping
- School
- Transfer Point
- Medical

- Downtown District
- City Limits
- State Boundary

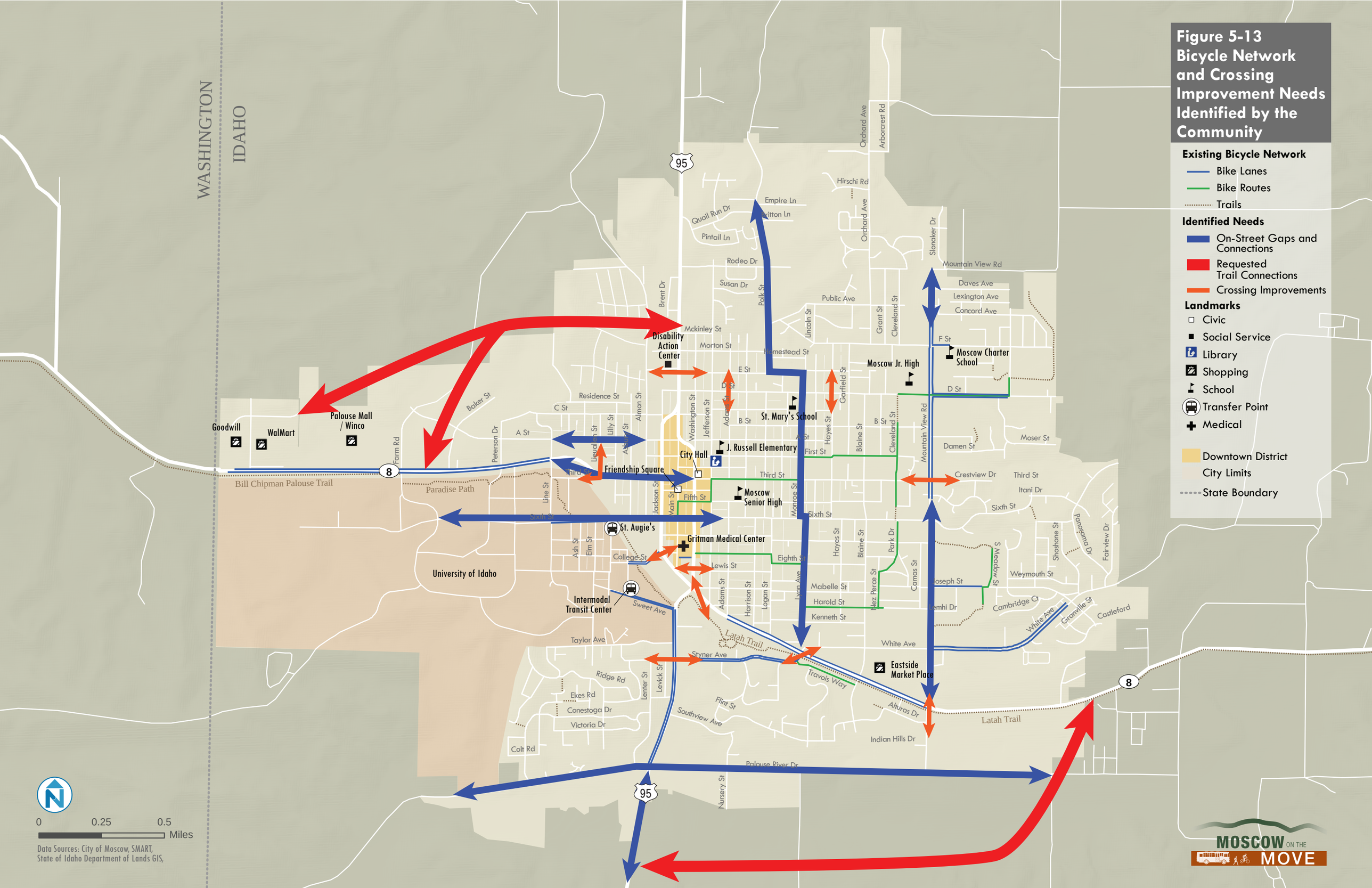
Figure 5-13
Bicycle Network and Crossing Improvement Needs Identified by the Community
Existing Bicycle Network
Bike Lanes
Bike Routes
Trails
Identified Needs
On-Street Gaps and Connections
Requested Trail Connections
Crossing Improvements
Landmarks
Civic
Social Service
Library
Shopping
School
Transfer Point
Medical
Downtown District
City Limits
State Boundary
WASHINGTON
IDAHO
Disability Action Center
Moscow Jr. High
Moscow Charter School
St. Mary's School
J. Russell Elementary
City Hall
Friendship Square
Moscow Senior High
St. Augie's
Gritman Medical Center
University of Idaho
Intermodal Transit Center
Eastside Market Place
Goodwill
WalMart
Palouse Mall / Winco
Bill Chipman Palouse Trail
Paradise Path
Latah Trail
Mckinley St
Morton St
Homestead St
Public Ave
Mountain View Rd
Daves Ave
Lexington Ave
Concord Ave
F St
D St
B St
A St
First St
Third St
Fifth St
Sixth St
Eighth St
Lewis St
College St
Sweet Ave
Styner Ave
White Ave
Travois Way
Alturas Dr
Indian Hills Dr
Palouse River Dr
Southview Ave
Flint St
Taylor Ave
Ridge Rd
Ekes Rd
Conestoga Dr
Victoria Dr
Colt Rd
Crestview Dr
Damen St
Moser St
Itani Dr
Weymouth St
Cambridge Ct
Castleford
Mabelle St
Harold St
Kenneth St
Joseph St
Lemhi Dr
Residence St
C St
Baker St
Farm Rd
Peterson Dr
Line St
Sloniker Dr
Orchard Ave
Arborcrest Rd
Hirschi Rd
Empire Ln
Quail Run Dr
Pintail Ln
Rodeo Dr
Susan Dr
Brent Dr
Polk St
Lincoln St
Grant St
Cleveland St
Garfield St
Hayes St
Blaine St
Park Dr
Camas St
Nez Perce St
Mountain View Rd
S Meadow St
Shoshone St
Panorama Dr
Fairview Dr
Granville St
White Ave
Almon St
Washington St
Jefferson St
Adams St
Harrison St
Logan St
Lynn Ave
Monroe St
Jackson St
Main St
Lilly St
Ash St
Elm St
Lenter St
Levick St
Nursery St
95
8
0
0.25
0.5
Miles
Data Sources: City of Moscow, SMART, State of Idaho Department of Lands GIS,
MOSCOW ON THE MOVE

Tiered Bicycle Network

Supplemented by detailed field observations, *Moscow on the Move* expands upon the historical bicycle network recommendations illustrated above to create a 20-year vision for bikeway network development. The proposed network identifies roadways and other off-street connections that:

- Are already well-suited to bicycle travel
- Are already well-used by bicyclists
- Close gaps in the existing bicycle network
- Provide east-west and north-south connections
- Support the development of more dedicated bicycle facilities like bike lanes and buffered bike lanes within the existing curb-to-curb width

The 20-year vision for bikeway network development illustrated in Figure 5-14 below provides a variety of facility options suitable for different bicycle users, whether they are old, young, experienced, or novice. Moscow's proposed bicycle network fills current bike lane gaps, provides off-street connections and neighborhood shortcut connections, as well as a dense network of neighborhood greenways. Moscow's proposed bicycle network applies a system of shared lane streets on critical connections through the University of Idaho campus and on the north side of the city and it proposes new bicycle lanes connections toward the southern periphery of the city, among other improvements. Critical crossing improvements are also proposed, improving two important at- and sub-grade junctions at Mountain View Drive/ SH-8 and Lauder Avenue/ US-95.

A complete list of prioritized short- and long-term bicycle network recommendations and its corresponding short- and long-term network map can be found in Chapter 8 of *Moscow on the Move* (the Action Manual).

Moscow's tiered bicycle network provides a variety of facility types for bicyclists with a variety of comfort levels.

Image from Nelson\Nygaard

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Figure 5-14 Planned (20-year) Bikeway Network

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ACCESS TO TRANSIT RECOMMENDATIONS

Providing safe and easy access to transit contributes to the safety, convenience, and comfort of transit riders. Seamless and safe access attracts new riders, increases ridership among existing transit users, and makes for a more complete transportation network for all users. Connecting people to transit will require complete sidewalks and accessible intersection design. Gaps in the pedestrian and bicycle networks, high speed roads, and inadequate transit stop facilities all negatively influence transit system access and quality. To address these issues, while being cognizant of budget constraints, the City of Moscow should strive to focus investments along streets that directly connect to transit.

Quality pedestrian facilities include more than complete sidewalks. Access should be direct and barrier-free. Safe crossings with automatic WALK phases for pedestrians, on-demand push button lights at all signals without automatic phases, pedestrian-scale street lighting, curb extensions, ADA-compliant curb ramps, marked crossings, and a host of traffic calming strategies all contribute to improved access to transit.

To expand the range and catchment area of transit riders, bicycle facilities should connect to transit stops. At a base level, providing bicycle parking at stops and linking stops to bicycle facilities encourages multi-modal riders. A higher level of service for bicycle riders may include covered, secured bicycle parking (particularly at the Intermodal Transit Center, University of Idaho, and other places where long-term bicycle parking is needed), buses with multiple bike racks, and transit stops that are linked to off-street shared use paths. Finally, access should be visually pleasing and create a pleasant environment.

The current transit network intersects with a number of problem areas identified in the pedestrian network. Generally, pedestrian access downtown offers adequate to excellent sidewalk facilities and adequate to excellent intersection conditions. Residential pedestrian facilities are often disconnected. Where sidewalks have been completed, they are often on only one side of the street and are often narrow and in competition with vehicle parking in residential areas.

Locations with high transit usage and inadequate pedestrian facilities include Eastside Market Place where adjacent parts of Mountain View Road lack complete sidewalks and safe crossings. There is no ADA access along Blaine Street from south of Third Avenue. The pedestrian environment near Palouse Mall/Winco along Farm Road and along the western section of SH-8 near the Palouse Mall, Walmart, and Goodwill either have no sidewalks or the sidewalks need improvement.

Bicycle Access

Bicycle access to transit is currently limited by route availability and stop amenities such as adequate and safe bicycle parking. The existing bike network provides limited access to existing transit routes with major gaps near the Eastside Market Place and neighborhoods north of D Street.

Some SMART transit vehicles operating in Moscow are equipped with on-board bike racks, improving access for bicyclists. Currently, bicycle parking facilities are limited to high demand transit stops. Per the Transit Strategy in Chapter 6, bicycle racks at transit stops should only be provided at Enhanced Stop locations.

Recommendations

Moscow should focus investments on building sidewalks and curb ramps that facilitate access to transit stops.

Investment Prioritization

As reflected in the sidewalk infill criteria, sidewalk and pedestrian improvements should be prioritized along streets that immediately connect with transit stops. A pedestrian catchment for transit in Moscow is up to a half mile. At a minimum, quality pedestrian facilities should be located on all streets one-quarter mile from stops—particularly

along direct access routes—and include safe, comfortable crossings, and complete sidewalks on both sides of the street. A catchment of one to two miles attracts bicycle riders and comfortable, convenient routes should be available to connect bicyclists to transit stops. Transit should act as a critical emergency ride home option in event of a mechanical issue (e.g., flat tire), injury, or undesirable weather.

Enhanced Transit Access to High Activity Stops

Moscow should employ a more comprehensive approach to improving bicycle and pedestrian connections to transit, merging enhanced transit passenger facilities like those highlighted in the Transit Strategy (see Chapter 6) with focused capital investments around high activity transit stops. A high activity transit stop is a stop location where either multiple transit routes or services intersect (much like the Super Stop concept illustrated in the *Transportation Fact Book's* transit best practices) and/or high quality stop facilities are located due to transit demand. Dovetailing with the Transit Strategy's plans for expanding and supporting existing enhanced transit stop facilities, these high activity transit stops provide a pleasant and convenient transfer between transit routes and comfortably connect passengers to key destinations in the community. Features that enhance pedestrian and bicycle access to transit include marked and visible crossings, complete sidewalks, bicycle storage, and lighting. Covered bicycle parking, small public bicycle self-repair stations (including tools and tire pumps), and maps of the bicycle network encourage bicycle and transit connections.

Many of Moscow's high activity transit stops are furnished with enhanced passenger amenities, including benches, shelter from wind and rain, and bicycle racks. Other amenities could include attractive lighting, bicycle repair stations (along major bicycle routes), greater bicycle rack capacity where needed and long-term bicycle storage in downtown and the University.
Images from Nelson\Nygaard

Enhancing access to transit in Moscow will elevate the transit experience for current users and may encourage higher transit ridership. Investment should be focused on access improvements at stop locations where enhanced transit shelters are already available. Transit access enhancements, particularly access route improvements, should be focused near the Palouse Mall/Winco, downtown near Friendship Square, near the Disability Action Center, and on North Main Street in eastern Moscow near Mountain View Road, F Street, and the Eastside Market Place. Making improvements in these locations will provide a well-developed network of stop amenities and enhanced access to those amenities for riders throughout the city.

RECOMMENDED ACTIONS FOR MOSCOW

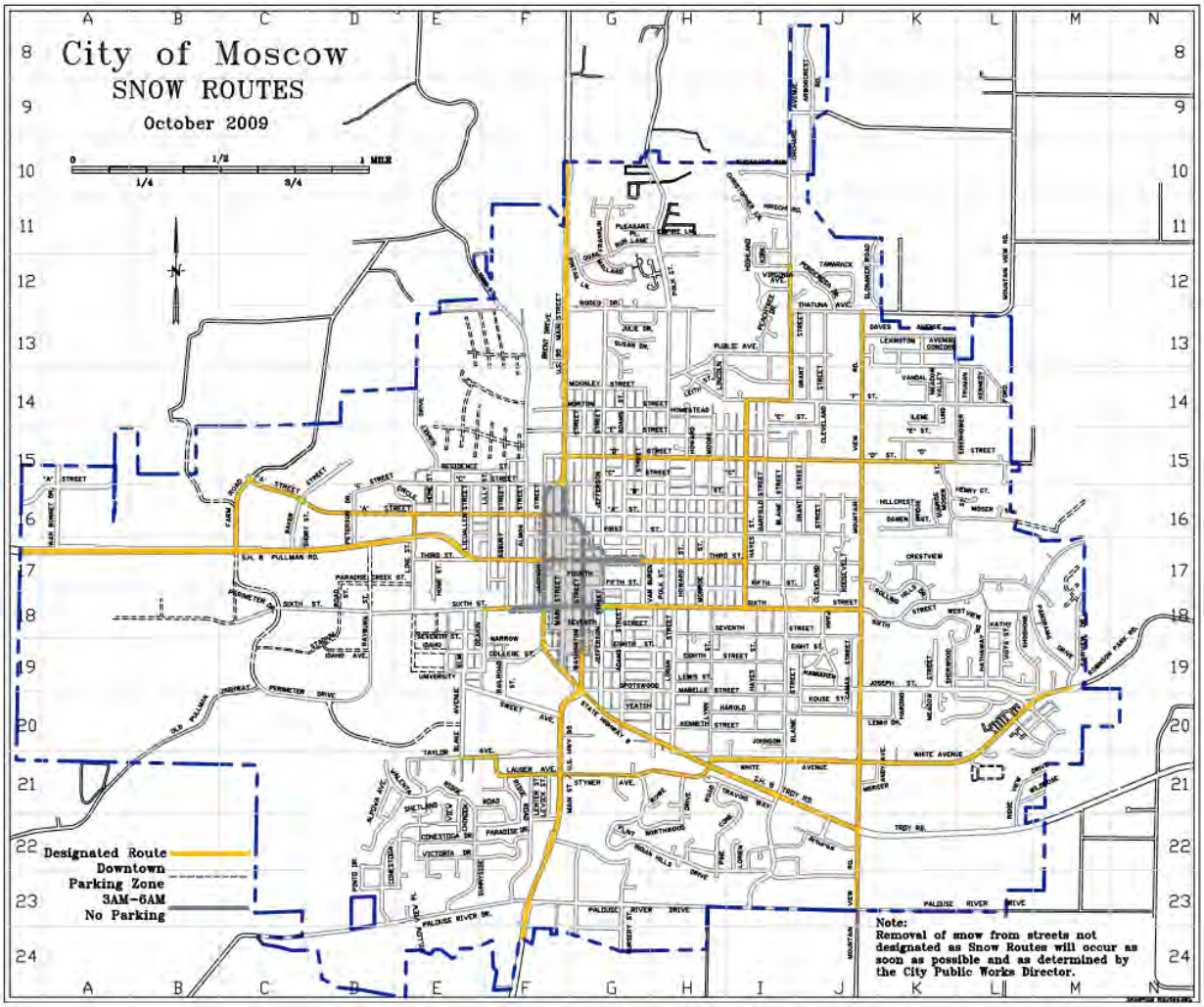
Action AT13. Building upon existing enhanced transit stops, enhance access to high activity transit stops.

SNOW REMOVAL RECOMMENDATIONS

The City of Moscow currently exercises a coordinated strategy to ensure timely and safe removal of snow from public streets. The primary focus of the current strategy, generally, is to allow passage of motor vehicles and, more specifically, for emergency response vehicles and through-traffic. The goal of the City is to remove snowfall, first from arterials and major streets, followed by neighborhood streets, within 36 hours. Through streets, such as SH-8/ Pullman Road/ Troy Road and US-95/ Main Street, are prioritized for removal while major transit stops such as the Intermodal Transit Center are not part of the Snow Route. During all snowfall events, residents are asked to park off-street to allow crews to clear as much of the roadway as possible.

In 2009, the City Council adopted several recommendations designed to improve plowing of prioritized streets, including Moscow City Snow Plowing Ordinances Numbers 2009-20 and 2009-22. These ordinances direct residents to clear sidewalks and hydrants of snow and allow the Mayor to make Snow Removal Proclamations in the event of major snowfall. The Proclamation gives residents 12 hours notice to move vehicles from the Snow Route. Together with existing code, these ordinances support the adopted snow management strategies of the City. Streets not designated as Snow Routes are cleared as quickly as possible and as directed by the City Public Works Director.

Figure 5-15 City of Moscow Existing Snow Routes



Source: City of Moscow

Criteria for Snow Removal

Key destinations for bicycles, pedestrians, and transit users, such as the Disability Action Center, are not served by the current Designated Snow Routes. By expanding the criteria for snow removal beyond accommodating motor vehicles and through traffic, the City will better serve the needs of bicyclists, pedestrians, and transit users. Snow removal criteria should include prioritization of transit routes, key bicycle connections, access to schools, health, and human services, and removal of snow on major streets with steep hills such as Sixth Street.

Recommendations

Updating snow removal routes and procedures should balance the City's cost burden with the multi-modal needs of residents. The following recommendations should be considered by the City when updating snow management strategies:

Snow Routes

Based on a review of the current Snow Route network (pictured in Figure 5-15), the current snow route network adequately accommodates auto-mobility needs for the City. However, the City of Moscow should update the designated snow route network to include two new snow route designations: *Primary* and *Secondary* snow routes. *Primary snow routes* consist of the existing designated snow routes and should be the first streets in the designated snow route network to be plowed. *Secondary snow routes* will be newly designated snow routes consisting of the most direct east-west and north-south neighborhood greenways, as they are implemented. Initial *Secondary snow routes* may include the following future neighborhood greenways:

- Lynn/Monroe/Lincoln Streets (Project NG1 in the Action Manual; see Chapter 8)
- E Street (Project NG3 in the Action Manual; see Chapter 8)
- Second / First Streets (Project NG4 in the Action Manual; see Chapter 8)
- Eighth / Lynn / Harold / Lemhi / Lewis Streets (Project NG5 in the Action Manual; see Chapter 8)

Plowing along these facilities should adhere to the Bicycle and Pedestrian Route Snow Removal Guidelines listed below. Plowing along the neighborhood greenways should only occur after the *Primary snow routes* are plowed.

Bicycle and Pedestrian Route Snow Removal Guidelines

- The City of Moscow's snow removal operations should continue considering the operational needs of bicyclists and pedestrians. The City should incorporate explicit consideration of the additional needs of bicyclists and pedestrians in inclement weather.
- Plowing operations should aim to limit impacts on pedestrian facilities and access to transit. Plowing should clear transit stops and the City should ensure transit users can easily access stops and do not have to step on snowbanks or slushy snow accumulation to reach the transit vehicles.
- On streets with bike lanes and on neighborhood greenways, snow removal should clear snow thoroughly and completely off the bicycle lanes. The mass of motor vehicles tends to clear slush and snow from vehicle travel lanes, pushing it toward bike lanes. The lower mass of bicycles does not effectively clear snow by weight alone.

Facility Design

- Where possible, bike lanes that occur with on-street parking should be striped wide enough to accommodate parked cars and bicycle lane space when snow accumulates along the curb.

- When redeveloping streetscapes, the City should incorporate vegetated buffers. This allows for the planting of street trees, makes for a more comfortable walking experience, and provides room for snow storage off of sidewalks.
- Street markings should be resistant to plow damage. All lane markings, especially the Green Shared Lane on A Street, should be marked with paint (e.g. StreetBond CL, which is used in Salt Lake City) or thermoplastic resistant to damage caused by plows.

City Policy

- Property owners should be required to remove all snow on sidewalks, natural and displaced by plowing. The current City ordinance does not require property owners to remove snow displaced by City plows. This may present a hazard for pedestrians, bicyclists, and transit users.

Education

- Through public information, drivers should be aware of the specialized needs of pedestrians and bicyclists in snowy conditions.

RECOMMENDED ACTIONS FOR MOSCOW

Action AT14. Improve snow removal procedures to ensure safe and functional bicycle and walking conditions during snow events—particularly in the areas of major bicycle and pedestrian route preservation, facility design, City policy and operations, and education.

Action AT15. Update the existing designated snow route network to include Primary (i.e., existing routes) and Secondary (i.e., key, direct neighborhood greenways) snow routes. Secondary Routes should only be plowed upon completion of Primary routes.

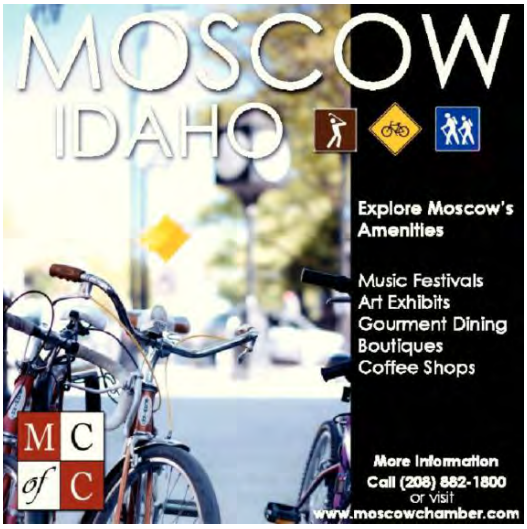
Action AT16. Design streets and sidewalks to better store snow out of bike lanes and off of sidewalks.

PROMOTING ACTIVE TRANSPORTATION AND RECREATION

An important part of promoting walking and bicycling in Moscow is to create a culture of active transportation. This can be achieved in a variety of ways, including focused investment in pedestrian and bicycle network development, education, promotional campaigns, and enforcement.

Another opportunity that Moscow is well-suited to pursue is to establish a coordinated bicycle tourism campaign that ties the city's identity to active transportation and recreation. The Moscow Chamber of Commerce has already begun marketing the City as an active city, but the City should provide support to further promote Moscow's trail network and proximity to mountain biking opportunities. A coordinated effort between the City and the Chamber of Commerce could include further investigation into whether Moscow could be marketed as a bicycle tourism hub.

Prior to making any major investment in bicycle tourism, the City (in coordination with the Chamber of Commerce and other local and regional stakeholders) should determine which types of bicycle tourism are viable and which bicycle tourists should be targeted for marketing. More detail on how to implement this strategy can be found in the Action Manual, in Chapter 8.



A recent promotional campaign that highlights Moscow bicycle culture.

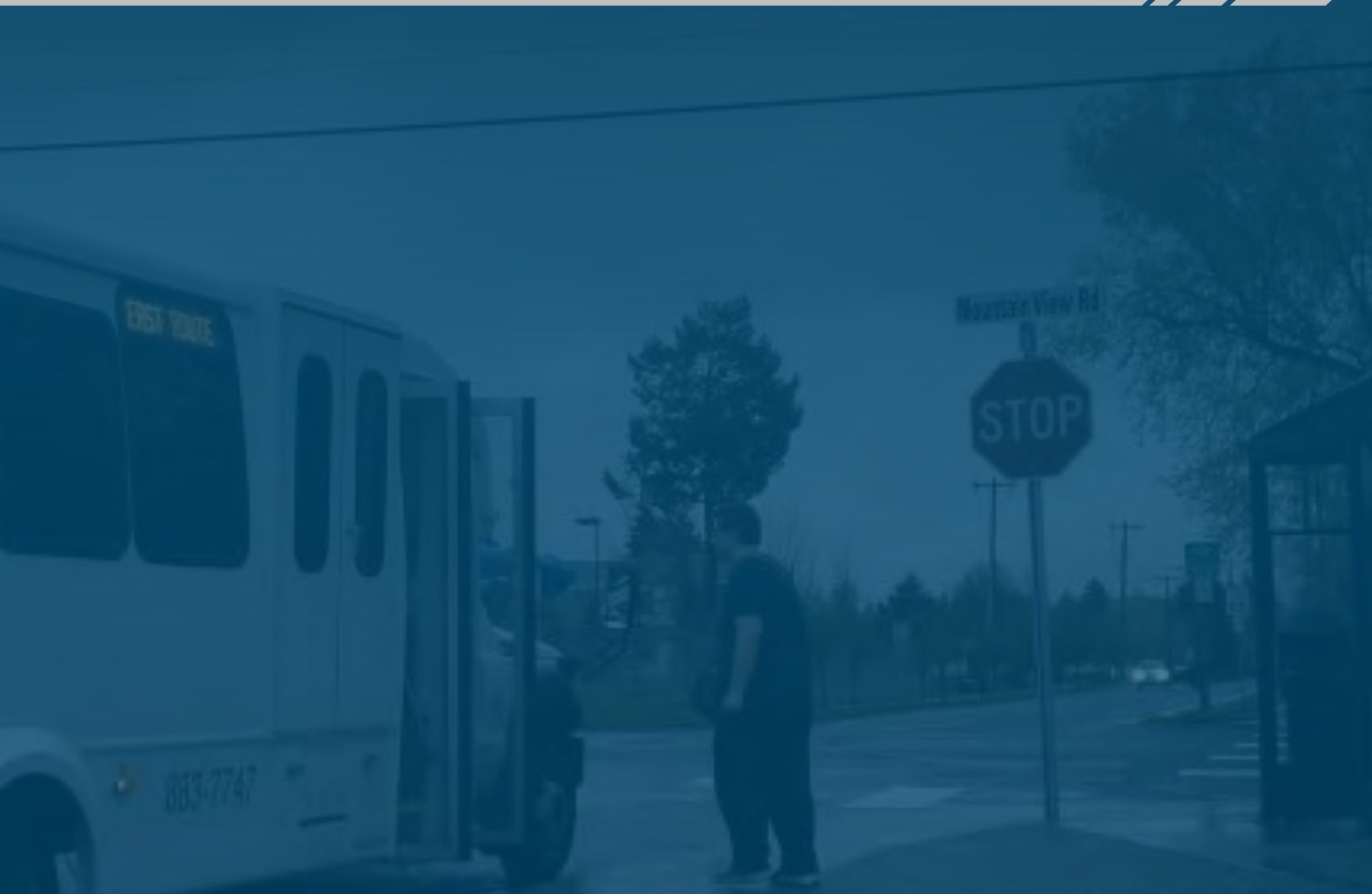
Image from Moscow Chamber of Commerce

RECOMMENDED ACTIONS FOR MOSCOW

Action AT17. Evaluate opportunities to support a citywide or regional bicycle tourism campaign or program to further promote active transportation and recreation in Moscow.

ESTABLISHING MULTI-MODAL STRATEGIES | CHAPTER 6

TRANSIT STRATEGY



Responding to the community's travel needs, this chapter provides a strategy to improve transit service in Moscow. It includes an overview of transit needs in Moscow, transit design guidelines, near-term transit service improvements, a long-term transit strategy, and several key initiatives to support transit service and build greater ridership.

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6 TRANSIT STRATEGY

THE IMPORTANCE OF TRANSIT

Key components of *Moscow on the Move* are strategies that allow the City and SMART to continue to improve local and regional transit; providing convenient, comfortable, and affordable service that helps Moscow residents meet their daily travel needs.

The Transit Strategy helps the City of Moscow achieve the following goals:

- Significantly increase the use of transit
- Improve transportation options, thus reducing single occupancy vehicle dependence
- Create strong incentives for using modes of transportation that reduce traffic congestion and improve community health
- Build a network of partnerships dedicated to expanding access to transit

This chapter takes stock of the current conditions of transit in Moscow, assesses future indicators of transit demand and funding opportunities, and identifies short-term design options and a 20-year, long-term vision for transit that best match community goals for mobility and land use. Since all transit trips begin with walking or bicycling, this strategy also considers important pedestrian and bicycle linkages to local and regional transit services and identifies ways to improve access to transit.

The Transit Strategy was developed with guidance from the Moscow Valley Transit Strategic Planning Report (see the summary to the right), and input from the community through an on-board transit survey, a community survey, community workshops, and stakeholder engagement.

Moscow Valley Transit Strategic Planning Report

In 2011, the SMART (formerly Moscow Valley Transit) board conducted an assessment of SMART operations. The findings are summarized below.

Strengths	Challenges	Opportunities	Threats
▪ Market demand ▪ City of Moscow Commitment ▪ Transit minded population	▪ Funding losses ▪ Lack of support from ITD ▪ Hilly terrain	▪ Private & corporate involvement ▪ Grow transit awareness ▪ Restore lost service and provide regional service	▪ Reduced funding ▪ Limited sidewalk connectivity to transit

Transit Benefits Moscow

While public transportation's primary purpose is to provide mobility options to residents, visitors, and employees in Moscow, it also delivers community benefits such as environmental, public health, and affordability. This section illustrates the multiple ways that transit benefits Moscow's community and its citizens.

Transit provides mobility options for everyone

Transit provides mobility options for commuting, shopping, and other trips. People of all ages and abilities use public transit in Moscow. Based on the 2012 on-board passenger survey, approximately 45% of riders are between the ages of 18 and 24, while residents between 25 and 64 account for 48% of riders. Only 7% of transit riders are younger than 18 or older than 65.[1] The same survey reports that half of transit riders have an income of less than $15,000, indicating a strong need for transit among lower-income residents, high school students, and University of Idaho students. Moscow's transit passengers report using transit for a variety of reasons; the top two reasons are to save money and the lack of access to a car.

Transit helps build a vibrant community.
Image from Nelson\Nygaard

Transit has environmental benefits

People living in communities where they can easily walk to basic services, or where transit is available, drive less than people living in more "sprawling" areas. Higher concentrations of residential and employment development and integrated land uses are associated with lower per capita miles driven.[2] Studies show that people living in these types of neighborhoods drive 40-50% fewer miles annually than their suburban neighbors. A report by the Urban Land Institute explores the connection between driving and CO2 emissions and conservatively assumes that a 100% reduction in miles driven is associated with a 90% reduction in overall CO2 emissions.[3]

Transit can improve public health

Public transit contributes to a healthy community by making the air cleaner and providing an affordable mode of transport that people can walk to and from. Numerous studies note the positive physical and mental improvements of people living in transit-served areas. Studies in the *American Journal of Health Promotion* found that body mass index ratings tend to decline significantly with the presence of bus stops, higher population density, and mixed land uses.[4] A study in the *American Journal of Preventative Medicine* found that, on average, transit users walk 19 minutes per day to access transit, bringing people well on their way to meeting the U.S. Surgeon General's recommendation of 30 or more minutes of daily exercise.[5]

Transit makes Moscow more affordable

According to research by the Center for Neighborhood Technology (CNT), households in cities where jobs and services are readily accessible by transit are less impacted by gas price increases. Access to transit – particularly free

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[1] City of Moscow. (2012) "Moscow on the Move Factbook – Transit."

[2] Eran Leck, "The Impact of Urban Form on Travel Behavior: A Meta-Analysis," *Berkeley Planning Journal* 19 (2006), 37-59.

[3] Red Ewing, et al. *Growing Cooler: The Evidence on Urban Development and Climate Change*. (Washington D.C.: Urban Land Institute, 2007).

[4] Andrew Rundle, Ana V. Diez Roux, Lance M. Freeman, Douglas Miller, Kathryn M. Neckerman and Christopher C. Weiss (2007), "The Urban Built Environment And Obesity In New York City: A Multilevel Analysis," American Journal of Health Promotion, Vol. 21, pp. 326-334. And Reid Ewing, et al. (2003), "Relationship Between Urban Sprawl and Physical Activity, Obesity, and

Morbidity," American Journal of Health Promotion, Vol. 18, No. 1Sept/Oct. 2003, pp. 47-57.

[5] Besser, et al. (2005). "Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations." *Journal of Preventative Medicine, Vol 29, 4.*

transit service as in Moscow - helps reduce household transportation costs, saving families money and making Moscow a more affordable place to live.

CNT research shows that transportation costs can range from 15% of household income in compact, accessible neighborhoods to well over 28% of household income in locations with auto-oriented land use patterns and limited access to transportation. A CNT study found that people who earn $45,000 per year (a "typical" income in the Moscow region for a household with 2.36 people is $36,448[6]) with one car who are frequent transit users versus those with one car who do not use transit spend on average 6% less per year on transportation.

Transit-Land Use Connection

In any growing city, transit quality is a key criterion for land use development, and yet land use is also a key criterion for transit service, making a strong correlation between land use and transit demand. The best long-range transit plans are in fact land use plans that provide guidance for how a city's land use patterns should be guided to support transit ridership.

A key objective of this Transit Strategy is a policy framework that ensures quality transit will be available when land use and street design take transit-oriented forms. A large share of future growth is planned to occur in outlying undeveloped parcels in eastern Moscow. This has implications for the ability of SMART to serve new households and commercial land uses, as well as the level of service. Without an increase in transit funding, future service will likely need to reduce the number of transit trips to serve a larger geographic service area.

There is a mutually supportive relationship between land use, access and system integration, and service quality from which community benefits of transit are derived.
Source: Nelson\Nygaard

To help the City of Moscow and its regional partners realize the greatest benefit from limited transit operating and capital resources, this plan identifies opportunities for Moscow to align transit service with existing populations (namely low-income, students, and seniors), and provides a vision for transit in Moscow over the next 20 years that will implement transit service in key employment centers and neighborhoods.

Transit Service Guidelines

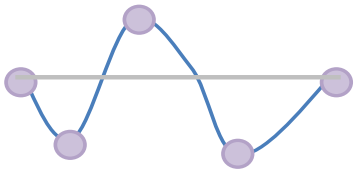
This section provides an overview of several general design principles that should guide the design and operation of fixed-route transit service in Moscow. Within the confines of funding availability, topography, and street network design, these guidelines were taken into consideration during the development of the near-term transit improvements and the long-term transit vision.

[6] Center for Neighborhood Technology. H+T Affordability Index. Transportation Costs % Income. http://htaindex.cnt.org/map/

Routes should be direct

Routes should be as straight as the street pattern allows. These direct paths make for the straightest, likely the fastest, possible trip, and therefore tend to be useful to more people than circuitous routes. Circuitous routes are not only uncomfortable, but they reinforce the perception that the trip is taking longer than it actually should. In Moscow, both the East and the West routes are circuitous. Over the long-term, direct transit routes that provide efficient bi-directional service between key activity centers should be designed.

One way loop routes are often instituted to cover more of a community at less cost, but they have downsides in that they provide inconsistent service for customers making two way trips. While a passenger traveling one direction might have a 5 minute trip, it may take 25 to make the return trip on the loop. Where operating resources area available, service design should avoid one-way loop routes.



A circuitous transit route provides a slow meandering route or one that bypasses key destinations and takes longer than necessary to travel from point A to B.

A direct transit route lines up destinations along a reasonably direct corridor and typically provides bidirectional service.

Service should be frequent

The elapsed time between consecutive buses on a route is one of the most important determinants of ridership. More frequent service attracts more passengers, assuming a market is present. A very infrequent route requires customers to plan trips around the bus schedule. A very frequent route, on the other hand, allows riders to travel whenever they want, without a schedule. At the upper end of the frequency spectrum, transit approaches the convenience that a car offers to a motorist: it is there exactly when customers want and need it. Provision of service that operates every 15 minutes is an important psychological breakpoint. At frequencies of 15 minutes or better, many riders will not need to use the schedule, because they know that they can just wait for the bus and it will be along "soon." In Moscow, 30 minute frequency may be more appropriate on most routes given the size of the community, as it is provided today. However, over the long-term, 15 minute service at peak times could be a good option for routes serving the University, for example.

Service should be consistent

A consistent pattern to the schedule is strongly recommended. While frequency may vary during the day according to demand, it should not vary with apparent randomness from one trip to the next. Whenever possible, routes should also have frequencies that divide evenly into an hour, such as every 5, 10, 15, 30, or 60 minutes. These are referred to as "clock headways" because customers can remember the schedule easily as the same pattern of times is repeated each hour. By contrast, if the bus runs every 35 minutes, few customers can remember the schedule and are forced to consult a timetable – or seek assistance from customer service – in order to catch any trip that they don't use routinely. Moscow's current service leaves at 10 and 40 past the hour every 30 minutes.

Service should connect major community anchors

An efficient transit corridor—and one that will support a primary transit network—connects multiple high demand destinations, or anchors, in a reasonably direct line. By connecting specific destination points, the transit system will be much more efficient because the major trip attractors will draw riders at each end of the line, creating a steady flow of passengers at all points. For example, in Moscow, the East and West routes connect major activity centers such as the University, Downtown, Walmart, and key residential areas.

Routes should be easy to understand

Straight routes are also easily associated with one or two major arterials. The naming, presentation, and planning of such routes should encourage the idea that the route is an integral part of the street. Most transit networks are very complicated, and simplification is a key value in creating networks that people can navigate easily to make many kinds of trips. Moscow's East and West routes are intuitive; simple naming and organization such as this is encouraged.

Transit should be within comfortable walking distance

Although opinions differ about how far one should be asked to walk to a transit stop, the industry experience overwhelmingly indicates that the vast majority of riders will walk up to one-quarter mile. Each transit route should be seen as serving a band one-half mile wide (one-quarter mile to each side of the route), except where the road network prevents reasonably direct pedestrian access. A well-connected street network (as shown below) will help increase the number of people within one-quarter mile walking distance from a transit stop.

A disconnected street network with long blocks and indirect streets (left) results in long walking distances and fewer people under ¼ mile walking distance to transit. A well-connected street network (right) enables shorter, more direct walking connections to transit and likely increases the number of people under ¼ mile walking distance to transit.

Source: TransLink Transit Oriented Communities (2011)

Multiple neighborhoods in Moscow suffer from the disconnected street network seen in the left hand diagram above. For example, residents living on Ilene Drive near the Moscow Charter School have to walk over a half a mile out of their way to F Street to the bus stop at the corner of F Street and Mountain View Road. A well-connected street pattern would allow these same residents to walk a direct one-quarter mile jaunt to Mountain View Road.

Bus stops should be welcoming and comfortable

All bus stops should be clearly marked with proper signage including the designated route identifiers (East, West, etc.). Seating should be incorporated in all stops, but prioritized for individual stops where the average daily boardings exceed 30 passengers. Priority should be given to bus stops serving senior apartments or activity centers and group residences designed for persons with disabilities. Recent investment in transit stops from the City of Moscow and the University of Idaho have set Moscow in the right direction. Further discussion on bus stop design and prioritization are provided on page 6-24.

In Moscow, although many stops lack passenger information or basic amenities (left), newly enhanced stops (right) at thirteen locations offer spacious shelters, benches, and other passenger amenities.

Service design should maximize service

All route schedules should include a minimum of 10% recovery time to ensure on-time performance. It should be noted this design parameter is intended to ensure schedule reliability, not necessarily to provide rest periods for operators. Best practices in transit scheduling recognize that transit operators can be afforded rest periods without adding to the number of buses necessary to maintain schedule reliability.

Stops should be spaced appropriately

Transit stops should be approximately 1,000 feet apart, except where there is hilly terrain or poor connectivity. Transit stops are the customers' access and egress points for transit services and should be conveniently located. However, transit stops are also the major reason that transit service is slower than automobile trips. Since most riders want service that balances convenience and speed, the number and location of stops is a key component of determining that balance. Services that emphasize speed should have fewer stops, while service that emphasizes accessibility should have more frequent stops.

NEAR-TERM TRANSIT SERVICE IMPROVEMENTS

The transit recommendations outlined in this chapter will help Moscow establish a transit system that serves the diverse travel needs of its residents. Based on an evaluation of existing transit services and a compilation of feedback from the community (via community surveys and the community workshop), key objectives were identified for transit service in Moscow that helped guide the near-term recommendations in this section and the long-term policy framework on page 6-14. The near-term recommendations are to:

- **Provide more direct service.** While the Moscow transit system provides coverage to many key areas in the city, the existing routes are too circuitous to effectively serve many passenger needs. For example, residents in the neighborhoods near Mountain View Road who are traveling to west Moscow must loop south to transfer to the West route via the University.
- **Improve connections between major activity centers.** Reaching some key activity centers in the Moscow area currently requires a transfer, requiring longer travel times. While transfers are a necessity for small transit systems, some key destinations like WalMart and medical services in west Moscow are not directly connected to other key activity centers, such as senior housing or the East Side Marketplace.

- **Expand the level of service to low-income, senior, and youth populations.** Providing transit service to transit dependent populations is a priority, including low-income, youth, and senior populations, while still maintaining connections to key activity centers.

Given the limited funding outlook, this chapter provides recommended changes to the transit system that can be made immediately without an increase in funding. It also provides a near-term service design recommendation that will improve the coverage of transit service in the Moscow area in the short-term (1-5 years) assuming additional funding is secured.

Improvements to Existing System

Without increased funding, the opportunity to enhance transit service in Moscow is limited. Feedback received from the community confirmed that maintaining 30 minute frequency on both the East and West routes was a higher priority than expanding the coverage of transit to areas currently not served by transit. Given this tradeoff, this section provides basic service improvements to improve coverage of service in Moscow without sacrificing frequency or increasing the amount of funding needed to operate transit in Moscow.

SMART can improve circulation within the University without increasing the number of service hours or buses needed for operation. Increased circulation within the University was identified as a need by the community and SMART staff. Figure 6-1 provides a map of route design improvements for the existing transit system. SMART can accommodate this increased coverage by minimizing the amount of layover time between runs.

Immediate improvements to University circulation would provide service from the Intermodal Transit Center north on Railroad Street, across College Avenue to Idaho Avenue, circling back via Ash Street and University Avenue. This routing change would bring service closer to the academic core of the campus. A bus stop would be added on Ash Street between the Health Center and the Life Sciences building. This proposed routing does require the one-way directionality of Idaho Street, University Avenue, and Ash Street to be reversed.

Near-Term Improvements (1-5 years)

The community identified a desire to expand transit service in Moscow without sacrificing frequency of service. This section provides service design recommendations for the near-term (the next 1-5 years) to reach more residents in the community, while maintaining 30 minute service frequency on all routes. To achieve this, funding to operate one more route and purchase one more bus is needed.

Near-Term Service Design

The near-term service design recommendation (illustrated in Figure 6-2) adds a third route to the SMART system based on a reasonably achievable financial scenario. This third route connects the University and downtown to neighborhoods south of Sixth Avenue and west of Mountain View Road. In the near-term, it is also recommended that the North/South route be extended out to Eisenhower Street every hour to provide service to the Good Samaritan Village senior housing center on Eisenhower Street. The following factors were considered during the development of the near–term service design recommendation:

- Location of low-income, senior, and/or youth populations
- Existing high-amenity stops
- Planned growth in the near-term

High demand activity centers, such as the University, downtown, WalMart, medical services in western Moscow, Gritman Medical Center, and the East Side Marketplace

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Figure 6-1 Existing System with Minor Improvements

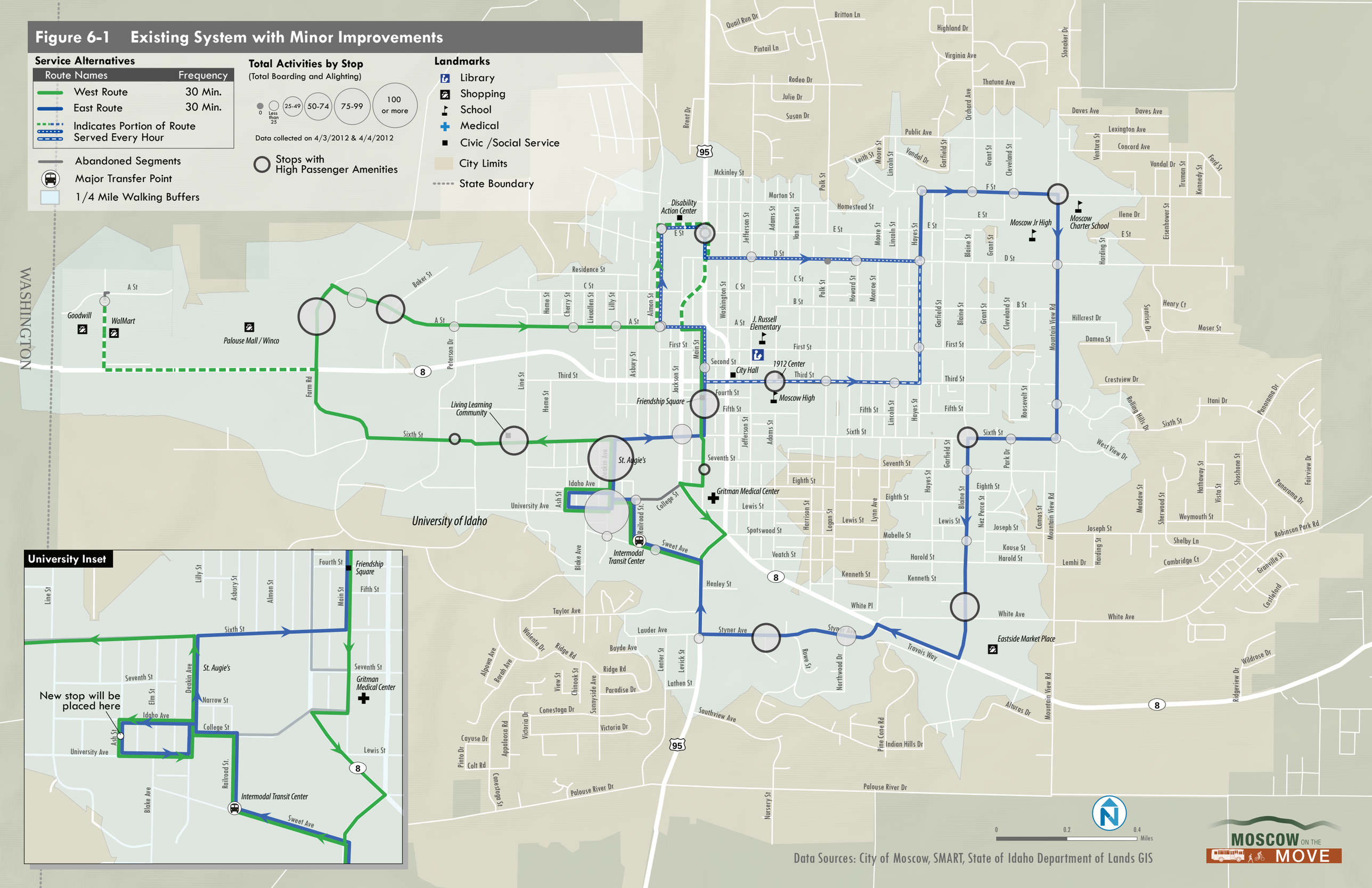
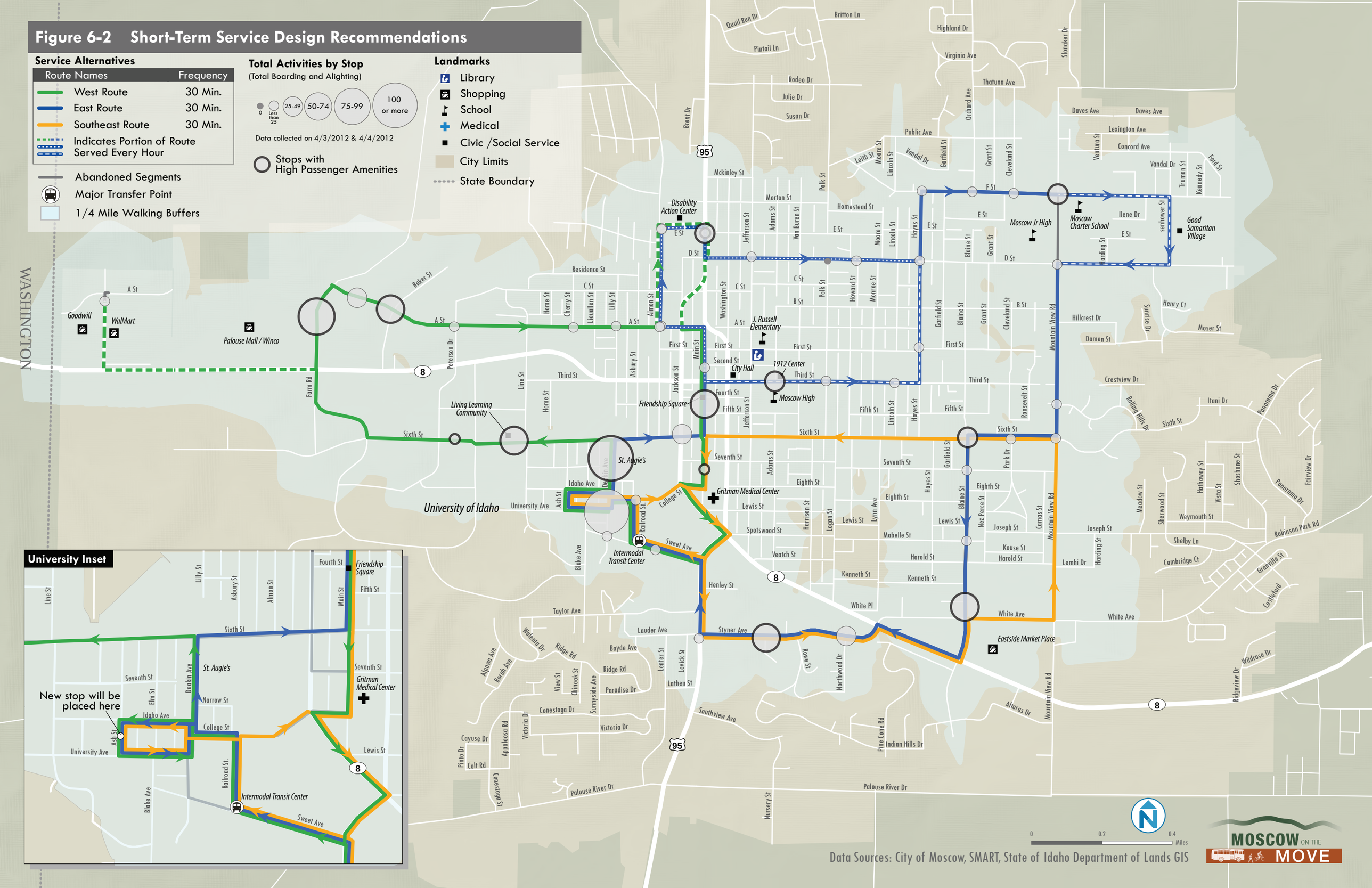


Figure 6-2 Short-Term Service Design Recommendations



Ridership Projections

The expansion of the East Route to Eisenhower Drive, the addition of the Southeast Route, and projected population increases will likely increase the number of SMART riders. Ridership projections are estimated for 2017 based on anticipated service improvements in year 5 of the near-term transit strategy. Factors that were considered in the ridership projection include:

- Existing riders per capita applied to the projected population in 2017.
- Ridership per mile calculation based on existing routes and ridership.*
- Estimated additional riders per mile for the new Southeast Route and the additional coverage of the East Route.

Based on these factors, it is estimated that ridership will increase from 168,756 in 2012 to between 182,851 and 257,022 in 2017. The low estimate represents an increase in ridership based on increased population only; the high estimate assumes that additional ridership will also be realized due to the expansion of service based on a ridership per mile calculation. Note that these estimates do not account for the potential increase in riders that could be the result of the City's transit-related marketing efforts.

*Note: existing ridership per mile estimates were based on the existing East Route only, given that this route is more similar to the new Panorama Route from a land use perspective.

Near-Term Operating Details

The near-term service design recommendation will require SMART to operate an additional route. This increase in service will require an increase in annual revenue hours from 6,085 to 9,563, amounting to an increase of $218,836 in operating costs per year (2012 dollars). The purchase of an additional bus would also be required. Figure 6-3 below provides a comparison of the near-term service design recommendation compared to service in Moscow today.

Figure 6-3 Summary of Near-Term Service Design Options

	EXISTING		NEAR-TERM	
	Weekday	Saturday	Weekday	Saturday
Frequency	30 minutes	n/a	30 minutes	n/a
Span of service	12:40 hours (6:40 AM – 6:00 PM)	n/a	12:40 hours (6:40 AM – 6:00 PM)	n/a
Operating cost per hour	$62.92/hr*		$62.92/hr*	
Revenue Hours	6,085	0	9,563	0
Annual operating cost	$382,868		$601,704	
Peak vehicles	2		3	

Note: Revenue hours and annual operating cost based on 2011 data submitted by SMART. Peak vehicles do not include spares.

*Operating costs are in 2014 Dollars

Although the near-term service design recommendation estimates a more than 50% increase in operating costs per year, Moscow would still be well below the per capital investment of its peers. In 2010, Moscow invested $16 per capita annually to operate fixed-route service versus an average of $32 spent by peers (see sidebar below). With the additional third route in the near-term, Moscow would still be well below the peer average, at only $24 assuming no increase in population.

Peer Spending per Capita

In 2010, Moscow invested $16 per capita annually to operate fixed-route service. By comparison, peers spent:

- Billings, MT: $32 per capita
- Cheyenne, WY: $15 per capita
- Corvallis, OR: $42 per capita
- Pocatello, ID: $40 per capita
- Missoula, MT: $47 per capita

On average, peers spent $35.20 per capita annually to operate transit. While the transit systems listed above are all larger than Moscow, this is a useful baseline for Moscow to begin thinking about how much it would need to spend to have a robust transit system.

*Image from Pocatello Regional Transit

Near-Term Capital Plan

To realize the route improvements outlined above, Moscow will need to purchase an additional bus. Transit stop improvements are also recommended, both on existing transit routes and to serve the new Panorama Route to the east and the extension of the East route to Eisenhower Street. Figure 6-4 below provides a list of recommended capital improvements in the near-term (1-5 years) based on recommended added service. A transit stop design and prioritization policy is provided on page 6-20 to help guide future transit stop improvements based on the level of boardings, including a definition of the "tiered" transit stop improvements noted below. Based on this policy, stops are generally recommended to be approximately 1,000 feet apart, except where there is hilly terrain or poor connectivity.

Figure 6-4 Cost of Capital Improvements

Improvement Type	Phase	Quantity	Cost Per Unit[2,3]	Total Estimated Cost
Tier I High-amenity stops	Immediate	1	$12,250 - $16,250	$12,250 - $16,250
	Short-term (1-5 years)	5	$12,250 - $16,250	$61,250 - $81,250
Tier II Bus Stop with Bench	Short-term (1-5 years)	2	$825 - $1,225	$1,650 - $2,450
Tier III Neighborhood Bus Stop	Short-term (1-5 years)	12	$525 - $725	$6,300 - $8,700
Vehicles	Short-term (1-5 years)	1	$111,500[1]	$115,500
Total Estimated Capital Costs				**$196,950 - $224,150**

[1] Cost of vehicle based on cost of existing SMART vehicle purchase in 2011 (adjusted for inflation)
[2] Costs are in 2014 dollars
[3] High-amenity stop costs based on average cost of existing City of Moscow enhanced bus shelters

Pullman/Moscow Service

During the community workshops, there was a lot of discussion and interest in reestablishing service between Moscow and Pullman. Based on our investigation, it is not feasible to reinstate this service in the near-term. However, in the next 5-10 years, the City of Moscow, City of Pullman, University of Idaho, and Washington State University need to revisit the demand for this route.

There are private services available to serve the demand between Moscow and Pullman (such as Reliance Transport). ZimRide – a ridesharing service – is also available to University students and staff. The City should expand the ZimRide service so that it is available to all residents in both Moscow and Pullman, and therefore decreases the number of vehicles traveling between the two communities. This would require commitment to an annual contract and the website would be hosted by the contractor (ZimRide).

Figure 6-5 below compares each service design option to the transit needs identified in Chapter 2: Getting Around Moscow Today. While the Existing System with Minor Improvements design option maintains 30 minute frequency and provides increased coverage in some areas, the near-term expanded coverage option provides transit service to significantly more neighborhoods.

Figure 6-5 Transit Service Options Needs Analysis

	Transit Service Summary of Needs	Existing System with Minor Improvement	Near-Term Improvement
Existing Transit Service Need	**South of Styner Avenue**: Low-income residential neighborhoods south of Styner Avenue	+	++
	Southeast of Gritman Medical Center: Neighborhood between S Adams Street and S Lyman Street (west to east) and 7th Avenue and Kenneth Street (north to south)	+	+
	East of Mountain View Road: Senior housing east of Mountain View Road	+	+
	North of Mckinley Street: Senior housing and youth and low-income populations on and around Rodeo Drive	+	+
	South of Taylor Drive: Residents, students, and faculty accessing the south and southwest side of the University	+	+
	Between Styner Avenue and E Palouse River Drive: Low-income populations living south of Styner Avenue and North of E Palouse River Drive	+	+
Transit Needs for Planned Growth	**"A" Street Development between Warbonnet Drive and Farm Road:** Need service to new development near the "A" Street extension	+	+
	Alturas Technology Park: Projected development south of SH-8/Troy Road and west of Mountain View Road	+	++
	SE Industrial Corridor: The area between the Indian Hills subdivision and the Palouse River between South Main Street and Carmichael Road	+	++
	Legacy Crossing: The Legacy Crossing project reinforces the connection between downtown and the University	+	++
Freq. & Span	Expand the coverage of SMART service	++	+++
	Expand the service span of SMART service	+	+
	Expand the frequency of SMART service	+	+
Other	Regional access to/from Moscow by transit	+	++
	Need a sustainable and increased funding package for SMART	+	+
	SMART's fixed-route service is centered on the University of Idaho, rather than downtown Moscow. Some participants believe the system's hub should be located in downtown Moscow.	+	+

KEY

-- Detracts from the need

+ Does not affect the need

++ Partially serves need

+++ Effectively serves need

LONG-TERM TRANSIT STRATEGY

Moscow on the Move is led by eight guiding principles, the first being "Mobility and Access." A main objective under this Guiding Principle is to "increase transit ridership by improving speed, frequency, and reliability, as well as the quality of transit facilities, passenger amenities, and vehicles." The Transit Strategy uses this guidance as its foundation to build a long-term transit strategy for Moscow that also supports higher level city goals related to reducing harmful emissions, mitigating future traffic congestion, and creating more vibrant neighborhoods.

Vision for Transit in Moscow

The long-term transit strategy provides a policy framework for transit and supportive infrastructure investments, while at the same time providing a policy framework for the City of Moscow to implement transit-supportive land uses and infrastructure and foster key partnerships in the community to help fund transit. This synergy between transit investment, land use policy, and sustainable funding is an essential component of any transit system to ensure an efficient and well-used transit system.

Long-Term Vision for Transit in Moscow

The *Moscow on the Move* Transit Strategy envisions a community that:

- Puts the passenger first by creating a safe environment for transit passengers, and making transit easy to use, accessible to persons with disabilities, and comfortable.
- Makes transit a convenient choice of travel by providing connections to a wide range of destinations, facilitating fast, frequent, and reliable service, and linking bus stops to well-connected pedestrian and cycling infrastructure.
- Uses transit to build a resilient community by seamlessly integrating transit with neighborhood design; promoting transit to support energy efficient and sustainable development; and putting money back into local residents' pockets by providing affordable access to local businesses and services.

The long-term vision for transit in Moscow connects high activity centers, such as the University, residential neighborhoods, downtown, and important services such as the medical services in west Moscow and health and welfare services near the East Side Marketplace. At full build out, transit service in Moscow should be guided based on the following factors:

- Location of low-income, senior, and/or youth
- Existing high-amenity transit stops
- Planned future growth
- Identification of activity centers, such as the University, downtown, WalMart, medical services in west Moscow, Gritman Medical Center, and the East Side Marketplace

Figure 6-6 provides a map of the financially unconstrained long-term transit vision. This map provides a guide for where transit service should be prioritized over the next 20 years. Per the guidelines noted above, the transit vision connects key destinations such as the University and Downtown, and includes projected growth areas, such as development along "A" Street between Warbonnet Drive and Farm Road, the Alturas Technology Park, and residential development east of Mountain View Drive and south of Palouse River Drive.

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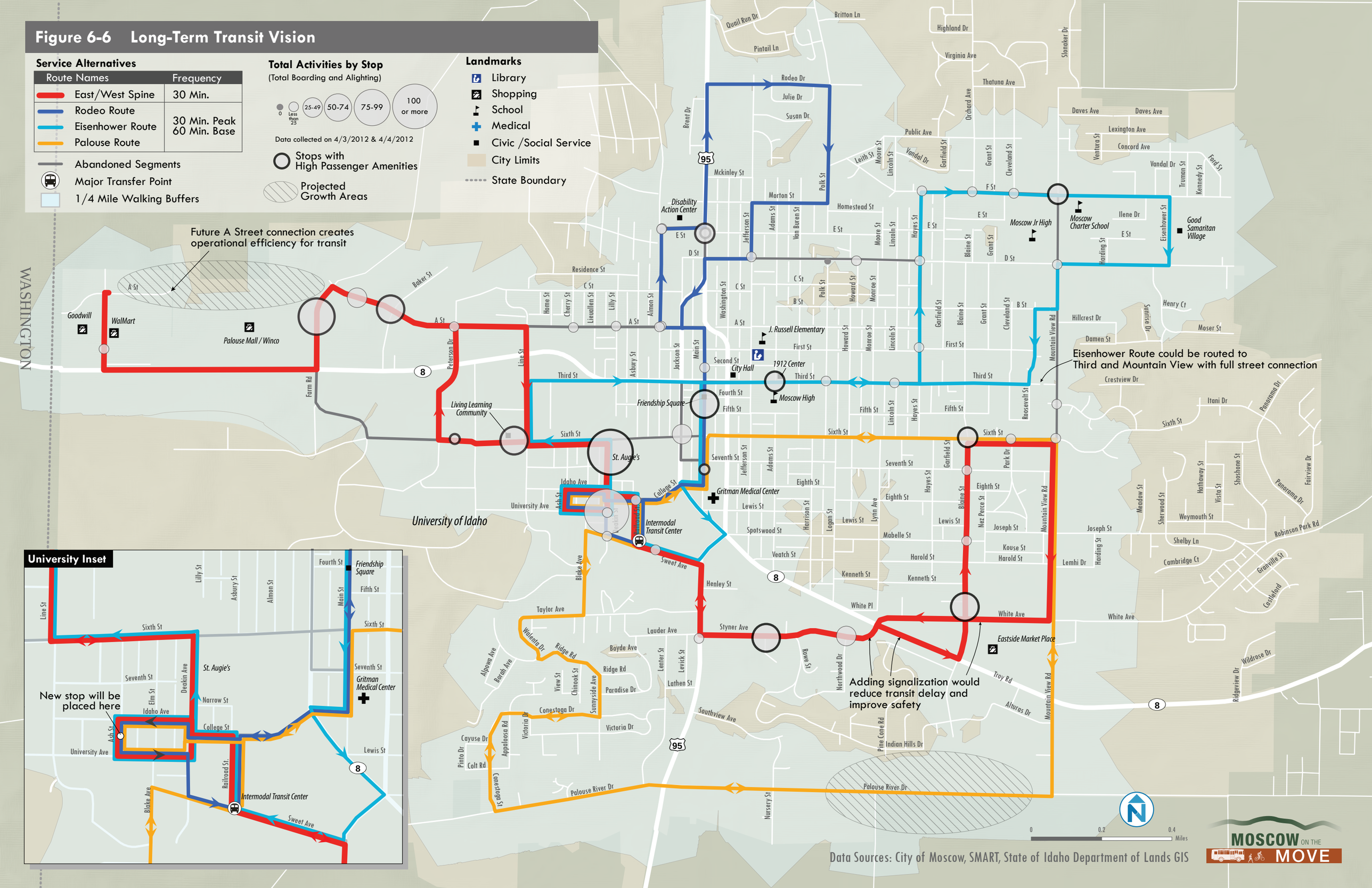
Figure 6-6 Long-Term Transit Vision



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Service Design Policy Framework

Taking into account the factors noted above, the City will also have to institute policies that provide a framework for service design and prioritization as development occurs, the population grows, and funds become available. This section outlines those policies that will help Moscow develop an efficient, balanced, and equitable transit system.

Service Allocation Policy

Every transit system must strike a balance between two competing purposes: providing high frequency service that serves primary transit corridors (i.e., those with the greatest demand) versus providing service to all corners of the community. We suggest that the City of Moscow and SMART develop a policy approach that balances these two goals against each other. The City should work with SMART to consciously allocate a portion of its resources to address productivity, while also providing for coverage. Doing this provides a solid framework for the development of a consistent approach to service allocation. Figure 6-7 provides an example of how resources could be allocated; this is not necessarily the recommended allocation.

Figure 6-7 Example of Resource Allocation to Productivity vs. Coverage Oriented Service

Service Standards and Criteria

In addition to extending hours and days of service, a key goal for Moscow over the next 20 years is to improve service frequency on existing routes and provide increased service to high demand areas currently not served by transit. As the City and SMART implement new transit service, it will be important to maintain a high level of service frequency, span, and reliability on both existing and new routes. Figure 6-8 provides a set of service design standards for the City and SMART to follow.

Figure 6-8 Long-Term Transit Strategy Service Standards

Service Element	Long-Term Strategy
Frequency	**Weekdays:** 30 minutes or better on most routes; high demand centers may justify 15 minutes or better **Saturdays:** hourly or better
Span	**Weekdays:** 10-16 hours per day depending on the route **Saturdays:** 10 hours per day
Speed	Average operating speed of no less than 30% of the speed limit (accounts for stops)
Reliability	Permanence and reliability are anchors of dependable and convenient transit service; users should expect Moscow transit service to operate on schedule
Loading	Passengers may have to stand on occasion, but should not be crushed into buses that have loads exceeding seating and standing capacity
Coverage	Most people living in the city of Moscow should be within one-quarter mile (3-4 blocks) of a transit stop

The City and SMART will benefit from adopting detailed criteria to screen and prioritize potential transit improvements. These criteria should consider a range of factors that lead to transit success. There are numerous examples of service design measures in the literature, mostly focused on a routes' likely ability to generate new passenger trips. Example service design criteria include:

- Modeled current patronage (if no service exists)
- Modeled future patronage
- The presence of fees for parking
- Existence of a collector street system allowing access from adjacent neighborhoods
- Existence and conditions of sidewalks
- Bike access and facilities
- Ridership on current transit services in the corridor

Stop Spacing

It is also recommended that the City adopt a stop spacing policy to both save running-time and ensure residents are within walking distance to transit. Ideal stop spacing is close enough that everyone in the surrounding area can walk to a bus stop, but not too close as to be inefficient. Based on national research (TCRP Report 19), roughly 600 feet is a common spacing standard; however in a walkable environment with a well-connected street grid, the distance can be increased to 800-1,000 feet. We recommend that as routes are restructured, stops are spaced roughly three blocks apart (approximately 1,000 feet), except where there is hilly terrain or poor connectivity.

RECOMMENDED TRANSIT SERVICE ACTIONS FOR MOSCOW

Action T1. Develop a service allocation policy to help weigh the balance between frequency and coverage.
Action T2. Adopt service design standards to guide the placement of new and expanded services.
Action T3. Optimize stop spacing to ensure efficient operations and improved access.

SUPPORTING THE NEAR- AND LONG-TERM TRANSIT VISION

In addition to providing a target for future service levels and direction on investment priority, the long-term transit vision also serves as a guide for transit related capital investment, such as vehicle expansion and bike and pedestrian facilities, in addition to providing a platform to market transit to key travel markets in the community. To optimize its investment in service, the City of Moscow, in partnership with SMART and the University of Idaho, should invest in a number of initiatives that will make accessing transit safer, easier, and more enjoyable for passengers. Moreover, the transit vision will serve as a guide for future growth so that transit investment and new growth in the community are implemented in parallel.

Changing the Face of Transit

Branding Transit

Transit in Moscow should be universally recognizable and easy to access. By branding transit as a permanent and integrated part of city infrastructure, SMART, in partnership with the City and the University, can market a set of convenient and reliable transit services.

- **Brand:** Moscow recently rebranded its transit service through its *Name Your Transit!* campaign. The new name, SMART, stands for Sustainable Moscow Area Regional Transportation. This name should be the basis of the new transit brand and should be supported by consistent color schemes, fonts, clear and informative iconography, and information rich transit maps.
- **Bus Shelters:** Moscow has already made great strides in developing high-amenity and distinct bus shelters for key transit stops throughout the city. Distinctive bus shelter design, including fully enclosed shelters that protect passengers from the elements, provide a comfortable experience for transit passengers. Signs on shelters identifying their location can also help passengers to orient themselves and give the shelters more of a "station" feel. Amenities at or near shelters that provide system mapping and information, trash receptacles, and newspaper racks add to the passenger experience.
- **Schedule Information:** Schedule information should be available on-line and posted at major transit stops. Mobile applications can also help transit users receive the most current information about bus stops and schedules using mobile devices. En route signage at the stop can help passengers know when the next bus is arriving in real time.
- **Signage:** As higher frequency service is implemented in Moscow, distinctive signage for this service can provide much more information than the current generic bus stop by advertising "30-minute service" or "the bus will be here soon!"

RECOMMENDED ACTIONS TO BRAND TRANSIT IN MOSCOW

Action T4. Broadcast the new SMART brand developed during the Name Your Transit! campaign.

Action T5. Develop a consistent brand for the SMART website, schedule information posted at stops, and marketing materials.

Action T6. Create stop signage design guidelines to establish more distinctive and legible transit stops.

Promoting Transit

People tend to make transportation choices based on a variety of factors, including cost, travel time, reliability, available options, and personal preference. Although younger generations may be more dialed into the benefits of taking transit, biking, and walking, the majority of people in Moscow (58%)[7] still choose to drive alone to work over other modes of transportation. Making real progress in shifting residents to choose transit for more trips will require marketing transit to the Moscow community. Incentives, education, and outreach programs will play a crucial role in teaching people how and why to integrate transit into their daily lives. Cultural acceptance of any product requires (1) providing an excellent and useful product, (2) using effective marketing to educate people about the product's value, and (3) entering the product into the social norm (or better yet, making it "hip"). The latter two elements are both most difficult yet most important to accomplish. A travel options program could be housed at the University or at the City and could be staffed by a half time position ($30,000-$60,000 annually including materials).

Events like Bike Walk Bus Week in Missoula encourage people to use alternative modes. These events can provide education, incentives, and information to people who do not typically take transit.

RECOMMENDED ACTIONS TO PROMOTE TRANSIT IN MOSCOW

Action T7. Partner with the University of Idaho to develop a travel options marketing campaign.

Transit Stop Design & Prioritization

Safe and comfortable passenger amenities are an important element of any successful transit service. To transit users, the bus stop is the front door of the transit agency and is often the first impression they have when using transit. The design and location of bus stops also defines how transit and transit users are viewed in the community. Locating appropriately designed bus stops is not only important for retaining existing riders, but also in attracting new ones. At a transit stop, shelters provide needed protection from inclement weather and sun, seats provide passengers a comfortable option while waiting for transit, and trash receptacles ensure the shelter area remains clean and attractive. Route/time information should also be posted at every stop. Higher-end stop amenities may also include live schedule information to let passengers know of the next vehicle arrival.

In Moscow, transit stop amenities vary greatly throughout the system. Some stops have enhanced amenities like a bus stop shelter with a bench, bicycle parking, route information, and a trash bin (see Figure 6-9). Since 2008, the City of Moscow and the University have partnered to implement transit stop improvements at 13 major transit stops in the city. Over the last five years, transit stop investment (including the cost of shelters, lights, bike racks, installation, and engineering) has amounted to over $340,000.

[7] American Community Survey 2006-2010 5 Year Estimates.

Transit stops at major transfer points and activity centers should have the highest level of passenger amenities. Passenger waiting facilities should be clean, comfortable, safe, well-maintained, protected from moving traffic, and should not impede pedestrian through movement.

Image from Nelson\Nygaard

Figure 6-9 Enhanced Stop Amenity Inventory

Stop Location	Amenities				
	Bench	Shelter	Trash receptacle	Bike parking	Solar powered lighting
Southeast corner of Sixth and Deakin Streets at St. Augustine's Catholic Church	⊙	⊙	⊙		
Sixth Street at Wallace Complex, University of Idaho campus[i]	⊙	⊙	⊙	⊙	
Eighth Street at Gritman Medical Center	⊙	⊙	⊙		⊙
Southwest corner of US-95 and E Street at Rosauers	⊙	⊙	⊙	⊙	
Southwest corner of Mountain View Road and F Street	⊙	⊙	⊙	⊙	
Friendship Square, Downtown	⊙	⊙			
Southwest corner of Blaine Street and White Avenue[ii]	⊙	⊙	⊙	⊙	⊙
Farm Road at north entrance to University Inn Plus Best Western	⊙	⊙	⊙		⊙
Southwest corner of A Street and Baker Street	⊙	⊙	⊙		
Northeast corner of Sixth Street and Blaine Street	⊙	⊙	⊙	⊙	⊙
Sixth Street at LLC, University of Idaho campus	⊙	⊙	⊙		
Third Street at Adams Street, in front of Moscow High School[iii]	⊙	⊙	⊙		
Styner Avenue at Hawthorne Drive[iv]	⊙	⊙	⊙	⊙	⊙

Source: SMART

Notes: All enhanced stops listed above include temporary system schedules posted on the shelter wall.

[i] Trash receptacle is University-owned

[ii] Only one bike parking rack with two spaces

[iii] Stop faces sidewalk rather than roadway due to space constraint and size of shelter footprint; no stop landing constructed

[iv] Railing prevents falling hazard at the northside hill

Although high-end stop amenities would ideally be installed at every transit stop, a more realistic approach is to identify a threshold for investing in stop upgrades. Moreover, not all stops need the same level of amenities. Figure 6-10 below outlines three tiers of stop improvements and the thresholds for investment.

Figure 6-10 Stop Tiers and Thresholds for Investment

Stop Tier	Stop Amenities	Threshold for Investment	Estimated Cost
Tier I: Enhanced Bus Stop 	▪ Shelter ▪ Seating ▪ Lighting ▪ Excellent pedestrian and bicycle access ▪ Posted route/time information	High = >100 daily boardings	$12,000 - $16,000
Tier II: Bus Stop with Bench 	▪ Seating (minimum) ▪ Good access preferred (sidewalk, access, etc.) ▪ Posted route/time information ▪ Lighting to illuminate waiting passenger	Medium = 50-100 daily boardings	$800 - $1,200
Tier III: Neighborhood Bus Stop 	▪ Posted route/time information ▪ Seat desired but not required ▪ Lighting to illuminate waiting passenger ▪ Good access desired but not required (except ADA requirements)	Low = <50 daily boardings	$500 - $700

Note: Shelter costs do not include construction.

RECOMMENDED ACTIONS FOR TRANSIT DESIGN IN MOSCOW

Action T8. Develop a tiered stop designation program that would allow the City of Moscow, the University of Idaho, and SMART to prioritize investment in stop area improvements.

Action T9. Update bus stop inventory on a biannual basis; track the percentage of bus stops with shelters, benches, schedule information, etc.

Action T10. Ensure City codes and policies promote, require, and/or create developer borne incentives to provide stop amenity, marketing, or information features.

Action T11. Partner with businesses to evaluate the feasibility of district funding mechanisms, such as a Business Improvement District, that can help fund transit information and marketing programs and make streetscape and transit stop improvements.

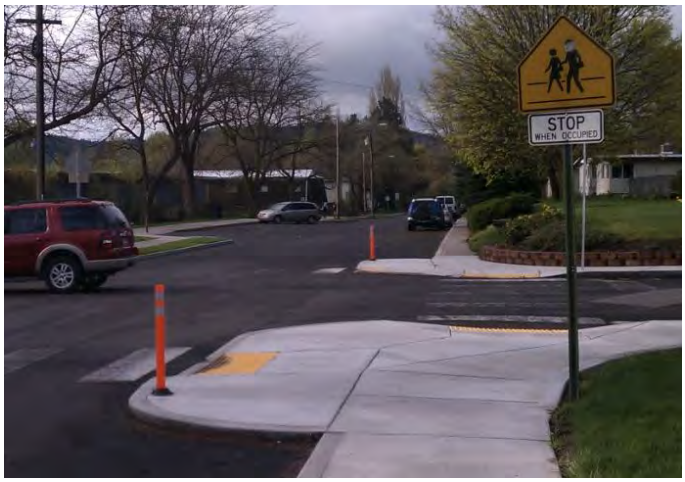
Multimodal Access to Transit

Safe and convenient pedestrian and bicycle access to transit stops is vital for an efficient and approachable transit system. A successful transit strategy integrates bicycle and pedestrian facilities and spot improvements around each transit route to ensure people can comfortably and safely access transit.

Pedestrian Access

Improving and installing sidewalks, ensuring curbs and stops are ADA accessible, and enhancing the walking environment along key transit streets improves the attractiveness and viability of transit for more users and more types of trips. Quality pedestrian access to transit facilities typically includes the following characteristics:

- Continuous and connected network of sidewalks that are ADA accessible
- Barrier-free routes, crosswalks, and ramps
- Direct walking paths
- Minimal conflicts with motor vehicle traffic
- Ample lighting along the street and at the stop
- Seating and shelter from wind and rain at stops
- Interesting visual environments and a good line of sight
- Trees or other streetscape elements that contribute to a comfortable and appealing walking environment



The walking environment will influence people's decisions whether or not to use transit.

Bicycle Access

Bicycle infrastructure that links into and along transit corridors and stop areas will help transit riders connect to transit. Networks of low stress and high visibility bicycle facilities—such as off-street bicycle paths, neighborhood greenways, and cycle tracks/buffered bike lanes—are a critical component for bike/transit integration. Such investment in the bicycle environment will vastly extend transit's reach. The bicycle catchment area for transit access is far more extensive than walking. There is also a large market of students who travel to campus by transit. By providing bicycle racks on transit and covered bicycle parking at the University and in other high demand areas, students can bring their bikes with them to travel on campus.

Transit routes should have direct bicycle access that includes safe street crossings and minimal conflicts with traffic; all buses should be equipped with bicycle racks.

Image from Nelson\Nygaard

RECOMMENDED ACTIONS FOR MULTIMODAL ACCESS TO TRANSIT IN MOSCOW

Action T12. Support each transit route with bicycle infrastructure and end-of-trip facilities, such as bicycle parking and on-board bicycle racks.

Action T13. Complete sidewalk coverage within one-quarter mile of each transit route.

Action T14. Integrate Universal Design principles into all stop designs to improve access for the visually, acoustically, and mobility-impaired.

Action T15. Provide clearly visible and consistent wayfinding signage between transit facilities and all pedestrian and bicycle access points.

Action T16. Develop an interagency working group to facilitate coordination between the City of Moscow, the University of Idaho, SMART, and private developers to develop design standards for transit and transit-access facilities.

Vehicle Options

As of 2013, SMART operated six fixed-route buses and three Dial-a-Ride buses. The fixed-route buses are Ford Cutaway buses and several have received major engine overhauls to expand the useful life of the vehicles.

Enhanced bus service in the long-term transit plan would require additional buses. The long-term transit plan described in the previous section recommends that SMART increase its fixed-route bus fleet by three buses (from two currently in service to five).

Transit vehicles should be of the highest quality possible to ensure a comfortable passenger experience. Buses should be clean, comfortable, and well-maintained.

RECOMMENDED ACTIONS FOR VEHICLES IN MOSCOW

Action T17. Develop specifications for future fleet replacement that provide high-amenity vehicles with bicycle racks.
Action T18. Track the evolution of hybrid fuel vehicles as a future option to reduce exposure to fuel price increases.

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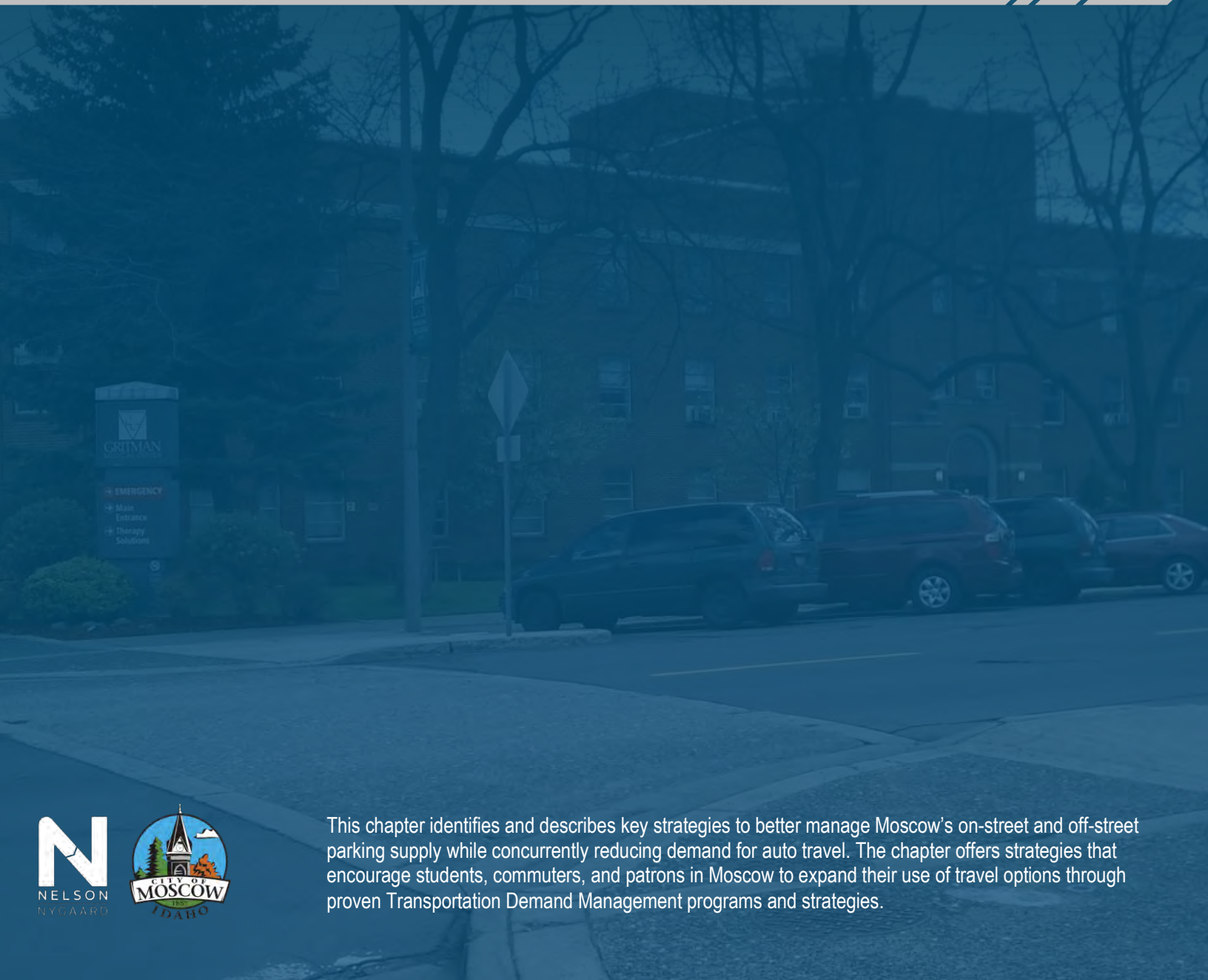
ESTABLISHING MULTI-MODAL STRATEGIES | CHAPTER 7

PARKING & TDM STRATEGY



This chapter identifies and describes key strategies to better manage Moscow's on-street and off-street parking supply while concurrently reducing demand for auto travel. The chapter offers strategies that encourage students, commuters, and patrons in Moscow to expand their use of travel options through proven Transportation Demand Management programs and strategies.

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7 PARKING & TDM STRATEGY

This chapter identifies and describes key strategies to better manage Moscow's on-street and off-street parking supply while concurrently reducing demand for auto travel by encouraging students, commuters, and patrons in Moscow to expand their use of travel options through proven Transportation Demand Management (TDM) programs and strategies.

MANAGING PARKING IN DOWNTOWN

As demand for downtown access continues to increase, carefully managing both the supply and price of on- and off-street parking can help Moscow meet its long-term goals and maintain access to support the economic vitality of downtown.

Recommended Parking Actions

The following strategy provides a *proactive plan responding to future growth and demand for downtown business access*. This is a potential blueprint policy framework that should be tailored as growth occurs in order to achieve future parking management needs. Please note: Recommended actions for managing parking supply are not necessary until parking utilization targets are triggered. These triggers are not anticipated to be prompted until the latter end of *Moscow on the Move's* 20-year planning horizon, if at all.

Why Should Moscow Manage Its Parking Supply?

While downtown parking management is not necessary for the foreseeable future, the City of Moscow should establish the basic thresholds and protocol to understand when and why parking management might be necessary in the future. Communities like Moscow manage parking supply for a variety of reasons. The most critical to local businesses and customers are listed below:

- **Use Downtown Moscow's limited parking supply more efficiently**
- **Reduce search-for-parking anxiety and traffic**
- **Improve customer confidence and reliability that spaces are available**
- **Encourage walking, bicycling, or taking SMART to downtown shops and offices**
- **Encourage parking turnover to maximize sales potential**
- **Afford customers access to the choicest spaces, not employees. ()**
- **Generate revenue (when warranted)**

The action steps below establish a framework for proactively monitoring when parking management is necessary, if at all. These are not considered near-term actions. Rather, this section serves as a toolbox for the City to use on an as needed basis.

Establish occupancy rate targets for on-street and off-street parking management

An ideal occupancy rate for on-street parking is approximately 85% at even the busiest hour and 90% in off-street facilities. This occupancy rate provides enough vacancies that visitors can find a spot near their destination. For on-street parking, this typically equates to approximately one or two vacant spaces per block face. *An on-street parking management program designed to maintain business access should be driven by a primary management objective of maintaining one to two free spaces on every block face.* Customer frustration with downtown parking is often driven by conditions on the specific block where the business they try to access is located, and not the overall supply of available parking in the district. As Moscow continues to grow, it will be ideal for the City to ensure that most downtown blocks are mostly full, but ensure that there are always one to two spaces available on any block. This strategy will allow the achievement of many other important management objectives, including:

- Reducing search-traffic (driving in pursuit of available parking);
- Maintaining consistent parking-revenues from permit fees; and
- Keeping block faces at optimal utilization to provide traffic-calming and pedestrian-buffer benefits.

Keeping a few spaces consistently open on all blocks will maintain or increase interest in downtown trips, as drivers realize they can rely on a few spaces being open, wherever they want to park. Even when overall occupancy rates are quite low, if infrequent downtown visitors find that they consistently have a hard time finding open spaces on the one or two blocks where they want to park, they will find downtown unaccommodating.

Focusing downtown parking management policy around this basic objective is an important first step as it establishes that space-availability is the central aim of all current and future management actions, such as introducing parking pricing (if necessary). Having a simple, measureable performance target will simplify internal and public debates about management actions, while achieving this vacancy target will both increase the appeal of curb parking and create customer- and business-friendly parking conditions.

To monitor and track parking utilization, the City should conduct an annual parking study to collect parking data in the downtown district by block face on weekdays and weekends. We recommend collecting parking utilization at minimum during peak hours.

Evaluate time-stay restrictions and consider implementing an employee parking strategy as demand increases

As demand for parking increases in downtown, a more comprehensive strategy is needed to manage the amount of time people can park downtown. Time limitations should be updated as utilization approaches 85% capacity on-street and 90% utilization off-street. Time limitations should also be used as a tool to limit the number of employees parking at the "front door." It has been noted that employees are occupying valuable parking spaces in the downtown. This type of activity reduces the availability of on-street parking for customer and visitor parking access in the downtown.

To reduce employee abuse of public parking in downtown meant for customers, the City should partner with the business community to monitor the use of employee parking in downtown. For example, employers could provide the city with a list of employee license plate numbers to ensure that employees are only parking in off-street lots dedicated to employees. The City should also partner with employers to sponsor employer-based initiatives to encourage employee use of alternative travel modes.

Implement on-street and off-street paid parking in Moscow's downtown parking district when the 85% threshold is met

Although Moscow offers monthly, quarterly, and annual paid parking permits for its four off-street public parking lots in downtown, on-street parking is free with time restrictions. Once the 85% target (noted above) is met, a first step for the City of Moscow could be to implement paid on-street parking in a designated downtown district with

residential parking permits established for adjacent neighborhoods to avoid neighborhood spillover parking. A "First Hour Free" program could be implemented alongside a paid parking program to support short visits to downtown. In the long term (10 or more years), the City of Moscow should install on-street parking meters in the downtown district and increase the cost of parking off-street. State-of-the-art pricing technology, including credit card and cell phone payment options, should be implemented to convey the impression that paid parking is convenient and efficient. While this planning effort did not survey parking utilization, observed occupancy signals that the 85% threshold is not being surpassed on most blocks, even during peak parking periods. Tracking this threshold should occur in the downtown parking district only.

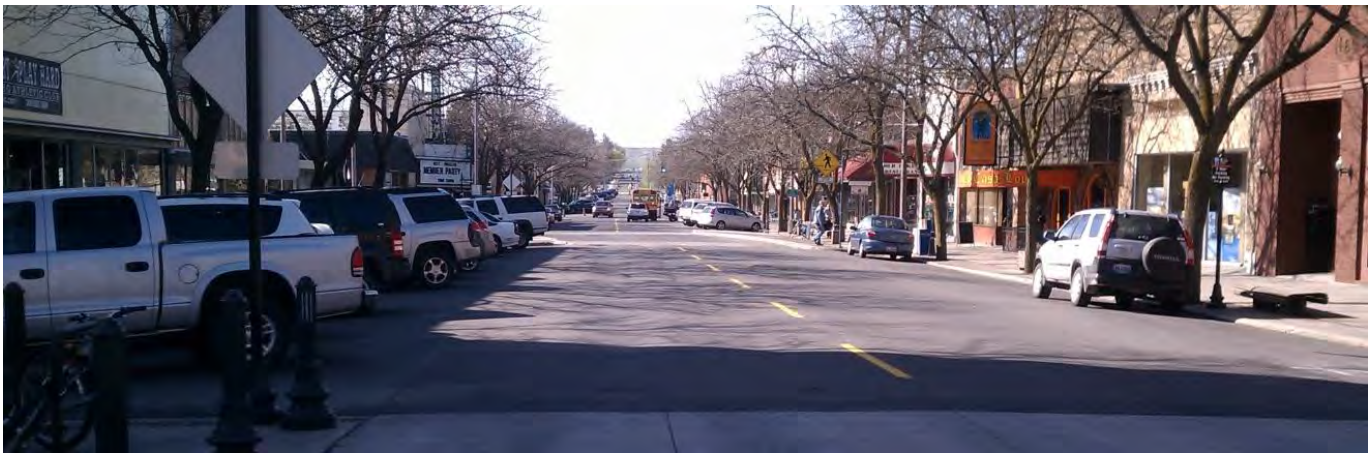

Image from Nelson\Nygaard

Make enforcement customer-friendly

The City should reinforce the public understanding that the purposes and objectives of enforcement are based on the effective management of resources — as well as public health and safety— by distinguishing responses to occasional mistakes from responses to serial infractions. Consider the following as a customer-friendly ticket-fine structure:

- The first ticket in any 12-month period is delivered in the form of a "courtesy" (no fine) ticket, that should contain information on the parking restriction violated, including its purpose
- The second ticket should be a nominal charge
- Subsequent tickets should increase the fine substantially

Ensure that press releases containing information on any changes to parking regulations, pricing, collection, and enforcement technology, are accompanied by a reminder of this new, friendlier fine structure policy.

Expand shared-parking options

If each land use were to build enough parking to accommodate its peak demand, then the supply of spaces would be grossly underutilized. Shared parking allows for accommodation of peak parking demand, but shares a supply among different uses. One parking space accommodates several vehicles each day, if that space is publicly available. The City can maximize parking resources by allowing developers or property owners to lease spaces in public lots during certain hours of the day, thereby guaranteeing an employee a reserved space during work hours, but freeing that same space for shoppers and visitors during non-work hours. The City should establish maximum limits on reserved, on-site parking at new development projects while setting no such cap on shared spaces. To qualify as "shared" parking, the City could require that spaces be made available for general parking for a minimum number of hours per week (perhaps 40) and be clearly signed to indicate this opportunity.

Build new parking only if triggers are met

The supply of parking should be managed to support the 85% on-street and 90% off-street triggers noted in Action P1. As demand for parking grows, the City should revisit the price for parking in downtown to ensure parking is priced appropriately. Then, if the parking supply is still not meeting demand, the City can consider building new parking. The City should adopt the 4-step approach to managing public parking inventory, located in the Action Manual (Chapter 8).

Study the potential for a parking impact fee for new downtown development

Responding to the City's emphasis on multi-modal transportation and downtown access, the City should study the fiscal impact and revenue potential for a parking impact or an in-lieu fee program. Such a program could be used to partially fund multi-modal improvements. Such a policy would work in conjunction with parking requirements to support several goals including 1) helping remove barriers for new development 2) encouraging efficiently shared public parking rather than many small, inefficient private lots (see above); and 3) creating a healthy market for commercial district parking, where parking spaces are bought, sold, rented, and leased like any normal commodity.

There are several key elements to address in developing an in-lieu fee price structure. The fee must serve the goals of the City, but it must also be flexible enough to encourage economic growth while providing an adequate pool of revenue for future parking facilities and alternative transportation programs. An effective in-lieu fee program should seek to:

- Avoid large up-front costs to developers that would deter investment.
- Guarantee a revenue stream for the City. A workable fee structure will both provide the City with enough initial funding to finance parking space construction (if necessary) and give the City a continuous long-term revenue stream for other transportation improvements.
- Fully utilize existing parking capacity. The actual fee amount should be based on parking utilization in Moscow and respond to the recommended strategies and triggers established above. Existing parking supply should be used in an efficient manner to allow a fee structure that favors a long-term revenue stream over immediate funds for parking construction.
- Maximize shared parking efficiencies.

To the greatest extent possible, the City should allow for flexible expenditures of in-lieu fee revenue. In addition to using the revenue for the construction of public parking facilities, it is recommended that fee revenues be used for leasing of available private spaces; improved parking management of existing supply; transit, bicycle, and pedestrian infrastructure improvements; and transportation demand management programs.

It is also important to emphasize that the purpose of a new in-lieu fee is not to generate all of the revenue required to build large parking facilities. Simply setting the in-lieu fee to the full costs of construction offers little value as it may discourage development. Thus, the in-lieu fee will never fully cover the cost of new parking construction.

RECOMMENDED PARKING MANAGEMENT ACTIONS FOR MOSCOW

Action P1. Establish occupancy rate targets for on-street and off-street parking management.
Action P2. Evaluate time-stay restrictions and consider implementing an employee parking strategy as demand increases
Action P3. Establish a 15% availability rate as the primary objective for on-street management.
Action P4. Make enforcement more customer-friendly.
Action P5. Expand shared-parking options.
Action P6. Build new parking only if triggers are met.
Action P7. Study the potential for a parking impact fee for new downtown development..

TRAVEL OPTION PROGRAMS

Transportation Demand Management (TDM) is a general term for strategies that increase overall transportation system efficiency by encouraging a shift from driving alone to other means of travel such as transit, bicycling, walking, and carpooling, by eliminating trips, or by shifting auto trips out of peak periods when roads are most congested.

TDM strategies make it easier to reduce reliance on automobiles by:

- Increasing travel options
- Providing incentives and information to encourage and help individuals adjust their travel behavior
- Providing information about travel options and their personal benefits
- Reducing the physical distance and need to travel through use of technology, community design, and facilities

TDM programs are typically implemented by a range of community partners, including employers, public agencies, and non-profit organizations. This section provides an overview of the TDM programs in Moscow today, and recommended strategies and programs that Moscow can implement in the coming years to increase the number of people biking, walking, taking transit, and sharing rides for more trips.

SmartTrips

Individualized Marketing Program in Whatcom County, Washington

Whatcom County, Washington launched its individualized marketing program, branded as SmartTrips in 2006. In 2008, neighborhoods on the west side of Bellingham were targeted. Nearly 5,000 households received individualized travel information to help them walk, bike, or take transit. Between 2007 and 2009, mode shift was notable in the target area influenced by the campaign:

- Transit trips increased 10%
- Walking trips increased 22%
- Bicycling trips increased 35%
- Drive alone trips decreased 13%

Recommended TDM Actions

To encourage students, commuters, and patrons in Moscow to expand their use of travel options, the City of Moscow should formalize TDM programs and strategies. A range of partners will be needed to market these travel options, including the City of Moscow Transportation Commission, the University of Idaho, employers, and non-profit organizations.

Establish a city-wide social marketing campaign that promotes the use of travel options

Creating a recognizable brand that promotes the use of travel options in Moscow can help expand the visibility of travel options and begin to shift behavior away from a "car culture." The travel options brand should be marketed through the use of social media (such as Facebook and Twitter), billboards, newspaper advertisements, and other media. *Moscow on the Move* could be an effective name for this brand, given that it is already gaining recognition in the community through this planning process. Whatcom County, Washington's highly successful transportation marketing campaign is showcased on the right. An early target group could be downtown employees given the issue of employees parking in valuable downtown parking spaces.

Work with the University of Idaho Parking and Transportation Services department to develop a travel options strategy

The City of Moscow should partner with the University of Idaho to promote travel options to students, faculty, and staff. The City should work with the University to adopt the brand identified under the social marketing campaign action detailed above and use these materials on the Parking and Transportation Services website, in addition to providing new students with a "travel training" packet when they first arrive on campus. The travel training packet

should include SMART's schedule and route information, bike routes, Zipcar membership promotions, and incentives to encourage students to use travel options. This action provides in-kind, coordination services only.

Organize community events to increase awareness of travel options

The City of Moscow, in partnership with SMART and the University of Idaho, should launch a range of community events throughout the year to promote and increase the visibility of travel options. These events could be sponsored by the City, SMART, and the University, but ultimately be managed by a non-profit organization such as the Palouse-Clearwater Environmental Institute. Events could include:

- **"Bike, Walk, Bus Week"** is an annual week-long celebration that promotes travel options throughout the city. This event would include a range of incentives and prizes for people who choose to bike, walk, or take transit to work or school.
- **Commuter challenge** engages the business community to encourage their employees to bike, walk, and take transit to work for a day, week, or month.
- **Individualized Marketing** programs provide individualized travel options materials to people in a specific neighborhood who have expressed interest in changing their travel behavior.

RECOMMENDED TRANSPORTATION DEMAND MANAGEMENT ACTIONS IN MOSCOW

Action TDM1. Establish a City-wide social-marketing campaign that promotes the use of travel options.
Action TDM2. Work with the University of Idaho Parking and Transportation Services department to develop a travel options strategy.
Action TDM3. Organize community events to increase awareness of travel options.

MOSCOW on the MOVE

ESTABLISHING MULTI-MODAL STRATEGIES | CHAPTER 8

THE ACTION MANUAL

Moscow on the Move presents a twenty-year plan for transforming Moscow's transportation system into a sustainable, efficient, multi-modal network that meets the mobility needs of all users. The Action Manual provides more detailed guidance for implementing the highest priority strategies presented in Chapters 4 through 7. The Action Manual includes action plans for each mode, long-term capital improvement program recommendations, and a strategy to fund *Moscow on the Move*.

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8 THE ACTION MANUAL

Moscow on the Move is a twenty-year policy and investment plan for Moscow's transportation system that guides the City in developing a sustainable, efficient, and multi-modal network that meets the mobility and access needs of all users. The Action Manual provides guidance for implementing priority projects, policies, and programs over the next five years. The Manual explains the method used to select priority projects, provides action plans for each mode, establishes long-term capital improvement program recommendations, and recommends a strategy to fund *Moscow on the Move*. The recommended priorities balance funding challenges and key implementation considerations. For example, costly capital projects that require right-of-way acquisition and major study might be less favorable compared to low-cost, high benefit projects that require only restriping or minor construction costs.

Moscow on the Move is a guiding document but is not too rigid for the City to respond to shifting economic, demographic and real estate dynamics. Therefore, the Action Manual stresses flexibility in implementing long-term priorities, especially as unique funding opportunities arise.

The Action Manual's recommended actions include policy, design, and programmatic improvements necessary to achieve the balanced, multi-modal system the Moscow community desires. Four Action Plans are laid out below, including:

- Roadway & Traffic Operations
- Active Transportation
- Transit
- Parking & Transportation Demand Management (TDM)

Action items are prioritized into high priority projects (to be implemented over the next 5 years) and projects that can be implemented over a longer period of time (5 to 20 years). Priority projects were determined based on evaluation criteria that reflect *Moscow on the Move's* Guiding Principles and goals.

ELEMENTS OF THE ACTION MANUAL

The primary purpose of the Action Manual is to prioritize projects, programs, and policy action for implementation. All proposed projects have been evaluated in a goal-oriented prioritization framework.[1] Projects are scored as either Good, Better, or Best depending on their ability to achieve a broad range of *Moscow on the Move's* Guiding Principles. As illustrated in Figure 8-1, the Action Manual employs a **multi-tiered project delivery framework** where the highest scoring projects are classified under an accelerated implementation timeframe (either for Immediate or Short-term implementation). All other projects are slated for Medium- or Long-term implementation.

[1] See the following section for more details on the evaluation process.

The Action Manual provides further implementation guidance *for near-term implementation projects only* (i.e., first five years of priority projects). This more detailed implementation guidance is based on a range of financially constrained scenarios. An icon accompanies each of the Recommended Actions in the following sections. These icons represent the funding scenario under which the project would be implemented:

Baseline Scenario: Up to $455,000 per year (average transportation funding since 2010, including grant funding)

Moderate Scenario: Up to $3,455,000 per year (assumes the baseline scenario plus moderate level of grant funding awards)

Aggressive Scenario: Over $3,455,000 per year (assumes the baseline scenario plus substantial amount of grant funding awards)

Medium-term and Long-term projects have been scored using the same project prioritization criteria, but the three funding scenarios are not applied to them. More detail on funding *Moscow on the Move* is available on page 8-21. In addition to identifying near-term and longer-term projects, the Action Manual concludes with a summary of policy measures and programs recommended for near-term adoption or deployment. It also provides a list of available funding sources and a multi-scenario funding strategy.

Figure 8-1 Project Evaluation Process and Immediate-/Short-term Priority Project Delivery

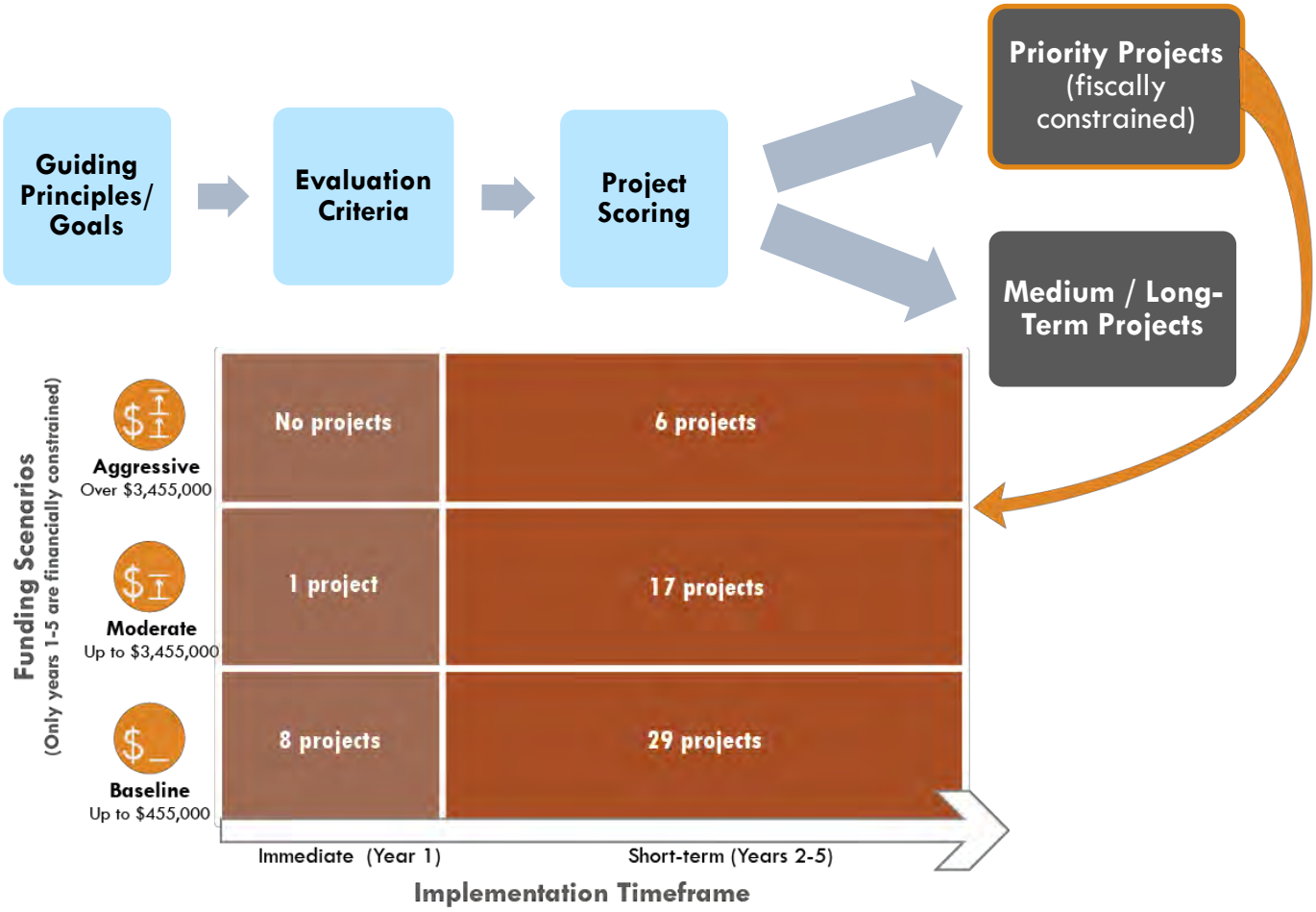

Figure 8-1 above illustrates Moscow's implementation approach for projects using temporal, priority scoring, and funding scenario factors. Only temporal and priority scoring characteristics are used to classify level of priority for Medium- and Long-term projects—not funding scenarios. The numbers shown in each time frame reflect the 5-year projects recommended in the plan. *Note: Four funded projects are not included in the above project tallies.*

Evaluating Project Priorities

There are many ways to prioritize local transportation investment. Different projects and their combined elements hold value for different groups of people. Guiding Principles and objectives were developed for *Moscow on the Move* by which transportation projects and policies have been measured. It is important that there is a consistent, objective mechanism to evaluate each project. Not only should the evaluation mechanism determine how closely the project meets the Guiding Principles, but it should also compare projects to each other relative to those principles. Projects identified in the plan process were evaluated using criteria related to each Guiding Principle developed in consultation with the community.

Programs and policies were evaluated based on a different set of criteria, including the ability to catalyze project development, increase chances for funding, and provide an immediate safety benefit. Although utilization of this framework will help identify the best projects to implement the vision of the plan, a steering committee, technical advisory committee, the Transportation Commission, City staff, and the community have also vetted the projects. Funding realities in place in Moscow and Idaho have also been considered. After filtering projects through all these considerations and perspectives, the projects presented in the following sections are the high priority action items.

These projects were given ratings of "Good", "Better", and "Best". These ratings reflect the idea that no projects included in the plan are low priority; rather, each project will become a valuable asset or amenity. All of the projects and strategies included in *Moscow on the Move* will help achieve the plan's goals. Although the projects highlighted in the action manual for each mode should be the short-term priorities, new opportunities to fund and implement other projects may arise in the future. This plan structure allows Moscow to be both strategic and opportunistic in planning a transportation system that will meet the needs of all users.

Image from Nelson\Nygaard

Active Transportation Project Evaluation

Active transportation project evaluation criteria were developed to make wise investment decisions that will maximize community benefit for the expenditure of public funds (see Figure 8-2). In recognition of the multiple benefits that active transportation investments bring, all seven of *Moscow on the Move's* Guiding Principles are reflected in the scoring criteria. These evaluation criteria generally relate to proximity to key destinations, filling in critical gaps, and facility type. The criteria have been applied to proposed bikeway and crossing improvements to prioritize projects into short- and long-term implementation phases.

Figure 8-2 Active Transportation Evaluation Criteria

Guiding Principle / Goal	Active Transportation Evaluation Criteria	Rationale / Scoring Mode
Mobility and Access	Proximity of facility to transit stop	Nexus with multi-modal transportation, scores higher for being directly on transit route.
	Closure of critical gap	Fills in existing gaps, creates safer and more usable network, and removes barriers to use. Scores higher for directly addressing gaps/key challenges identified in Fact Book.
	Proximity of residents to proposed facility	All residents should have access to facilities. Scores higher the closer to designated/identified facility.
Downtown and University Public Spaces	Accessible pedestrian routes	Presence of curb cuts and potential to reduce sidewalk deficiencies.
Economic Resilience	Trail proximity to trip generators	Having a well-connected trail system improving access to retail, jobs, and attractions is good for Moscow. Higher scores as the trail gets closer to economic and trip generators (employment centers, University of Idaho, downtown, etc).
	Available bike parking	Visible, secure, high-quality bike parking is essential to attracting users and keeping them in the area. Higher scoring for covered parking and long-term parking facilities. This measure will use a ratio of vehicle parking to bike parking.
Land Use, Design, and Quality of Life	Proximity to grocery stores	Land use integration. Higher scores for closer proximity/connectivity.
	Proximity to Parks	Land use integration. Higher scores for closer proximity/connectivity.
	Proximity to Schools	Land use integration. Synergy with SRTS. Higher scores for closer proximity/connectivity.
Safe Streets	Right of way available for bicyclist and pedestrian facilities/amenities	Promotes the implementation of Complete Streets.
Active and Healthy Living	Low stress facility	Higher scores for more user-friendly facility types.
Environmental Quality	Stormwater integration	Leverages transportation investments to achieve stormwater benefits.

Roadway and Traffic Operations Project Evaluation

Figure 8-3 describes and provides rationale for the Roadway and Traffic Operations project evaluation criteria and describes scoring mechanisms. Like the Active Transportation evaluation framework, criteria are directly tied to *Moscow on the Move's* Guiding Principles.

Figure 8-3 Motor Vehicle Evaluation Criteria

Guiding Principle / Goals	Roadway and Traffic Operations Evaluation Criteria	Rationale / Scoring mode
Mobility and Access	Facilitate multi-modal access	Fill in existing roadway gaps, create parallel routes, or a project that accommodates all modes or provides alternative routing in constrained corridors. Scores higher for directly addressing gaps/key challenges identified in Fact Book.
	Maintain minimum level of service	Flexibly maintains the citywide level of service standard for signalized (LOS D), all-way stop (LOS D), and two-way stop (LOS E) intersections that can be relaxed based on project goals, land use function, and corridor function.
	Proximity of facility to key freight/delivery route	Improve goods movement and delivery access, scores higher for being directly on key freight/delivery route.
Downtown and University Public Spaces	Proximity of improvement to downtown and University of Idaho campus	Enhance safety and comfort along streets in and around downtown and the UI campus. Higher scores for proximity to these areas.
Economic Resilience	Proximity of streetscape enhancements to any commercial districts	Enhances street aesthetics and pedestrian safety/access (e.g., adding landscaping). Highest scores for proximity to commercial districts.
	Availability of on-street parking	Retain high demand on-street parking. Lower scores for impacts to high demand parking supply.
Land Use, Design and Quality of Life	Level of impact to existing land uses/property	Minimize impacts to existing land uses/property. Higher scores for context-sensitive solutions within existing right-of-way.
	Level of impact to residential street traffic	Reduce potential for cut-through traffic on residential street. Higher scores for improvements that encourage trips on arterial and collector street system.
Safe Streets	Improve street segment/intersection safety	Enhance safety along streets/intersections. Higher scores for potential reduction in collisions.
	Level of impact to vehicle speeds	Reduce vehicle speeds to improve safety. Higher scores for potential speed reduction.
Active and Healthy Living	Provides facilities for active transportation	Higher scores for projects that include an active transportation component. Potential higher weighting for projects that would upgrade an incomplete street or a connection to the Paradise Path network.
	Improves access to basic services	Provides an access improvement to basic services that otherwise would not be available. Higher scores for an improvement to health/government/retail/recreation service access.
Environmental Quality	Level of impact to environmental resources	Protects environmentally sensitive areas. Impactful projects accrue negative scores.

Implementation Timeframes

The Action Manual compiles both current planned and funded projects with a list of new proposed projects as part of the planning process. It then recommends projects to be implemented within several priority/time horizons:

- **Immediate (First year).** These are Moscow's highest priority projects that best meet Comprehensive Plan goals and/or constitute projects that are funded and ready to progress toward construction. The 2015 fiscal year is envisioned as the first year of the plan and includes pilot projects.
- **Short-term.** Projects recommended for implementation in the 2 to 5 year timeframe.
- **Medium-term.** Projects recommended for implementation in the 6 to 10 year timeframe.
- **Long-term.** Projects likely to be implemented beyond 10 years. These projects are important for the development of the Moscow's transportation system, but are unlikely to be funded in the next 10 years.

Within each time horizon, projects are both illustrated on a map and listed in a summary table.

Image from Latah Trail Foundation

Modal Action Plans

All near-term priorities—including recommended projects, programs, and policies—are consolidated into four Modal Action Plans: the Roadway and Traffic Operations Action Plan, the Active Transportation Action Plan, the Transit Action Plan, and the Parking and Transportation Demand Management Action Plan. The Action Plans are organized by **Recommended Policies and Programs** and **Recommended Projects** with specific guidance for implementation. The tables below illustrate the format for all near-term recommended policies and programs. **All policies and programs listed in the following sections are recommended for implementation in the first 5 years (from 2015-2020).**

Near-Term Action Description	
Actions to Implement in First 5 Years	
T1	…….
T2	…….
T3	…….

Specific Action with Implementation Guidance	
Implementation Steps	
Step 1	…….
Step 2	…….
Step 3	…….

MODAL ACTION PLANS: THE NEXT 5 YEARS

Roadway & Traffic Operations Action Plan

To serve planned growth, Moscow's transportation system will require multi-modal improvements and strategies to manage the commensurate growth in travel demand. Strategies for meeting traffic needs related to future growth include:

- Network Connectivity Options
- Regional Circulation Enhancements
- Intersection Modifications
- Multi-modal Street Design Standards

The following sections describe the top priority roadway and traffic operations improvements and policies for the next five years. Phasing of implementation of some of these action items will be necessary. Although all actions included in the Roadway & Traffic Operations Strategy are valuable, opportunities to pursue additional strategies may arise through new funding or partnerships. Priorities should be updated periodically to reflect current needs.

Near-Term Roadway and Traffic Operations Policy and Program Recommendations

Connectivity and Regional Circulation Enhancements: System connectivity, as well as, spot connectivity opportunities was evaluated during the Moscow on the Move process. The following actions are recommended for implementation over the next five years.

Connectivity and Regional Circulation Enhancements (Actions RT1-RT3)

Image from Nelson\Nygaard

	Recommended Actions to Implement in the First 5 Years
RT1	Improve roadway connectivity for all users by expanding the collector and minor arterial street system with the high priority roadway projects described in this Action Manual.
RT2	Construct a full access multi-modal bridge over Paradise Creek to provide a connection to Third Street and provide traffic calming measures on Third Street from the new bridge west to Jefferson Street. Traffic calming recommended for use includes curb extensions, chicanes, and/or neckdowns. Traffic calming should extend east of Mountain View Road when the current street end is constructed into a full street connection. The final proposed traffic calming features and their location will be determined by a future design and community outreach process.
RT3	Conduct a transportation study of the Ring Road Southwest quadrant corridor based on federal requirements to identify potential impacts and select the preferred project (alignment, cross-section, and access). Once a corridor alignment has been selected, work towards obtaining project right-of-way. All other Ring Road quadrants are not recommended for further planning during the Moscow on the Move planning horizon.

Street Design Standards: Before adopting new citywide street design standards, several additional design elements should be considered for inclusion in the standards. These recommendations will improve safety and will contribute to the development of comprehensive multi-modal travel networks. Suggested changes include:

- Collector standard – require 5-foot sidewalks, 6-foot bike lanes, and 11-foot travel lanes
- Collector with Left Turn Lane standard - require 5-foot sidewalks, 6-foot bike lanes, 11-foot travel lanes, and 12-foot turn lane
- Minor Arterial standard - require 6-foot bike lanes with option for 8-foot buffered bike lane
- Add a Minor Arterial standard cross-section with options for bike lane buffering

Make revisions to the draft citywide street design standards (Action RT4)

Implementation Steps
Revise draft citywide street design standards according to recommendations in this plan.
Submit revised street design standards for consideration by the City Council.

Neighborhood Traffic Management: Neighborhood Traffic Management (NTM) tools can help fix existing traffic issues and also avoid simply shifting the problem to another area. Education, Engineering, and Enforcement are all critical components of successful NTM implementation.

Neighborhood Traffic Management (Actions RT5-RT7)

Image from Nelson\Nygaard

Recommended Actions to Implement in the First 5 Years	
RT5	Education – Provide citizens information and tools necessary to make informed decisions regarding neighborhood traffic concerns.
RT6	Engineering – Implement traffic calming solutions when appropriate based on engineering principles and community input.
RT7	Enforcement – Support community-identified solutions by targeted police and parking enforcement.

Access Management: Access Management is a broad set of techniques that balance the need to provide efficient, safe, and timely travel with the ability to allow access to individual properties. The suggested criteria used for providing local connections for new residential or mixed-use developments are shown in Figure 8-4 and recommended access management actions are listed below. These standards should be flexible. A variation to the access spacing standards may be granted by the City in areas with limited property frontage and/or environmental

constraints. It is recommended that any variation to these spacing standards would require an access management plan to be approved by the City Engineer, including residential accesses along collector and minor arterial facilities.

Figure 8-4 Access Spacing Standards for City Street Facilities

Street Facility	Maximum Access Spacing	Minimum Access Spacing with Full Access	Minimum Access Spacing with Limited Access*
Minor Arterial	-	600 feet	300 feet
Collector	660 feet	400 feet	200 feet
Local	660 feet	-	-

Note: Intersection and driveway spacing measured from centerline to centerline.
* Limited Access – Vehicles are restricted to right-in/right-out turn movements. In some cases, left-in turn movements may be permitted.

Access Management (Actions RT8-RT12)

Image from Nelson\Nygaard

Recommended Actions to Implement in the First 5 Years	
RT8	Implement access spacing standards shown in the Roadway and Traffic Operations Strategy.
RT9	Implement specific access management plans for arterial streets (such as Third Street west of downtown) to maximize the capacity of the existing facilities and protect functional integrity.
RT10	Work with land use developers during the development application process to consolidate driveways, where feasible.
RT11	Provide left turn lanes where warranted for access onto cross streets.
RT12	Construct raised medians to provide for right-in/right-out driveways, as appropriate.

Intersection Improvements: The operational analysis conducted for *Moscow on the Move* found that some improvements would be required at the study intersections to accommodate forecast traffic growth. Improvements could include changes to turn lanes, traffic control devices, intersection geometrics, and traffic signal timing and coordination.

Intersection Mobility and Signal Standards (Actions RT13-RT16)

Image from Nelson\Nygaard

Recommended Actions to Implement in the First 5 Years	
RT13	Intersection Improvements: Construct recommended solutions (below) to mitigate future operational problems at intersections.
RT14	Traffic Control Plan: Implement the Traffic Control Plan as future intersection volumes increase and capacity improvements are needed.
RT15	Intersection Mobility Standards: Adopt intersection mobility standards with flexibility under specific conditions.
RT16	Traffic Signal Spacing: Require a minimum signal spacing of 1,000 feet on minor arterials and 600 feet on collectors.

Near-Term Roadway and Traffic Operations Project Recommendations

The near-term projects (first five years) included in the following tables were rated "Best" in the project evaluation. Each of these projects carries value for users of Moscow's roadways and will improve the transportation system. Some of these projects will also aid implementation of the strategies and actions included in the Roadway and Traffic Operations Strategy, particularly Action RT1 ("Improve roadway connectivity for all users by expanding the collector and minor arterial street system with the high priority roadway projects").

Traffic Calming Projects		Estimated Cost
TC1: Nez Perce Traffic Calming at intersection of Nez Perce/Blake Avenue	Construct traffic calming elements at the Nez Perce/Blake Avenue intersection to narrow the pedestrian crossing width. May include elements such as curb bulb outs and crossing enhancements.	$50,000
TC2: Sixth Street Traffic Calming from Line Street to Rayburn Street	Construct traffic calming elements on Sixth Street between Line Street and Rayburn Street to increase pedestrian comfort. The project would include elements such as a raised pedestrian crossing, lane narrowing, street lighting, colored pavement and landscaping and furniture. The project may require modifications to drainage and stormwater services.	$300,000 (UI Funded)
TC3: Deakin Street Traffic Calming Sixth Street to University Avenue	Construct traffic calming elements on Deakin Street between Sixth Street and University Avenue to improve pedestrian safety. The project would include elements such as a raised pedestrian crossing, lane narrowing, street lighting, colored pavement and landscaping, and furniture. The project may require modifications to drainage and stormwater services.	$300,000 (UI Funded)
TC4: D Street Traffic Calming Mountain View Road to Hayes Street	Construct traffic calming features and various bicycle and pedestrian improvements.	$530,000

Note: University funded traffic calming projects (TC2 and TC3) are ranked highly due to available funding and ability to meet evaluation criteria.

A Street Improvements		Estimated Cost
CS4: A Street Reconstruction from Peterson Drive to Home Street	Relocate stop signs at the intersection with A Street uncontrolled and Line Street stop sign controlled, add a separate northbound right turn lane with eastbound receiving lane on A Street, and close the north leg of intersection. It would include new curbs, sidewalks, drainage and retaining walls on A Street (from Peterson to Home) and Line Streets (A to SH-8).	$3,250,000

Mountain View Road Corridor Improvements		Estimated Cost
F1: Mountain View Road Corridor Improvements from the Fairgrounds to Sixth Street	Widen Mountain View Road from the Fairgrounds to Sixth Street to provide curbs and gutters, storm drainage, sidewalks, bike lanes, and street lighting. Provide new traffic control Sixth Street/Mountain View Road.	$2,000,000

Other Projects		Estimated Cost
II3: Sixth Street/Jackson Street Geometry	Expand right-of-way through acquisitions to provide a dedicated eastbound right-turn lane with through bike lane and shift the lane striping to the south to achieve desired alignment. Modify intersection striping, signing, and traffic signal heads to accommodate the new geometry.	$500,000
CS1: SH-8 Urban Corridor Improvements Jackson Street to Lieuallen Street	Provide safety improvements to the section of SH-8 corridor between Jackson Street and Lieuallen Street. Apply access management strategies such as driveway narrowing / consolidation / closure and construct raised medians where appropriate. The block lengths on this section of SH-8 are short and most properties could gain access from the side street or alley. Raised medians on Third Street at select locations would have an added benefit of providing a pedestrian crossing refuge (east side of Asbury Street and west side of Almon Street). Work with ITD to stripe one crosswalk per intersection.	$100,000
CS3: Third Street Bridge at Paradise Creek	Construct a multimodal full access bridge on Third Street at Paradise Creek. This project would include traffic calming measures and bicycle facility enhancements on Third Street from Third Street Bridge to Jefferson Street, including traffic circles, curb extensions, chicanes, and neckdowns.	$1,100,000
RD1: Downtown Couplet Improvements on Jackson Street from C Street to College Street and Washington Street from Lewis Street to Second Street	Remove the outside vehicle travel lanes on Jackson Street from C Street to College Street and on Washington Street from Lewis Street to Second Street. Reconfigure Jackson Street (one-way southbound) and Washington Street (one-way northbound) to a two-lane cross-section with a bike lane and on-street parking. This project will require further coordination with the Idaho Transportation Department (ITD) to determine applicable traffic operation standards on State facilities. Extending the project along US95 to Moscow's northern City limits on would require further study and is a considered a long-term design (see the Active Transportation Strategy for additional detail). Initial project should be a pilot implementation using low cost materials. Impacts should be tested before undergoing final construction.	$50,000
DS1: Main Street from First Street to C Street	Install new streetscape features such as decorative street lighting, bollards, curb extensions, and street trees on North Main Street from First Street to C Street—(Partially Funded)	$60,000
DS2: Jackson Street from C Street to the South Couplet	Install new streetscape features such as decorative street lighting, bollards, curb extensions, and street trees on Jackson Street from C Street to the South Couplet. This project may be funded and implemented in phases as funding becomes available and redevelopment occurs along the corridor.	$300,000
DS3: Washington Street from South Couplet to A Street	Install new streetscape features such as decorative street lighting, bollards, curb extensions, and street trees from the South Couplet to A Street. This project may be funded and implemented in phases as funding becomes available and redevelopment occurs along the corridor.	$300,000

Active Transportation Action Plan

The Active Transportation Action Plan provides specific actions to implement the active transportation strategy recommendations included in *Moscow on the Move*. These actions will help fulfill the plan's Guiding Principles and goals in the following ways:

- Mobility and access: Active transportation projects will increase travel options and facilitate multi-modal access for users of all ages and abilities.
- Downtown and University public spaces: Many of the proposed projects and strategies address the most important active transportation needs in Downtown and in and around the University of Idaho.
- Economic resilience: Improved transportation options will improve access to local businesses and make Moscow and surrounding areas an attractive place for recreational tourism.
- Land use, design, and quality of life: Each high priority active transportation project and strategy constitutes an investment in Moscow's neighborhood quality of life.
- Safe streets: Designing and improving facilities with people using active transportation in mind will improve safety for all road users.
- Active and healthy living: Increasing the convenience and quality of active transportation in Moscow will enable healthier living.
- Environmental quality: Active transportation has a low environmental impact and reduces greenhouse gas emissions.

The programs and policies that follow will help Moscow achieve these benefits by taking action in the next five years.

Near-Term Active Transportation Policy and Program Recommendations

The active transportation strategy includes three key actions. In addition to specific projects, these key actions will guide policy with respect to future transportation projects and ensure that active transportation needs are met effectively. Each strategy is briefly introduced then followed by a list of action items needed to implement the strategy.

Complete Streets: Moscow should adopt a Complete Street policy to ensure its streets can accommodate all modes of travel. Developing a Complete Streets policy or codified ordinance in Moscow would formalize the City's intent to plan, design, and maintain streets that are safe for users of all ages and abilities. Once a Complete Streets policy has been adopted, the City's Street Design Standards should be supplemented with a Complete Streets Design Supplement.

Adopt a Complete Streets policy to build out transportation facilities for all users (Action AT10)

Image from Nelson\Nygaard

Implementation Steps
Create the foundation for Complete Streets.
Establish a Baseline Condition.
Re-evaluate street design standards.
Establish new tools to measure performance.
Educate the community.
Establish a Complete Street Design Supplement as an add-on to the City's updated street design standards (Action AT2).

Improve non-motorized user experience: Encouraging greater levels of walking and bicycling cannot be achieved by new facilities alone. Support facilities and end-of-trip amenities like wayfinding signs and short- and long-term bicycle parking are necessary to improve the user experience and facilitate walk and bike trip-making.

Support Facilities and End-of-Trip Amenities (Actions AT5-AT7)

Image from Nelson\Nygaard

Recommended Actions to Implement in the First 5 Years	
AT5	Produce a Bicycle Wayfinding Signage Plan identifying sign locations, sign information, and an attractive brand/sign design. Implementing this plan should be an interim implementation step to building the 20-year bikeway network.
AT6	Conduct an extensive education and engagement process the community and business stakeholders to adopt a downtown bicycle parking improvement program and/or a citywide bicycle parking ordinance.
AT7	Create a supply of covered bicycle parking downtown and other commercial centers.

Improve access to transit and sidewalk connectivity: Strategic sidewalk infill consists of four steps: performing a sidewalk inventory, analyzing the community's existing sidewalk network to identify network gaps, prioritizing gaps based on community needs, and filling in these gaps as funding becomes available. The following actions build upon recent sidewalk infill efforts made by the City and its investment in transit facility improvements.

Access to Transit and Sidewalk Infill (Actions AT12 and-AT13)

Image from Nelson\Nygaard

Recommended Actions to Implement in the First 5 Years	
AT12	Use Sidewalk Infill Project Criteria to guide investment decisions of the Sidewalk Infill Program.
AT13	Building upon existing enhanced transit stops, enhance access to high activity transit stops.

Updating snow removal procedures: Moscow can improve motor vehicle, bicycle, and pedestrian travel during snow events making slight modifications to existing snow removal procedures and the snow route network.

Updating snow removal procedures (Actions AT14 and AT15)

Image from KLEW News

Recommended Actions to Implement in the First 5 Years	
AT14	Improve snow removal procedures to ensure safe and functional bicycle and walking conditions during snow events—particularly in the areas of major bicycle and pedestrian route preservation, facility design, City policy and operations, and education (see Chapter 5 for more details).
AT15	Update the existing designated snow route network to include Primary (i.e., existing routes) and Secondary (i.e., key, direct neighborhood greenways) snow routes. Secondary Routes should only be plowed upon completion of Primary routes.

Promoting active transportation through tourism: Moscow has the opportunity to reinforce and formalize its local bicycle culture. A supportive action to achieve this is to strengthen the local economy by implementing a bicycle tourism strategy.

Evaluate opportunities to support a citywide or regional bicycle tourism campaign or program to further promote active transportation and recreation in Moscow (Action AT17)

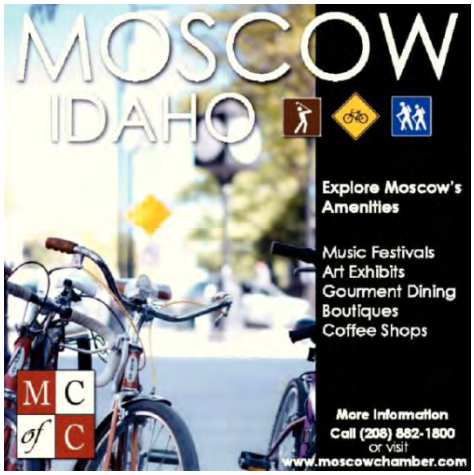

Image from Moscow Chamber of Commerce

Implementation Steps
Step 1: Form a steering committee and identify key stakeholders.
Step 2: Set goals and objectives for bicycle tourism, including determining if the program should be regional in scope.
Step 3: Evaluate potential for creating a bicycle tourism hub in Moscow
Step 4: Establish partnerships and assign resources.
Step 5: Conduct a needs analysis or feasibility study.
Step 6: Evaluate the findings of feasibility analysis and make a "go" or "no go" decision.
Step 7: Develop an action plan with stakeholders and program partners to implement a bicycle tourism campaign (should include a communication and marketing checklist).
Step 8: Find funding and work with partners to apply for grants.
Step 9: If funding is successfully secured, implement the action plan from Step 7.

Near-Term Active Transportation Project Recommendations

Seventy-five active transportation projects were evaluated and the Action Manual recommends 47 projects for immediate or short-term implementation. Although the full list of both short-term and long-term projects can be found in the Capital Improvement Program portion of this chapter, the projects listed below are immediate or short-term projects that ranked "Best" in the project evaluation (27 total). These projects focus on building out the neighborhood greenway network to the east of downtown, improving key at-grade crossings, and filling in critical gaps in Moscow's bicycle system. The projects included here should be prioritized for near-term implementation.

Downtown to University/Paradise Path Trail Connection	Estimated Cost
 Image from Nelson\Nygaard	
SP1: Lieuallen-First Street Path Connection (through Otness Park; portion between Asbury Street to Almon Street is on private property)	$210,000

Neighborhood Greenways	Estimated Cost
 Image from Nelson\Nygaard	
NG1: Lynn/Monroe/Lincoln Streets (Initial project should be implemented as pilot project using low cost materials. Impacts should be tested before undergoing final construction.)	$80,000
NG3: E Street (with connection on D / N Jackson / C Streets)	$70,000
NG4: Second / Van Buren / B / First Streets	$36,000
NG5: Eighth / Lewis / Lynn / Harold / Lemhi Streets	$66,000

Shared Lanes and Bike Lanes	Estimated Cost
 Image from Nelson\Nygaard	
SL6: US-95 (short segment from South Couplet to Sweet)	$2,250
SL19: Third Street (Polk Street to Paradise Creek)	$26,000
SL15: A Street (Peterson Drive to Main Street)	$9,400
BL1: Third Street (Uphill Bike Lane and downhill Shared-Lane Marking)	$12,000
BL7: Mountain View Road (Sixth Street to White Avenue)	See Roadway project F1
BL22: SH-8 / W Third Street (Line Street to Jackson Street)	$14,000

Image from Nelson\Nygaard

Crossings and Underpasses	Estimated Cost
U1: White / Styner / SH-8 Highway Undercrossing	$340,000
CI3: Lewis and Washington Streets At-Grade Crossing Improvement (crosswalks)	$5,000
CI9: Sixth Street and Main Street At-Grade Crossing Improvement (green turn queue box and signage at southeast corner of intersection to facilitate left turn bicycle movements for eastbound bicycles)	$5,000
CI10: South Couplet: At-Grade Crossing Improvement (pedestrian refuge and realign crosswalks to reduce pedestrian crossing distance)	$50,000
CI7: Third Street and Lieuallen Street (rectangular rapid flashing beacon [as needed], pedestrian refuge islands and crosswalk)	$85,000
CI12: Meadow Street and Joseph Street (At-Grade Crossing Improvement [mid-block crossing with pedestrian refuge island])	$15,000
CI6: Fairgrounds/Trail and Mountain View Dr (At-Grade Crossing Improvement [mid-block crossing with pedestrian refuge island])	$15,000
CI1: Asbury and Third (rectangular rapid flashing beacon [as needed], pedestrian refuge islands and crosswalk)	$85,000
CI2: Almon and Third (rectangular rapid flashing beacon [as needed], pedestrian refuge islands and crosswalk)	$85,000
CI4: Almon and A Street (rectangular rapid flashing beacon [as needed], pedestrian refuge islands and crosswalk)	$85,000
CI8: Lauder Avenue / Styner Avenue at US-95 (HAWK signal)	$200,000

Transit Action Plan

The Transit Action Plan focuses on actions and strategies that will improve transit service and passenger amenities in Moscow. A main objective under this Guiding Principle is to "increase transit ridership by improving speed, frequency, and reliability, as well as the quality of transit facilities, passenger amenities, and vehicles". The Transit Strategy uses this guidance as its foundation to build a long-term transit strategy for Moscow that also supports city goals related to mobility, expanding transportation options, and creating more vibrant neighborhoods.

Near-Term Transit Policy and Program Recommendations

Service Allocation: Every transit system must strike a balance between two competing purposes: providing high frequency service that serves primary transit corridors (i.e., those with the greatest demand) versus providing service to all corners of the community. Service design is critical for building ridership and making transit an attractive choice. Adopting policies to guide investments in Moscow's transit system will facilitate service improvements and network expansion, as well as improve frequency and easy transit access to meet residents' daily needs. Because SMART Transit operates the system, the City should coordinate with the transit agency to develop the appropriate service standards.

Service Allocation and Design (Actions T1-T3)

This is an example of service allocation. Actual service allocation should be determined collaboratively between the City of Moscow, SMART's Board and other stakeholders.

Recommended Actions to Implement in the First 5 Years	
T1	Develop a service allocation policy to help weigh the balance between frequency and coverage.
T2	Adopt service design standards to guide decisions on new and expanded services.
T3	Optimize stop spacing to ensure efficient operations and improved access.

Branding Transit: Transit in Moscow should be universally recognizable and easy to access. By branding transit as a permanent and integrated part of city infrastructure, SMART, in partnership with the City and the University, can market a set of convenient and reliable transit services that people can build their daily lives around. SMART should upgrade their website to be more user-friendly.

Branding and Promoting Transit (Actions T4-T7)

Recommended Actions to Implement in the First 5 Years	
T4	Broadcast the new SMART brand developed during the *Name Your Transit!* campaign in Fall 2012.
T5	Develop a consistent brand for the SMART website, schedule information posted at stops, and marketing materials.
T6	Create stop signage design guidelines to establish more distinctive transit stops.
T7	Partner with the University of Idaho to develop a travel options marketing campaign.

Transit Stop Design and Prioritization: The design of transit stops can impact whether people choose to use the transit system and the quality of their transit experience. High quality transit stops with improved amenities can provide existing riders an enhanced experience and attract new riders to the system.

Transit Stop Prioritization Program (Actions T8-T11)

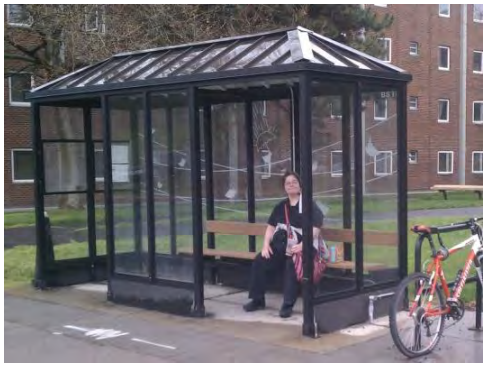

Image From Nelson\Nygaard

Recommended Actions to Implement in the First 5 Years	
T8	Develop a tiered stop designation program that would allow the City of Moscow, the University of Idaho, and SMART to prioritize investment area improvements.
T9	Update bus stop inventory on a biannual basis; track the percentage of bus stops with shelters, benches, schedule information, etc.
T10	Ensure City codes and policies promote, require, and/or create developer borne incentives to provide stop amenity, marketing, or information features.
T11	Partner with businesses to evaluate the feasibility of district funding mechanisms, such as a Business Improvement District, that can help fund transit information and marketing programs and make streetscape and transit stop improvements.

Near-Term Transit Project Recommendations

The primary focus for Moscow in the short-term will be making the necessary capital improvements to fully support a restructure of current service. This restructure reflects the community's desire to expand transit service in Moscow without sacrificing frequency of service. This section provides service design recommendations for the near-term (the next 1-5 years) to reach more residents in the community, while maintaining 30 minute service frequency on all routes. To achieve this, funding to operate one more route and purchase one more bus is needed.

Capital Improvements to Support New Service

Improvement Type	Phase	Quantity	Unit Cost[2, 3]	Total Cost
Tier I High-Amenity Stops	Immediate	1	$12,250 - $16,250	$12,250 - $16,250
	Short-term (1-5 years)	5	$12,250 - $16,250	$61,250 - $81,250
Tier II Bus Stop with Bench	Short-term (1-5 years)	2	$825 - $1,225	$1,650 - $2,450
Tier III Neighborhood Bus Stop	Short-term (1-5 years)	12	$525 - $725	$6,300 - $8,700
Vehicles	Short-term (1-5 years)	1	$111,500[1]	$115,500
Total Estimated Capital Costs				**$196,950 - $224,150**

[1] Cost of vehicle based on cost of existing SMART vehicle purchase in 2011 (adjusted for inflation)
[2] Costs are in 2014 dollars
[3] High-amenity stop costs based on average cost of existing City of Moscow enhanced bus shelters
Note: Exact locations to be determined by SMART and the City based on service planning for the proposed new routes.

Parking & Transportation Demand Management Action Plan

The Parking and Transportation Demand Management Action Plan presents strategies and actions that will advance the goals of *Moscow on the Move* in numerous ways. City policy can impact both supply and demand for transportation infrastructure, including parking as well as use of the roadways. Careful management of these resources allows for more efficient travel and can improve health, environmental quality, economic resilience, quality of life, and much more for Moscow's residents.

Parking Management (once necessary)

A well-managed supply of parking is important for the long-term economic vitality of downtown Moscow. Managing the temporal use, price, and supply of parking can improve access to downtown businesses and increase the effective sales capacity of downtown by encouraging turnover.

Managing Downtown Parking (Actions P1-P5 and P7)

Image From Nelson\Nygaard

Recommended Actions to Implement as necessary
P1. Establish occupancy rate targets for on-street and off-street parking management.
P2. Evaluate time-stay restrictions and consider implementing an employee parking strategy as demand increases
P3. Establish a 15% availability rate as the primary objective for on-street management.
P4. Make enforcement more customer-friendly.
P5. Expand shared-parking options.
P7. Study the potential for a parking impact fee for new downtown development.

Guidance for Building New Parking

Because there is already an adequate supply of off-street parking, the Action Manual provides guidance for when new off-street parking construction is merited. Action P6 below establishes utilization thresholds and responsive measures to optimize utilization. This will allow Moscow to focus its limited resources on less costly and high value infrastructure needs.

Build new off-street parking only if triggers are met (Action P6)

Implementation Steps
Step 1: Before investing in costly surface parking lots, estimate parking construction costs, ongoing maintenance costs, and projected revenue. Assess the balance between the costs and the likely revenue of potential new parking facilities. A negative balance indicates the level of subsidy required to fund any proposed new parking. A neutral or positive balance indicates the likelihood that the proposed facility would be self-supporting or revenue-positive.
Step 2: Use cost-benefit analyses, based on Step 1 calculations, to compare the effectiveness of new parking construction with that of investments in other modes of access. As an example, should parking structure capacity become

Build new off-street parking only if triggers are met (Action P6)
Implementation Steps
constrained, the City would examine whether it would provide greater access per municipal dollar to build a parking lot or fund evening service for SMART bus routes and/or provide more bicycle parking.
Step 3: Use pricing to maintain on-street availability and expand the parking system's effective capacity.
Step 4: Use pricing strategies to maintain off-street availability until constructing new parking becomes the most viable option in Step 2. If the City determines that new parking is necessary, the City would need to reassess its current pricing structure to both manage demand and recoup the cost of parking construction and maintenance. Currently, any significant parking costs incurred by the City would take decades to recoup.

Transportation Demand Management

Transportation Demand Management (TDM) programs have the potential to benefit all residents, from introducing existing and new travel options to reducing congestion on local roadways. TDM strategies also offer an excellent opportunity to partner with local educational, health, and business organizations to support programs that benefit their students, employees, and customers.

Transportation Demand Management (Actions TDM1-TDM3)

Image From Nelson\Nygaard

Recommended Actions to Implement in the First 5 Years
TDM1. Establish a city-wide social-marketing campaign that promotes the use of travel options.
TDM2. Work with the University of Idaho Parking and Transportation Services department to develop a travel options strategy.
TDM3. Organize community events to increase awareness of travel options.

TDM Evaluation Criteria. TDM performance measures will help Moscow measure the value of investing in various TDM programs. The approach described below provides guidance on how the City of Moscow can track the performance of these programs, with the understanding that programs will be monitored based on qualitative and quantitative metrics. Figure 8-5 below provides a list of evaluation criteria to score TDM programs and projects.

Figure 8-5 TDM Evaluation Criteria

Potential Evaluation Criteria	Rationale/Potential scoring mode
Number of people reached	The more people a project reaches, the higher the score.
Number of participants	The more participants a project secures, the higher the score.
Reduce congestion	Projects that can demonstrate a reduction in congestion receive higher scores.
Improve safety	Projects that improve road safety (through awareness and education for example) receive higher scores.
Incentivize travel alternatives	Projects that directly incentivize people to bike, walk, take transit, or share rides will receive higher scores.

FUNDING MOSCOW ON THE MOVE

The projects in *Moscow on the Move* are based on criteria that weigh whether the project meets the community's needs, as well as whether the project fits within the possible funding scenarios presented here. The funding scenarios include current fiscal constraints, in addition to the possibility of greater funding due to grants and developer contributions.

Funding Scenarios

The following funding scenarios are recommended as a phasing approach to Moscow's Capital Improvement Program. In any given year, the project list will be greater than the available funding. If a project is not funded for construction during that given year, it moves to the next year's Capital list or shifts to the next implementation timeframe (e.g., from short- to medium-term implementation timeframe). The following funding scenarios were developed by the City based on conservative base funding and scenarios with moderate and aggressive procurement of grants and other funding mechanisms.

Baseline Funding Scenario. The baseline scenario assumes the minimum funding levels that have been available in recent years. Moscow's anticipated baseline budget includes $155,000 in local funding in addition to $300,000 in grants, for a total of $455,000 annually. The three scenarios included here assume that this baseline is the minimum level of funding, with two additional funding scenarios that represent the potential project development should increased funding become available. It is anticipated that many of the roadway projects would require project-specific grant funding in order to become feasible, while transit projects would likely be funded through grants or developer contributions. Active transportation projects would be funded through the general fund and grant funding.

Moderate Funding Scenario. The moderate scenario assumes the baseline funding, $455,000, in addition to up to $3 million in additional funding, for a total of $3,455,000. This funding could come from successful grant proposals and developer contributions to specific projects.

Aggressive Funding Scenario. In the aggressive funding scenario, over $3 million dollars are added to the baseline budget, allowing for completion of projects beyond $3,455,000 in cost.

Overview of Available Transportation Funding

Reliable funding is essential for any multi-modal transportation system. Almost every transportation project or program, from a highway interchange to a bicycle lane, requires multiple funding sources for planning, design, construction, operation, and ongoing management or maintenance. The following section provides existing and potential funding sources at the federal, state, regional, and local level as well as alternative funding mechanisms.

Federal

The federal government plays a large role in funding the nation's transportation system, including federal, state, and locally owned facilities. The most significant source of federal transportation funding is the federal gas tax. Federal transportation spending and priorities are established by the Surface Transportation Act. The current act, MAP-21 (Moving Ahead for Progress in the 21st Century Act), was signed into law in July 2012. Federal transportation funding is typically directed through state agencies and metropolitan planning organizations to local governments in the form of either grants or direct appropriations. In FY2014, the State of Idaho and its local jurisdictions will receive a total of $278,743,444 in transportation funding from the federal government. However, a significant portion of this funding will be allocated to ITD.

Federal Active Transportation Funding: Transportation Alternatives Program

MAP-21 changed the way the federal government funds active transportation planning and projects. Previously, three programs funded bicycle and pedestrian transportation: Transportation Enhancements, Safe Routes to School, and the Recreational Trails Program. These three programs are now consolidated under the Community Choices program which funds numerous types of pedestrian, bicycle, and streetscape projects.

The Community Choices program is funded by the State's National Highway Performance Program, Surface Transportation Program, Highway Safety Improvement Program, Congestion Mitigation and Air Quality Improvement Program, and Metropolitan Planning apportionments. Through the Community Choices program, Idaho received $5,409,197 to fund active transportation projects in FY2013. Of these Community Choices funds, Idaho is required to set aside a total of $1,707,139 for the Recreational Trails Program (RTP). Half of the remaining Community Choices funding is allocated to areas based on population and the other half is available for use anywhere in the state. $817,617 is eligible for distribution to areas with between 5,000 and 200,000 residents.

The types of projects eligible for Community Choices funding include the following:

- **Transportation Alternatives** projects include construction, planning, and design of a range of on- and off-street bicycle and pedestrian infrastructure, such as sidewalks, bikeways, pedestrian and bicycle signals, traffic calming, safety improvements including improved lighting, and projects to bring infrastructure up to ADA standards.
- **Recreational Trails** projects focus on development and maintenance of recreational trails and trail-related facilities, including paved and unpaved trails.
- **Safe Routes to School** projects are designed to address the "Five E's": Evaluation, Education, Encouragement, Enforcement, and Engineering. Projects must be located within two miles of a primary or middle school and may include both infrastructure and non-infrastructure projects.
  - Non-infrastructure projects such as implementing Safe Routes to School programs at local elementary and junior high schools are eligible for Community Choices grant funding. The City of Moscow partners with the University of Idaho to submit grant applications and coordinate project implementation.
  - Infrastructure projects focus on the final E, "Engineering", and may include new sidewalk construction and path projects. Although construction costs are eligible for Community Choices grant funding, City of Moscow Public Works Department engineering, design, and construction management costs for these projects can be credited toward the project as local match.

Safe Routes to School funding can help pay for infrastructure projects and non-infrastructure projects like the walking school bus program (pictured above).
Image from Brooke Lowry

Federal Public Transportation Funding

Major federal grants for public transportation projects in rural areas include:

- **FTA 5309 Bus and Bus Related Equipment and Facilities Program.** The 5339 program (new under MAP-21) provides capital funding related to replacement, rehabilitation, or purchase of new buses, vans, related equipment, and bus-related facilities. Capital projects could also include passenger amenities, such as shelters, bus stop signs, and fare boxes.
- **FTA 5310 Elderly Individuals and Individuals with Disabilities Program.** The FTA 5310 program provides funds for projects that reduce dependence on ADA Paratransit by improving access to fixed-route transit services, projects that exceed ADA requirements, and projects that provide alternatives to public transportation.
- **FTA 5311 Non-Urbanized (Rural) Area Formula Program.** The FTA 5311 program provides formula funds for public transportation in rural areas with populations of less than 50,000. Eligible activities include capital, operating, and administrative costs for public transportation in rural communities. States are required to use 15% of these funds to support intercity bus service.
- **FTA 5317 New Freedom Program.** The FTA 5317 formula grant program funds capital and operating costs to provide transportation services and facility improvements that exceed those required by the ADA. Examples include installing accessible pedestrian signals, enhancing transit stops to improve accessibility, and establishing a mobility coordinator position.

State

The Idaho Transportation Department (ITD) generates funds for transportation mainly through fuel taxes, registration fees, and driver's license fees. State funds are allocated from the Highway Distribution Account to cities based on population. Thirty eight percent (38%) of the Highway Distribution Account is distributed to local governments, including cities (30%) and counties (70%), and 57% is apportioned to the State Highway Account. The ITD Division of Public Transportation is mostly funded through federal funds.

State administered funding programs include:

- **Surface Transportation Program**. Federal funding to maintain and improve federal highways, public bridges and tunnels, pedestrian and bicycle infrastructure, transit capital projects, and intercity bus terminals. In FY 2014, Idaho will receive $77,420,234 in STP funds (of which Moscow could a secure a small portion). States are required to set aside a percentage of STP funds for the Community Choices program. Half of the STP funds are allocated throughout the state based on population, and the remaining half may be spent anywhere in the state.
- **Highway Safety Improvement Program**. Federal funding for projects that achieve significant reductions in traffic fatalities and serious injuries on public roads, bikeways, and walkways. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds. In FY2013, Idaho will receive a total of $16,538,795 for the Highway Safety Improvement Program (HSIP), of which Moscow could a secure a small portion. States are required to set aside a percentage of HSIP funds for the Community Choices program.
- **Idaho ADA Pedestrian Curb Ramp Improvement Program.** State administered funding program to improve pedestrian curb ramps on the state highway system to meet ADA standards. In FY2013, the state allocated $500,000 to this program. Applicants can apply for up to $60,000 for construction purposes only. Projects must be completed within one year of receiving funds.
- **Idaho Community Development Block Grants.** Federal program administered by the Idaho Department of Commerce to provide funds for the development of needed public infrastructure such as construction or reconstruction of streets, other public infrastructure, and public services.

Local

Traditionally, transportation projects have been predominantly funded by federal and state revenue sources. In recent years, however, many cities have shifted towards a funding system that relies more on local funding sources. This shift is primarily the result of declining investment at the federal and state levels. Revenue from the federal gas tax, traditionally the largest source of transportation funding, has failed to keep pace with spending authorizations. The reduction in revenue from the federal gas tax is largely due to three causes: the gas tax has not been increased in decades to keep up with inflation, the fuel efficiency of vehicles is increasing, and people are driving less. Revenue from the Idaho State gas tax has declined for the same reasons. The state gas tax of $0.25 per gallon has not been increased since 1996.

The City of Moscow funds the planning, construction, operations, and maintenance of the transportation system through a variety of sources, including the General Fund (primarily property taxes), the Highway User Tax (fuel tax), and Road and Bridge Tax. General Fund monies for transportation are minimal and typically are allocated to transportation projects when annual unspent funds are made available. Idaho state law only allows certain cities, counties, and special districts to charge a local sales tax in addition to the state sales tax. Exempt localities include resort cities and auditorium districts. This statewide restriction constrains the City's ability to generate local funds for transportation purposes. Moving forward, Moscow will likely receive diminished state and federal funding, yet is limited in its ability to generate local transportation dollars to replace this funding.

Funding TDM Programming

Funding for TDM programming in Moscow could come from a variety of sources, including public and private contributions. A sampling of funding options for the City to consider is provided below:

- **University of Idaho Student Fee.** A portion of the University of Idaho student transportation fee could be used to fund travel options programs at the University in the future.
- **Health and Environmental Sector Support.** The City could partner with area hospitals and environmental groups to solicit funding and/or marketing materials to promote travel options. In Portland, Oregon, for example, the regional government has partnered with Kaiser Permanente to fund a regional "Walk There!" guidebook that promotes healthy ways to travel throughout the region. These types of partnerships help the City promote travel options, in addition to helping the private health care or environmental sectors meet their human and environmental health goals.
- **Business Community Support.** The City can partner with the business community to solicit funding to help employees bike, walk, take transit, and share rides to work. Framed as an economic development initiative, the business community's stake lies in the availability of parking downtown for patrons and the assurance that their employees can easily and affordably access their place of employment.
- **Parking Revenue.** A portion of parking meter (if implemented) and fee revenue from the downtown parking district could be used to fund TDM strategies, such as bicycle parking, marketing and outreach materials, and safe pedestrian crossings at key intersections. Currently, all parking fee revenue is used for parking lot maintenance and parking enforcement costs. Parking meter revenue as a funding source is unlikely to become available.

New and Innovative Funding Opportunities

With federal and state transportation funding in flux, it is critical for Moscow to leverage new and innovative funding partners and strategies that can provide long-lasting investment in the City's transportation infrastructure and programs. While traditional state and federal transportation funding will continue to be critical to build, operate, and maintain Moscow's transportation system, the City would be wise to diversify its funding sources. This section covers funding opportunities that could be relevant in Moscow today or in the future.

- **Impact Fees.** Impact fees are defined as one-time assessments used to mitigate the impact of new growth and development and to recover the capital costs to local governments. Fees may be levied to cover a range of services and infrastructure, including police, fire, street, parks, and stormwater systems. Impact fees are typically based either the square footage of the new development or the number of dwelling units. Impact fees can be a very useful tool for local jurisdictions to make critical improvements like building sidewalks and bicycle parking or installing new traffic signals.
- **Local Improvement District.** Local Improvement Districts (LIDs) are assessments on property owners to finance improvements that benefit property owners within the district. LID improvements may be financed with bonds, and there is no statutory requirement for voter approval. Sixty percent of resident property owners (or 66% of all owners) subject to the assessment must agree to the LID. LID bonds may be issued for up to 30 years, although such bonds are usually issued for 10 to 15 years. LIDs can pay for a range of capital improvements, including sidewalk construction, landscaping, and crosswalks.
- **Flood Mitigation Funding.** Some communities have completed multi-use path and bicycle and pedestrian underpass projects with flood mitigation funding. Grant funding for these projects may be available at the State or Federal level and is most appropriate when combined with other floodplain management projects. Boulder, Colorado, has used funding from the Flood Management Utility Fund, which is a local utility provider and is eligible for funding from the Urban Drainage and Flood Control Distract at the state level. The availability of flood mitigation funds and grant application process varies from state to state, but the opportunity to achieve active transportation benefits in addition to flood control benefits represents a potential win-win for the City of Moscow.
- **Parking Benefit District.** A Parking Benefit District can finance improvements in downtown areas while also addressing traffic congestion and parking constraints. Within a parking benefit district, public parking spaces (both on and off-street) are charged for an hourly rate. Funds collected from parking charges are used for improvements that make the district more attractive, such as sidewalks, landscaping, and other improvements. New parking meter technologies have improved customer convenience (customers can pay remotely by credit card or cell phone), increased pricing flexibility (rates can be changed in real-time based on location, time of day, day of week, or level of occupancy), reduced streetscape clutter, and reduced operating costs. Although Moscow does not currently charge for on-street parking, paid parking in the downtown district could provide needed revenue to fund streetscape improvements, sidewalks, and safe crossings to encourage people to shop and visit downtown.
- **Public-Private Partnerships.** Partnerships to generate funding have become more common in recent years, partly out of necessity, and also as a means of building support for investments by engaging stakeholders in a collaborative process. Public-private partnerships usually consist of direct contributions to capital and operating expenses or sponsorships. These partnerships can be a win-win for local jurisdictions and private entities that benefit from transportation investments.
- **Health Partnerships.** Physical and mental health are closely related to urban design and planning. The risk of obesity for people who live in walkable neighborhoods with mixed land use is 35% lower than for people who live in more suburban areas.[2] Furthermore, every additional 30 minutes per day spent in a car correlates to a 3% greater chance of obesity.[3]

  In response to these findings, the health care industry is becoming increasingly interested in community design and mobility. Community transportation projects that attract people to active transportation can help

[2] Federal Highway Administration (2012). "Driving, Walking, and Where You Live: Links to Obesity." McCann Consulting. http://knowledge.fhwa.dot.gov/cops/italladdsup.nsf/All+Documents/8D26513DD4635FED85256F6A007BF2EB/$FILE/J%20of%20Preventive%20Medicine%20re%20link%20between%20driving%20and%20obesity.pdf (accessed February 1, 2012).
[3] Federal Highway Administration (2012). "Driving, Walking, and Where You Live: Links to Obesity." McCann Consulting. http://knowledge.fhwa.dot.gov/cops/italladdsup.nsf/All+Documents/8D26513DD4635FED85256F6A007BF2EB/$FILE/J%20of%20Preventive%20Medicine%20re%20link%20between%20driving%20and%20obesity.pdf (accessed February 1, 2012).

meet greater public health goals. Health-related organizations may be promising funding partners for community active transportation and access to transit projects. In Portland, Oregon, health care providers have sponsored major programs like Sunday Parkways and the regional WalkThere book. In a number of U.S. cities, health care and insurance companies have been key funders of public bike share programs and infrastructure that promotes active transportation.

- **University Partnerships.** Universities are often key partners in providing and funding a range of transportation options for students, faculty, and visitors. Universities are particularly interested in attracting top-caliber faculty and students and retaining students after graduation. Additionally, universities have a vested interest in creating a livable, safe, and accessible community both on and off campus. Cities can leverage this commitment to livable community development by partnering with universities to fund and maintain community transportation infrastructure and programs. Many universities have an on-campus travel options department to improve and maintain bicycle and pedestrian infrastructure, provide subsidized transit passes, and offer bicycle rentals and maintenance services to faculty and students.
- **Community-Based Funding.** In response to reduced funding from the public sector, communities are finding innovative ways to levy dollars from local community members. Crowd funding, where a group of people contributes funding for a specific project or program, is an increasingly popular solution for funding community projects.
- **Community-based mechanisms.** Grassroots community-based campaigns supported by the City may fund projects such as improvements to a neighborhood trail, wayfinding to direct people towards safe walking or bicycling routes, or a public open space project. This funding format could also be used to help the community meet grant funding match requirements. Social marketing platforms are being used to both publicize projects and collect donations from the community. For example, Kickstarter campaigns have helped fund CicLAvia, where streets are closed to motor vehicles and open for the public to walk, bike, and skate through the open streets in Los Angeles and other communities. Communities in Latah County have embarked on community-based funding efforts related to the Latah Trail development and have raised substantial funds. The City could consider utilizing community-based funding tools and platforms to increase fund raising capabilities.
- **Private Grants.** Private foundations are an increasingly important source of funds for bicycle and pedestrian planning and implementation. For example, the Kodak American Greenways Program provides grants to communities in support of the development of greenway planning and design that will link natural areas, historic sites, and parks and open space. The grant is available to community-based organizations. In 2010, the Miami Green Mobility Network received this grant to support their work building safe streets for pedestrians and bicyclists.

RECOMMENDED CAPITAL IMPROVEMENT PROGRAM

Moscow on the Move's long-range Capital Improvement Program (CIP) includes the full list of recommended active transportation and roadway projects (listed in Figures 8-6 and 8-8 and displayed in Figures 8-7 and 8-9, respectively). Each project is accompanied by a consumer index-style scoring symbol showing whether it ranked as Good, Better, or Best in the project evaluation process. Although the projects that ranked as "Best" should be the top priority over the next five years, all of the projects in the CIP are beneficial projects that achieve many of the plan's Guiding Principles and objectives.

Good =

Better =

Best =

The planning level cost estimates provided are based on general unit costs for transportation improvements but do not necessarily reflect the unique project elements that can significantly add to project costs. Each of these preliminary project costs will need further refinement to include a level of design that identifies right-of-way and utility requirements and costs associated with special design details (environmental and topographical needs).

For example, future roundabout projects have sight distance requirements that will need to be evaluated in preliminary design. The projects for US-95/SH-8/Washington Street and Mountain View Road/White Avenue include purchasing right-of-way in the cost estimates. These improvements would likely be led and funded by the City. The remaining projects would likely be constructed in conjunction with new development providing dedicated land; therefore, right-of-way costs are not included in their cost estimates.

As conditions and opportunities change over time, some projects may become higher priorities or may become easier to implement thanks to new funding. Additionally, the projects included in the CIP that are on private property and/or are funded by developers or other partners should be a priority for coordination between the City and the project developers. If Moscow continues to receive similar levels of funding, some of the short-term recommendations will need to be implemented in phases. At current local transportation funding levels, 7 high-priority active transportation projects could be built in one year. Although most roadway projects are significantly more expensive, many benefit from full or partial funding from the University of Idaho or developers.

A number of lower priority and lower cost projects could be added to this list if additional revenue becomes available. Projects in the Capital Improvement Program are listed in the following order:

- Implementation timeframe (Immediate, Near-term, Medium-term, or Long-term)
- Project type (e.g., bike lane, grid connectivity, neighborhood greenway, etc.)
- Funding scenario under which implementation would occur
- Evaluation score (from Best to Good)

Figure 8-6 *Moscow on the Move* Capital Improvement Program: Active Transportation Projects[4]

Project types

BL = Bike Lane or Buffered Bike Lane
SL = Shared-Lane Marking
NG = Neighborhood Greenway
SP = Shared Use Path
U = Undercrossing
CI = Crossing Improvement

Project	From/to	Facility Type	Cost Estimate	Rating	Timeframe	Funding scenario
BL1: Third Street	Washington Street to Polk Street	Uphill Bike Lane / Shared-Lane Marking (downhill only)	$12,000	●	Immediate	$_
BL22: SH-8 / W Third Street	Line Street to Washington Street	Bike Lanes and a short segment with Shared-Lane Markings	$14,000	●	Short-term	$_
BL5: Almon Street	C Street to city limits	Bike Lanes	$18,000	◔	Short-term	$_
BL10: F Street	Cleveland Street to Ford Street near (Paradise Path)	Bike Lanes	$18,000	◔	Short-term	$_
BL4: White Avenue	Mountain View Road to SH-8	Bike Lanes	$15,000	◔	Short-term	$_
BL2: A Street	Peterson Dr to Farm Road	Bike Lanes	$10,000	◐	Short-term	$_
BL3: Farm Road	SH-8 to A Street	Bike Lanes	$4,500	◐	Short-term	$
BL6: Blaine Street	SH-8 to Indian Hills Road	Bike Lanes	$10,000	◐	Short-term	$_
BL8: Mountain View Road	Concord Avenue to Mountain View Road	Bike Lanes	$370,000	◐	Short-term	$
BL 20: Rodeo Drive	US-95 to Polk Street	Bike Lanes (part of the future Paradise Path connection)	$18,000	◐	Short-term	$_
BL9: Indian Hills	Blaine Street to Mountain View Road	Bike Lanes	$11,000	◐	Short-term	$
BL18: Jackson Street	C Street to College Street	Buffered Bike Lane (requires ITD approval)	$60,000	●	Medium-term	N/A
BL19: Washington Street	SH-8 to First Street	Buffered Bike Lane (requires ITD approval)	$60,000	●	Medium-term	N/A
BL7: Mountain View Road	Sixth Street to SH-8	Bike Lanes	$20,000 (part of a widening and sidewalk project)	●	Immediate/ Medium (depends on segment)	N/A

[4] Note: Funding scenarios apply to **Immediate** and **Short-term** projects only.

Project	From/to	Facility Type	Cost Estimate	Rating	Timeframe	Funding scenario
BL14: Blaine Street	Indian Hills Rd to Palouse River Drive	Bike Lanes	$4,000		Medium-term	N/A
BL24: Public Avenue	Lincoln Street to Orchard Avenue	Uphill Bike Lane / Shared-Lane Marking (downhill only)	$4,500		Medium-term	N/A
BL16: Joseph Street	Mountain View Road to White Avenue	Bike Lanes (where right-of-way narrows, shared lane markings will be used at intersection approaches)	$18,000		Medium-term	N/A
BL24:A Street Extension	A Street to Farm Rd	Bike Lanes	$3,000,000 (includes widening and sidewalks)		Long-term	N/A
BL15: Mountain View	SH-8 to Palouse River Drive	Bike Lanes	$1,300,000 (part of a widening and sidewalk project)		Long-term	N/A
BL12: West Palouse River Drive	US-95 to city limits	Bike Lanes	$2,275,000 (includes widening and sidewalks)		Long-term	N/A
BL17: D Street	Eisenhower to city limits	Bike Lanes	$1,800,000		Long-term	N/A
BL25: Third Street (east of Mountain View)	Mountain View Road to city limits	Bike Lanes	$10,600,000 (includes widening and sidewalks)		Long-term	N/A
BL11: Mountain View Road	Mountain View Road to city limits	Bike Lanes	$2,400,000 (includes widening and sidewalks)		Long-term	N/A
BL21: Main Street Buffered Bike Lane	Rodeo Drive to city limits	Buffered Bike Lanes	$31,000		Long-term	N/A
BL23:Baker Street	Pullman Road to Farm Rd	Bike Lanes	$22,000		Long-term	N/A
NG1: Lynn/Monroe/ Lincoln (initially implemented as a pilot project)	White Place to E Street	Neighborhood Greenway	$48,000		Immediate	$_
NG4: Second Street / First Street	Main Street to Cleveland Street	Neighborhood Greenway	$36,000		Immediate	$_
NG3: E Street (with connection on D / N Jackson / C Streets)	Almon Street to Cleveland Street	Neighborhood Greenway	$70,600		Immediate	$_
NG5: Eighth Street / Lewis / Lynn / Harold / Lemhi	Washington Street to Joseph Street	Neighborhood Greenway	$66,000		Short-term	$_
NG16: Fifth Street	Jefferson Street to Main Street	Neighborhood Greenway	$4,000		Short-term	$_

Project	From/to	Facility Type	Cost Estimate	Rating	Timeframe	Funding scenario
NG8: Asbury / Almon couplet	Sixth Street to A Street	Neighborhood Greenway	$28,000		Short-term	
NG12: Indian Hills	Blaine Street to Styner Avenue	Neighborhood Greenway	$32,000		Short-term	
NG6: Nez Perce / Park Drive / Cleveland	Harold Street to B Street	Neighborhood Greenway	$48,000		Short-term	
NG2: B Street	Van Buren Street to Cleveland Street	Neighborhood Greenway	$24,000		Short-term	
NG13: Cleveland / Ponderosa	F Street to Orchard Street	Neighborhood Greenway	$18,000		Short-term	
NG9: Concord / Eisenhower /E / Harding	D Street to Mountain View Road	Neighborhood Greenway	$30,500		Short-term	
NG10: Jefferson Street	E Street to Rodeo Drive	Neighborhood Greenway	$18,000		Short-term	
NG11: Meadow Street	Trail to Trail	Neighborhood Greenway	$10,000		Short-term	
NG7: Fairgrounds	Fairgrounds	Neighborhood Greenway	$4,000 (Pending Fairgrounds Approval)		Short-term	
NG14: Lenter / Victoria / Ekes / Ridge	Lauder Avenue to Taylor Avenue	Neighborhood Greenway/ Shared-Lane Markings/Up Hill Bike Lane	$32,000		Medium-term	N/A
NG15: Damen Street	New path connection (SP6, parallel to Mt View Rd) to Bridge Street	Neighborhood Greenway	$5,000		Long-term	N/A
SL17: Third Street	Polk Street to Paradise Creek/Future Bridge	Shared-Lane Markings	$26,000		Immediate	
SL2: Third Street	Line Street to Lieuallen Street	Shared-Lane Markings	$3,000		Immediate	
SL5: US-95	Sweet Ave to South Couplet	Shared-Lane Markings	$2,250		Short-term	
SL3: Main Street Corridor (including Third Street between the couplet)	Lewis Street to A Street	Shared-Lane Markings	$9,700		Short-term	

Project	From/to	Facility Type	Cost Estimate	Rating	Timeframe	Funding scenario
SL16: Jefferson Street	Second Street to Fifth Street	Shared-Lane Markings	$4,500		Short-term	
SL6: Blaine Street	SH-8 to Harold Street	Shared-Lane Markings	$3,700		Short-term	
SL1: Washington Street	First Street to D Street	Shared-Lane Markings	$6,000		Short-term	
SL15: A Street	Peterson Drive to Main Street	Shared-Lane Markings	$9,400		Short-term	
SL7: Lauder Avenue / Taylor Avenue	US-95 to Blake Avenue	Shared-Lane Markings	$5,000		Medium-term	N/A
SL11: Sixth Street	Deakin Avenue to Perimeter Dr (includes north-south connecting segment on Peterson Drive and Stadium Way)	Shared-Lane Markings	$20,000		Medium-term	N/A
SL12: College Street	Deakin Avenue to Railroad Street	Shared-Lane Markings	$1,000		Medium-term	N/A
SL7: Lauder Avenue / Taylor Avenue	US-95 to Blake Avenue	Shared-Lane Markings	$5,000		Medium-term	N/A
SL10: Nez Perce Dr / Perimeter Dr	Blake Avenue to Pullman Road	Shared-Lane Markings	$18,000 (Pending UI Approval)		Medium-term	N/A
SL13: Polk Street	Morton Street to city limits	Shared-Lane Markings	$13,500		Medium-term	N/A
SL9: Deakin Avenue	Sweet Avenue to Sixth Street	Shared-Lane Markings	$4,500		Medium-term	N/A
SL14: Orchard Avenue	Public Avenue to city limits	Shared-Lane Markings	$16,500		Medium-term	N/A
SL4: Public Avenue / Morton Street	E Street to Lincoln Street	Shared-Lane Markings	$7,400		Medium-term	N/A
SL8: Blake Avenue	Taylor Avenue to Sweet Avenue	Shared-Lane Markings	$3,200		Medium-term	N/A
SP5: Moscow Jr. High Parking Lot connection	D Street to E Street	Shared Use Path	$170,000 (funded by Community Choices grant)		Immediate / Short-term	

Project	From/to	Facility Type	Cost Estimate	Rating	Timeframe	Funding scenario
SP3: Walenta Drive path connection	Walenta Dr to Nez Perce Dr	Shared Use Path	$50,000 (Pending UI Approval)		Short-term	
SP1: Lieuallen-First Street path connection	Third Street to Almon Street	Shared Use Path (through Otness Park; portion between Asbury Street to Almon Street is on private property)	$210,000		Short-term	
SP6: Rolling Hills-Damen path connection	Trail to Damen Street	Shared Use Path	$200,000		Short-term	
SP8: Paradise Loop - North Segments	Warbonnet Drive to Slonaker Drive	Shared Use Path/Bike Lanes/Shared-Lane Markings	$1,800,000		Long-term	N/A
SP7: D Street-Harding path connection	Existing path to Harding Street	Shared Use Path	$210,000		Long-term	N/A
CI7: Third Street and Lieuallen Street		At-Grade Crossing Improvement (rectangular rapid flashing beacon, pedestrian refuge islands and crosswalk)	$85,000		Immediate	
CI12: Meadow Street and Joseph Street		At-Grade Crossing Improvement (mid-block crossing with pedestrian refuge island)	$15,000		Immediate	
CI6: Fairgrounds/Trail and Mountain View Dr		At-Grade Crossing Improvement (mid-block crossing with pedestrian refuge island)	$15,000		Immediate	
CI3: Lewis and Washington		At-Grade Crossing Improvement (high visibility crosswalks)	$5,000		Short-term	
CI9: Sixth Street and Main Street	Southeast corner of intersection	At-Grade Crossing Improvement (green turn queue box and signage; example shown below) 	$5,000		Short-term	
CI10: South Couplet		At-Grade Crossing Improvements (pedestrian refuge and realign crosswalks to reduce pedestrian crossing distance)	$50,000		Short-term	
CI1: Asbury and Third		At-Grade Crossing Improvement (rectangular rapid flashing beacon [as needed], pedestrian refuge islands and crosswalk)	$85,000		Short-term	
CI2: Almon and Third		At-Grade Crossing Improvement (rectangular rapid flashing beacon [as needed], pedestrian refuge islands and crosswalk)	$85,000		Short-term	

Project	From/to	Facility Type	Cost Estimate	Rating	Timeframe	Funding scenario
CI4: Almon and A Street		At-Grade Crossing Improvement (rectangular rapid flashing beacon [as needed], pedestrian refuge islands and crosswalk)	$85,000	●	Short-term	$_
CI8: Lauder Avenue / Styner Avenue at US-95	-	At-Grade Crossing Improvement (including HAWK signal)	$200,000	●	Short-term	$
CI5: Seventh Street and Mountain View Rd		At-Grade Crossing Improvement	$15,000	◔	Short-term	$_
CI11: Mountain View Road and Fairgrounds/Paradise Path		At-Grade Crossing Improvements (new crossing with pedestrian refuge island)	$15,000	◖	Short-term	$_
U1: White / Styner / Troy Highway	At Paradise Creek	Undercrossing	$340,000	●	Short-term	$

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Figure 8-7 Capital Improvement Program: Active Transportation Projects

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Figure 8-8 *Moscow on the Move* Roadway and Traffic Operations Projects

Project types

CS = Complete Street
GC = Grid Connectivity
RD = Retrofits/Road Diets
TC = Traffic Calming
DS = Downtown Streetscape
II = Intersection Improvements
F = Reasonably Funded Projects

Project	From/to	Project Description	Cost Estimate	Rating	Timeframe	Funding scenario
CS1: SH 8 Urban Corridor Improvements	Jackson Street to Lieuallen Street	Provide safety improvements to the section of SH 8 corridor between Jackson Street and Lieuallen Street. Applied access management strategies such as driveway narrowing / consolidation / closure and construct raised medians where appropriate. The block lengths on this section of SH 8 are short and most properties could gain access from the side street or alley. Raised medians on Third Street at select locations would have an added benefit of providing a pedestrian crossing refuge (east side of Asbury Street and west side of Almon Street).	$340,000	●	Short-term	$_
CS4: A Street Reconstruction	A Street from Peterson Drive to Home Street	Relocate stop signs at the intersection with A Street uncontrolled and Line Street stop sign controlled, add a separate northbound right turn lane with eastbound receiving lane on A Street, and close the north leg of intersection. Include new curbs, sidewalks, drainage and retaining walls on A Street (from Peterson to Home) and Line Streets (A to SH-8).	$3,250,000	●	Short-term	$
CS3: Third Street Bridge	Third Street at Paradise Creek	Construct a multimodal full access bridge on Third Street at Paradise Creek. This project would include traffic calming measures and bicycle facility enhancements on Third Street from Third Street Bridge to Jefferson Street, including traffic circles, curb extensions, chicanes, and neckdowns.	$1,100,000	●	Short-term	$
CS2: Sixth Street Bridge	Sixth Street at Paradise Creek	Construct a replacement bridge on Sixth Street at Paradise Creek to provide sidewalks and bike lanes.	$800,000	◔	Short-term	$
CS5: A Street Reconstruction	A Street from Home Street to Jackson Street	Widen A Street from Home Street to Jackson Street to provide a third travel lane/center-turn lane curbs and gutters, storm drainage,	$3,250,000	●	Medium-term	N/A

Project	From/to	Project Description	Cost Estimate	Rating	Timeframe	Funding scenario
		sidewalks, and street lighting.				
CS6: Mountain View Road Corridor Improvements	F Street north to W Mountain View Road	Widen Mountain View Road from F Street to Mountain View Road to provide curbs and gutters, storm drainage, sidewalks, bike lanes, and street lighting. This project may include a shared use path.	$2,000,000	●	Medium-term	N/A
CS7: Mountain View Road Corridor Improvements	White Avenue to SH 8	Widen Mountain View Road from White Avenue to SH 8 to provide curbs and gutters, storm drainage, sidewalks, bike lanes, and street lighting.	$2,000,000	●	Medium-term	N/A
CS8: Palouse River Drive Corridor Improvements	US-95 to city limits	Widen Palouse River Drive from US-95 to the city limits to provide curbs and gutters, storm drainage, sidewalks, bike lanes, and street lighting.	$2,275,000	◐	Long-term	N/A
TC2: Sixth Street Traffic Calming	Line Street to Rayburn Street	Construct traffic calming elements on Sixth Street between Line Street and Rayburn Street to improve pedestrian safety (include elements such as a raised pedestrian crossing, lane narrowing, street lighting, colored pavement and landscaping and furniture).	$300,000 (UI Funded)	●	Immediate	N/A
TC3: Deakin Street Traffic Calming	Sixth Street to University Avenue	Construct traffic calming elements on Deakin Street between Sixth Street and University Avenue to improve pedestrian safety. Include elements such as a raised pedestrian crossing, lane narrowing, street lighting, colored pavement and landscaping and furniture.	$300,000 (UI Funded)	●	Immediate	N/A
TC1: Nez Perce Traffic Calming	Nez Perce/Blake Avenue intersection	Construct traffic calming elements at the Nez Perce/Blake Avenue intersection to narrow the pedestrian crossing width. The project would include elements such as curb bulb outs and crossing enhancements.	$50,000	●	Short-term	$_
TC4: D Street Traffic Calming	Mountain View Road to Hayes Street	Construct traffic calming features and various bicycle and pedestrian improvements.	$530,000	◔	Short-term	$
II3: Sixth Street/Jackson Street Geometry	Sixth Street/Jackson Street intersection	Expand right-of-way through acquisitions to provide a dedicated eastbound right-turn lane with through bike lane and shift the lane striping to the south to achieve desired alignment. Modify intersection striping, signing, and	$500,000	●	Short-term	$_

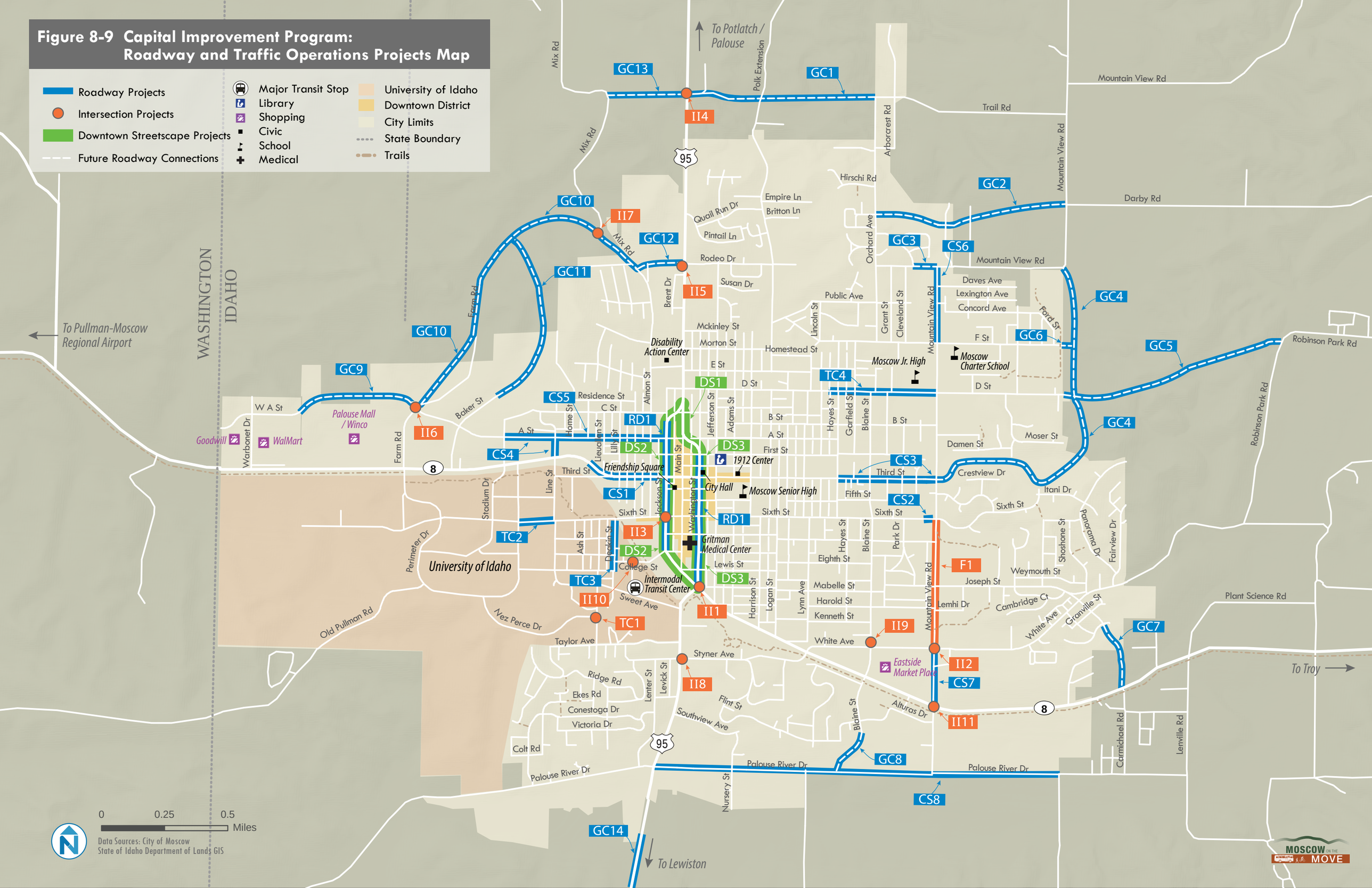
Project	From/to	Project Description	Cost Estimate	Rating	Timeframe	Funding scenario
		traffic signal heads to accommodate the new geometry.				
II8: US 95/Styner Avenue/Lauder Avenue	US 95/Styner Avenue/Lauder Avenue intersection	Install a HAWK signal on US 95 at Styner Avenue/Lauder Avenue. This project will require further coordination with ITD.	$200,000	●	Short-term	$
II1: US 95/SH 8 (South Couplet)	SH 8 at US 95/Washington Street	Widen the roadway to accommodate a second eastbound through lane on SH 8. Widening would occur on the south side of the roadway approximately 1,000 feet east of the intersection and would provide new sidewalks and landscaping.	$3,000,000	◔	Medium-term	N/A
II2: Mountain View Road/White Avenue	Mountain View Road/White Avenue intersection	Install a roundabout to improve intersection operations.	$450,000	◕	Medium-term	N/A
II11: SH 8/Mountain View Road	SH 8/Mountain View Road intersection	Install a traffic signal when warrants are met to improve intersection operations.	$200,000	◕	Medium-term	N/A
II9: Blaine Street Bridge	Blaine Street at White Avenue	Construct a replacement bridge on Blaine Street just north of White Avenue.	$700,000	◕	Medium-term	N/A
II10: College Street Bridge	College Street at Paradise Creek	Construct a replacement bridge on College Street at Paradise Creek.	$800,000	◕	Medium-term	N/A
II4: Trail Road/US 95	Trail Road/US 95 intersection	Install a traffic signal when warrants are met to improve intersection operations after construction of the Trail Road Extension.	$200,000	◕	Long-term	N/A
II5: Rodeo Drive/US 95	Rodeo Drive/US 95 intersection	Install a traffic signal when warrants are met to improve intersection operations after construction of the Rodeo Drive Extension.	$200,000 (Potential Developer Funding)	◔	Long-term	N/A
II6: A Street/Farm Road	A Street/Farm Road intersection	Install a roundabout to improve intersection operations after the construction of the A Street Extension.	$300,000	◕	Long-term	N/A
II7: Mix Street/Farm Road	Mix Street/Farm Road	Install a roundabout to improve intersection operations after the construction of the Farm Road Extension.	$300,000	◕	Long-term	N/A
RD1: Downtown Couplet Improvements (initially implemented as a pilot project)	Jackson Street from C Street to College Street and Washington Street from Lewis Street to	Remove the outside vehicle travel lanes on Jackson Street from C Street to College Street and on Washington Street from Lewis Street to First Street. Reconfigure Jackson Street (one-way southbound) and Washington	$50,000	●	Short-term	$

Project	From/to	Project Description	Cost Estimate	Rating	Timeframe	Funding scenario
	Second Street	Street (one-way northbound) to a two-lane cross-section with a buffered bike lane and on-street parking. This project will require further coordination with ITD to determine applicable traffic operation standards on State facilities. Extending the project along US95 to Moscow's northern City limits on would re quire further study and is a considered a long-term design (see the Active Transportation Strategy for additional detail).				
DS1: Main Street	First Street to C Street	Install new streetscape features such as decorative street lighting, bollards, curb extensions, and street trees on North Main Street from First Street to C Street	$60,000 (Partially Funded)	●	Short-term	$_
DS2: Jackson Street	C Street to the South Couplet	Install new streetscape features such as decorative street lighting, bollards, curb extensions, and street trees on Jackson Street from C Street to the South Couplet. This project may be funded and implemented in phases as funding becomes available and redevelopment occurs along the corridor.	$300,000	●	Short-term	$
DS3: Washington Street	South Couplet to A Street	Install new streetscape features such as decorative street lighting, bollards, curb extensions, and street trees from the South Couplet to A Street. This project may be funded and implemented in phases as funding becomes available and redevelopment occurs along the corridor.	$300,000	●	Short-term	$
F1: Mountain View Road Corridor Improvements	Sixth Street to White Avenue	Widen Mountain View Road from Sixth Street to the Fairgrounds to provide curbs and gutters, storm drainage, sidewalks, bike lanes, and street lighting. New traffic control would be proved at Sixth Street/Mountain View Road.	$2,000,000	◔	Immediate	$
GC9: A Street Extension	Farm Road to Warbonnet Drive	Extend A Street from Farm Road to Warbonnet Drive and help build out the east-west street grid in the west area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$3,000,000 (Developer Funded)	●	Long-term	N/A

Project	From/to	Project Description	Cost Estimate	Rating	Timeframe	Funding scenario
GC10: Farm Road Extension	A Street to Rodeo Drive Extension	Extend Farm Road from A Street to the Rodeo Drive Extension (on some of the existing Mix Road alignment) and help build out the street grid in the northwest area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$13,000,000		Long-term	N/A
GC11: Baker Street Extension	A Street to Farm Road	Extend Baker Street from A Street to Farm Road and help build out the street grid in the west area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$4,000,000 (Developer Funded)		Long-term	N/A
GC1: Trail Road Extension East	Orchard Avenue to Main Street	Extend Trail Road from Orchard Avenue to Main Street and help build out the east-west street grid in the area north of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$5,900,000 (Partially Developer Funded)		Long-term	N/A
GC2: Darby Road Extension	Mountain View Road to Orchard Avenue	Extend Darby Road from Orchard Avenue to Mountain View Road and help build out the east-west street grid in the northeast area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$4,500,000 (Developer Funded)		Long-term	N/A
GC3:Thatuna Avenue Extension	East to Mountain View Road	Extend Thatuna Avenue east to Mountain View Road and help build out the east-west street grid in the northeast area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$1,100,000		Long-term	N/A
GC4: Third Street Extension	Mountain View Road to D Street and Mountain View Road Extension	Extend Third Street from Mountain View Road through D Street and to N. Mountain View Road and help build out the east-west street grid in the east area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$10,600,000 (Developer Funded)		Long-term	N/A
GC5: D Street Extension	East to Robinson Park Road	Extend D Street east to Robinson Park Road and help build out the east-west street grid in the east area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$8,100,000 (Developer Funded)		Long-term	N/A
GC6: F Street Extension	East to Third Street Extension	Extend F Street east to the Third Street Extension and help build out the east-west street grid in the east area of Moscow. Bicycle lanes, sidewalks and a bridge would be	$670,000 (Developer Funded)		Long-term	N/A

Project	From/to	Project Description	Cost Estimate	Rating	Timeframe	Funding scenario
		constructed as part of the project.				
GC7: Carmichael Road Extension	SH 8 to Notting Hill Drive	Extend Carmichael Road from SH 8 to Notting Hill Drive and help build out the north-south street grid in the southeast area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$1,800,000 (Developer Funded)		Long-term	N/A
GC8: Blaine Street Extension	Palouse River Drive to Alturas Drive	Extend Blaine Street from Alturas Drive to Palouse River Drive and help build out the north-south street grid in the southeast area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$1,400,000 (Developer Funded)		Medium-term	N/A
GC12: Rodeo Drive Extension	Main Street (US 95) to Almon Street	Extend Rodeo Drive from Main Street (US 95) to Almon Street and help build out the street grid in the northwest area of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$3,000,000		Long-term	N/A
GC13: Trail Road Extension West	Main Street to Mix Road	Extend Trail Road from Main Street to Mix Road and help build out the east-west street grid in the area north of Moscow. Bicycle lanes and sidewalks would be constructed as part of the project.	$3,000,000 (Partially Developer Funded)		Long-term	N/A
GC14: US 95-Thorncreek Road to Moscow Project	South City Limits to Thorncreek Road	Replace the existing US 95 alignment from Thorncreek Road to the South City Limits (approximately 6.5 miles) with a new four-lane divided highway to reduce the grade and improve safety.	ITD Funded		Medium-term	N/A

Figure 8-9 Capital Improvement Program: Roadway and Traffic Operations Projects Map



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MOSCOW ON THE MOVE

Images from Nelson\Nygaard and Jen Heibert

TRANSPORTATION FACT BOOK

NELSON NYGAARD

CITY OF MOSCOW 1887 IDAHO

In association with DKS Associates and Alta Planning + Design

September 2012

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INTRODUCTION

The Transportation Fact Book compiles information about existing transportation conditions in Moscow, important trends that influence future transportation decisions, and projected land use conditions that will drive local mobility and access needs. Further, the Transportation Fact Book highlights opportunities for the community through a survey of best practices from around North America. The Fact Book is an important reference document that will be used to guide near- and long-term transportation investments developed through the Moscow on the Move process.

NELSON NYGAARD

CITY OF MOSCOW IDAHO

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INTRODUCTION

MOSCOW ON THE MOVE: PROJECT BACKGROUND

The City of Moscow has set the development of a balanced, sustainable, and efficient multi-modal transportation master plan as a high-priority, short-term goal. This plan, *Moscow on the Move*, will act as an implementation tool for the policies established in the City of Moscow's Comprehensive Plan. The Comprehensive Plan, along with several prior planning efforts such the Downtown Revitalization Plan, seek to improve mobility options and opportunities to access Moscow's wealth of cultural, retail, civic, and university destinations. *Moscow on the Move* will guide transportation investments within Moscow by developing policies and strategies that promote a range of attractive and viable transportation options.

The Transportation Fact Book is a community resource and compilation of transportation-related data, existing conditions, policies, and best practices into a highly digestible series of documents. As the city's transportation network evolves, this document can be revised to account for changing conditions.

A Vision for Mobility and Access

The City's Comprehensive Plan calls for a transportation system that extends its street and pathway networks, ensures safe access

throughout the city using a variety of transportation modes, including walking, bicycling, driving, carpooling, and public transportation. As the street, pedestrian, and pathway network is developed or improved, the City aims to preserve and enhance community character and use transportation investments to leverage economic development and better human health. In addition, the City seeks to accommodate delivery vehicles and state highway traffic, while balancing the needs for improved and safer local business access.

Achieving these goals will in turn enhance the City's attractiveness for future residents, visitors, and businesses, including University students, staff, and faculty.

Engaging the Community

Moscow on the Move will provide a twenty-year transportation plan that prioritizes short- and long-term actions for the City to reach the vision and goals set forth by the community.

The process of developing the *Moscow on the Move* plan and setting implementation priorities will be guided by key stakeholders and citizen participation. The plan's recommended actions will aim to balance residential, commercial, downtown, institutional, and regional interests through a community and stakeholder engagement process. The city's transit provider Regional Public Transportation (doing business as Moscow Valley Transit), the University of Idaho, and Idaho Transportation Department are key partners in the planning effort whose support will be needed to implement *Moscow on the Move*. City departments, Moscow School District, and Latah County will be encouraged to participate throughout the process.

Moscow on the Move's first community open house gathered community members to discuss issues and opportunities for all transportation modes in Moscow.
Image from Nelson\Nygaard

Setting the Context

Moscow is at the crossroads of several roadways and multi-use paths[1] of regional and national significance, including State Highway 8 (SH8, hereafter), U.S. Highway 95 (US95, hereafter), interstate and international freight corridors, and three regional trails including the Latah Trail, Paradise Path, and Bill Chipman Palouse Trail. The majority of residents depend on driving for commute trips, but there is a sizeable contingent of residents that travel to, from, and through Moscow on public transit, on foot, or by bicycle. Given the city's manageable scale and active culture, there is substantial interest in increasing the use of alternative forms of transportation such as walking, bicycling, and transit. Key challenges that *Moscow on the Move* will consider include securing sustainable funding for all modes, cost effectively improving traffic flow, developing continuous bicycle and pedestrian networks, providing connections across major barriers such as highways and difficult topography, connecting people to and from other

[1] Multi-use paths are known locally as *pathways*. The Transportation Fact Book will use multi-use paths and pathways interchangeably.

regional centers, and extending transit's reach into the city's outer neighborhoods.

WHY DOES MOSCOW NEED A MULTI-MODAL TRANSPORTATION PLAN?

The 2010 Biennial Citizen Survey is a useful barometer for understanding the public's perception of mobility in Moscow. According to the survey, 95% of respondents rated the overall quality of life in Moscow as "good" or "excellent." That being said, transportation issues ranked among Moscow citizen's greatest concerns with traffic management and sidewalk conditions ranking as two of the five most pressing planning issues in Moscow. Initial stakeholder feedback indicates a wide range of mobility needs from the level and quality of transit service and lack of bikeway connections to addressing street connections and sidewalk conditions.

Streets are one of Moscow's most heavily utilized and most critical community assets. *Moscow on the Move* seeks to balance the competing needs of the city's diverse travel markets[2] and improve local quality of life through transportation investments.

In addition to adhering to Idaho Code, the City is developing a multi-modal transportation plan for the following reasons:

- People desire transportation options and a variety of route options.
- The recent adoption of MAP-21, the updated federal transportation bill, will likely add new challenges to funding transportation improvements in Moscow. This plan seeks to expand funding options and local partnerships to develop the transportation network of the future.
- The cost of transportation is increasing due to rising fuel costs. Thus, offering affordable travel options in a city comprised of large college student and elderly populations is critical.
- As a relatively active town, many Moscow residents are interested in expanding opportunities for human-powered transportation (walking and bicycling) and recreation.
- Moscow is competing on a national and global scale to attract new companies, talented workers, and new students and faculty. The City also seeks to retain University of Idaho students. Developing streets that foster civic, retail, and social activity as well as vibrant, well-connected neighborhoods is a key strategy to attract new business and support cultural vitality.
- Moscow has the ability to maintain a healthy Paradise Creek and relatively clean air. Greater emphasis on infrastructure that promotes the use of low impact modes of travel like walking, bicycling, public transit and ridesharing, can limit the impact on local air quality, water quality, and global climate change by reducing per capita tailpipe emissions and runoff.
- Physical activity and the ability to remain active are highly valued by Moscow residents. Safe and inviting streets and clear connections to bicycle and pedestrian pathways are essential to encourage active living and recreation.
- As Moscow residents age, the City must accommodate those who wish to age in place, remain in a private home, by providing mobility options for senior citizens. This will ensure senior populations are engaged, active, and independent.

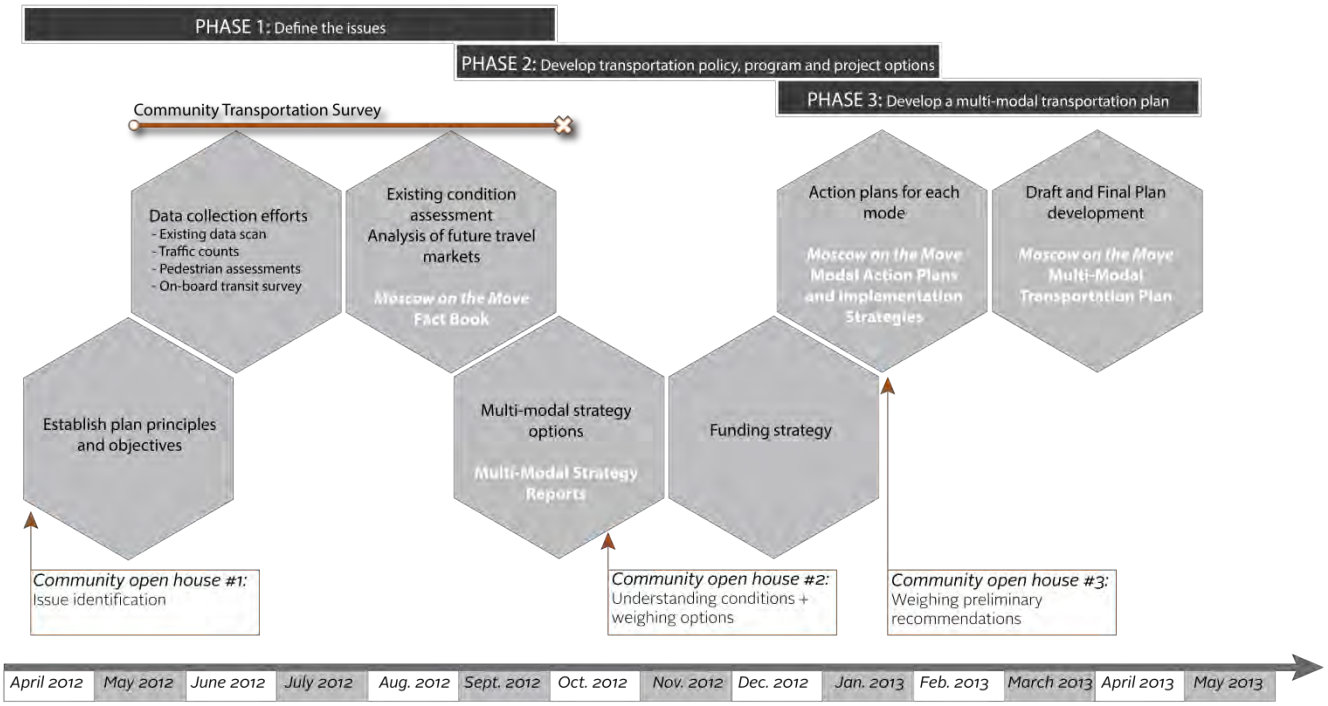
[2] A travel market is a segment of commuters or travelers using any particular mode, or the markets that are most likely to access a particular transportation service. For example, the transit market commonly includes, students, elderly, carless, and low-income populations.

THE *MOSCOW ON THE MOVE* PROCESS

Moscow on the Move will be developed in three key phases, illustrated in the timeline in Figure 1 below.

- **Phase 1 – Define the issues:** Involves meetings with stakeholders and interested citizens as well as technical work in the areas of Transit Operations, Traffic Operations and Street Design, Bicycle and Pedestrian Environments, and Parking and Travel Options Programming.
- **Phase 2 – Develop multi-modal transportation policy, program and project options:** Identifies programs, and physical improvements based on the findings of Phase 1.
- **Phase 3 – Develop a multi-modal transportation plan:** Includes definition of near- and long- term projects and programs for Streets and Traffic, Goods Movement, Transit, Active Transportation, and Parking and Travel Options.

Figure 1 The *Moscow on the Move* Process



Guiding Principles & Planning Context

This chapter establishes guiding principles and objectives for *Moscow on the Move*. These were generated by input from community members and coordinated with local transportation and land use plans and policies. *Moscow on the Move* principles stress that transportation investments are an important means to helping the City achieve its broader economic development, environmental, and community health goals.

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GUIDING PRINCIPLES & PLANNING CONTEXT

MOSCOW ON THE MOVE TRANSPORTATION PRINCIPLES AND OBJECTIVES

One of *Moscow on the Move's* initial milestones is to develop a set of visionary and achievable transportation principles and objectives that will guide investment, management, and operation of Moscow's local transportation system. This set of guiding principles and objectives was vetted and agreed upon by City of Moscow planning and engineering staff and *Moscow on the Move's* technical advisory committee.

The key underlying philosophy is that outcomes generated from *Moscow on the Move* are tied directly to broader community goals. Mobility and the investments that guide development of a multi-modal transportation system are not an end in themselves. Communities do not invest in transportation for the sole purpose of moving people and goods. Transportation is really a means to achieve wide-ranging local and regional economic, environmental, and community goals.

Moscow on the Move Guiding Principles and Objectives

The Guiding Principles and Objectives Analysis and Policy Framework shown on page 2-3 was derived from a variety of sources including City staff, the technical advisory committee, and steering commitee's knowledge of community issues and needs, and the project team's extensive experiences and research on multi-modal transportation planning efforts in similar communities or communities with similar aspirations. In addition, various local and regional planning documents were consulted to ensure the transportation principles and objectives remain consistent with adopted goals, objectives, and policies. Moscow's recently adopted Comprehensive Plan served as a fresh reminder of the community's aspirations as they relate to mobility, access, and myriad other economic and quality of life goals. Other plans that informed the creation of transportation principles and objectives include, but are not limited to, the:

- Downtown Revitalization Plan

- University of Idaho Long Range Campus Development Plan
- Moscow Transportation Study (a highway bypass study)
- Latah County Comprehensive Plan
- ITD Idaho 8 Corridor Plan
- Legacy Crossing Urban Renewal District Redevelopment Plan
- Active Living Task Force Report, and
- Mobility Task Force Report
- Miscellaneous Transportation Commission reports on parking

The section that follows the transportation principles and objectives briefly summarizes each planning effort and explains how each will be integrated into the *Moscow on the Move* process.

The Guiding Principles and Objectives Analysis and Policy Framework, detailed in Figure 1, is comprised of the following elements:

- **Guiding principles.** Clear statements that guide the project. These are general goals reflective of the city's aspirations and agreed on by City staff, the technical advisory and steering committees, the broad array of local and regional stakeholders, and ultimately the general public.
- **Objectives.** Actionable and achievable statements that directly support a guiding principle, that can be measured and supported by implementation action items, and are understandable to both a technical and general public audience. Objectives may serve multiple benefits across more than one guiding principle.

As strategies are developed, the project team, City staff, and technical advisory committee will develop a single set of targeted and multi-modal performance measures to prioritize proposed transportation projects and determine post-implementation success. The guiding principles and objectives identified for *Moscow on the Move* include:

- **Mobility and access.** Ensures people can access destinations using a diversity of travel options, routes, and seamless multi-modal connections. Objectives relate to providing a variety of travel options for all types of users (including the provision of a connected sidewalk and pathway system); increasing transit ridership through improved transit service; establishing high-quality and affordable intercity transportation options to nearby regional centers; improving access to Pullman-Moscow Regional Airport; and ensuring efficient goods movement and delivery access.
- **Downtown and University public spaces.** Creates great community places throughout Moscow that residents and visitors want to visit and pass through. Objectives include ensuring downtown thoroughfares and the streets that lead to them are walkable, interesting, and safe; developing downtown and commercial districts as places that encourage people to stay, eat, shop, and play; and ensuring current campus street connections and future campus-related development makes car-free living an attractive and realistic option.
- **Economic resilience.** Develops a transportation system with active downtown and neighborhood environments that support and create sustained economic activity. Objectives include designing walkable commercial streetscapes that promote retail activity and local business growth; reducing transportation costs and insulating residents from global economic fluctuation in oil prices by providing affordable travel options; striking a balance between safe and efficient

delivery access and fostering a walkable downtown; and developing a well-connected trail system that improves access to retail and jobs, while attracting visitors to Moscow.

- **Land use, design, and quality of life.** Supports expanded quality of life in downtown and residential neighborhoods through well-designed street design, growth, and trail development. This includes integrating land use decisions to promote walkable and well-connected communities supported by trails and open space. Related to this, a key objective is to advance neighborhood quality of life in Moscow by investing in, and developing, streets that foster active, healthy, quiet, clean, safe, and socially cohesive neighborhoods.
- **Safe streets.** Promotes awareness of different roadway users through design, traffic operations, expansion of route choices, and education. Objectives cover the design, operation, and maintenance of streets and pathways to promote safe, comfortable use for all roadway users, applying the Complete Streets model, targeting lighting improvements in key corridors, and expanding awareness and traffic enforcement efforts. For more information on Complete Streets, check out the *Complete Streets* best practice section.
- **Active and healthy living.** Encourages citizens to maintain an active lifestyle. Objectives relate to supporting walking to transit with adequate pedestrian infrastructure; providing a variety of bikeways and bike parking to expand the benefits of cycling to a broader section of Moscow's population; and developing walking routes and intersections that are fully accessible to pedestrians of all ages and abilities.
- **Environmental quality.** Ensures Moscow's transportation supports the health of the local and regional environment. Objectives include limiting the impact of transportation operations on air quality, watershed health, and farmland, and reducing transportation-related greenhouse gas emissions.

Figure 1 Moscow on the Move Guiding Principles and Objectives Analysis and Policy Framework

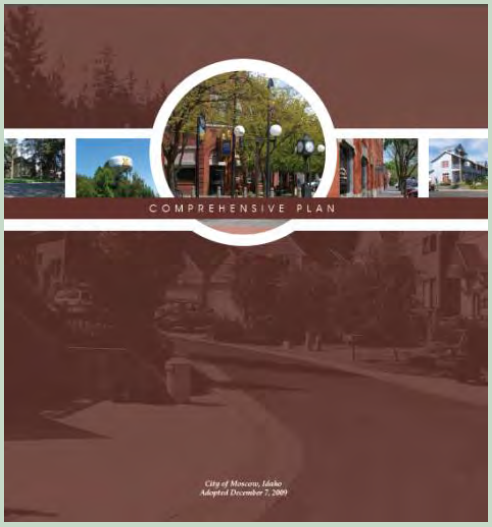
Guiding Principles/Goals	Objectives
Mobility and access Ensure people can access destinations using a diversity of travel options, routes, and seamless multi-modal connections.	Ensure Moscow's streets, intersections, and transportation networks facilitate multi-modal access to neighborhoods and major destinations accommodating all modes and all users, regardless of age or ability.
	Increase transit ridership by improving frequency, reliability, and service span, as well as the quality of transit facilities, passenger amenities, and vehicles.
	Establish and maintain high-quality, affordable intercity transportation options between Moscow and other regional centers like Pullman, Lewiston, Coeur d'Alene, Spokane, and Boise.
	Improve non-single occupant vehicle connections to Pullman-Moscow regional airport.
	Provide cost-efficient parking options that respond to customer demand and integrate with walkable street and community design.
	Ensure efficient goods movement and delivery access to key destinations and commercial/industrial areas.

Guiding Principles/Goals	Objectives
Downtown and University public spaces Create great community places throughout Moscow that residents and visitors want to visit and pass through.	Ensure downtown thoroughfares and the streets that lead to them are walkable, interesting, and safe.
	Develop downtown and commercial districts as places that encourage people to stay, eat, shop, and play.
	Coordinate with the University of Idaho to ensure current campus street connections and future campus-related development makes car-free living an attractive and realistic option and allows people to arrive on campus and move about without a private vehicle.
Economic resilience Develop a transportation system with active downtown and neighborhood environments that support and create sustained economic activity.	Design walkable commercial streetscapes that promote retail activity and local business growth.
	Develop a well-connected trail system that improves access to retail and jobs and attracts visitors to Moscow.
	Provide a range of transportation options to reduce transportation costs and retain local wealth.
	Reduce the impact on residents from global fluctuation in oil prices by expanding local and regional travel options beyond automobile travel.
	Ensure safe, efficient, and predictable freight and delivery access while acknowledging the need to foster walkable downtown and University streetscapes.
Land use, design, and quality of life Support expanded quality of life in downtown and residential neighborhoods through well-planned street design, growth, and trail development.	Integrate transportation and land use decisions to promote walkable and well-connected communities.
	Expand and develop better connections to Moscow's trail and open space network to support more active transportation and recreation.
	Advance Moscow's neighborhood quality of life by investing in and developing streets that foster active, healthy, quiet, clean, safe, and socially cohesive neighborhoods.
Safe streets Promote awareness of different roadway users through design, traffic operations, expansion of route choices, and education.	Operate and maintain streets and pathways to promote safe and comfortable use for all roadway users.
	Improve user visibility by better illuminating key corridors.
	Improve safety by designing Complete Streets for all roadway users and discouraging excessive vehicle speeds.
	Coordinate with Moscow Police Department to enforce traffic laws and provide educational opportunities to traffic law offenders.
	Expand educational efforts for motorists (both cars and trucks), pedestrians (including transit users), and bicyclists on safe operation and behavioral expectations.
Active and healthy living Encourage citizens to maintain an active lifestyle.	Ensure walking to transit is supported with adequate sidewalks and crossing facilities.
	Provide a variety of bikeways, including paths, bike lanes, low traffic bicycle routes, and separated on-street facilities, as well as secure bicycle parking to expand cycling's benefits to a broader section of Moscow's population.
	Develop walking routes furnished with sidewalks and intersections that accommodate the diverse needs of pedestrians of all ages and abilities.
Environmental quality Ensure Moscow's transportation system coexists with and supports the health of the local and regional environment.	Limit the impact of transportation operations on air quality, watershed health, and farmland.
	Reduce transportation-related greenhouse gas emissions.

WHAT PLANS AND POLICIES WILL INFORM *MOSCOW ON THE MOVE*?

Moscow on the Move must consider the environmental and social context of the City and region to form an effective long-range transportation strategy. This section provides a brief overview of the numerous City, County, University, and State plans that relate to the success of *Moscow on the Move*.

City of Moscow



Moscow Comprehensive Plan

City of Moscow

Through an extensive public outreach process from 2007 to 2009, this plan was developed to set forth the community's values and policies as a guide for the development of the city over the next 20 years. The decision-making framework covers land use and community character, neighborhood livability, all transportation modes, public services and facilities, and economic development. *Moscow on the Move* will build on the land use framework identified in the Comprehensive Plan and identify a transportation system that supports Plan goals.

Downtown Revitalization Plan

City of Moscow

Finalized in 2002, the plan was developed in partnership with the City of Moscow, University of Idaho, Latah Economic Development Council, Moscow Area Chamber of Commerce, the Downtown business community and property owners, and the larger community. Although the plan has not been formally adopted or implemented, it presents short- and long-term actions to achieve sustainable economic renewal that can influence *Moscow on the Move*. *Moscow on the Move* will support economic development by developing policies and transportation strategies that improve access to Moscow's commercial centers.

Transportation Commission Reports

City of Moscow

Moscow's Transportation Commission actively provides guidance and recommendations on the City's most pressing transportation issues. Recent reports produced by the Transportation Commission include a Ring Road concept, Arterials Plan, Streets Standards, and a transit routing plan.

The Transportation Commission will be a critical sounding board on *Moscow on the Move* recommendations and plan adoption.

Mobility Task Force Report

City of Moscow

In 2010, the Mobility Task Force, a mayor-appointed citizen group, developed a report for the Moscow Transportation Commission recommending critical improvements to the pedestrian infrastructure to ensure ADA compliant routes throughout the city. The Task Force identified Mobility Routes and prioritized sidewalk segments that needed improvement in order of severity and impact of deficiency. The report suggests implementation through enforcement of City codes, public-private partnerships, grant funding, and use of existing sidewalk funds. Task Force recommendations will be an important consideration for the active transportation components of *Moscow on the Move*.

Sidewalk Improvement Plan

City of Moscow

Moscow's Sidewalk System Improvement Plan, developed in 2011, aims to improve and maintain accessible pedestrian facilities for everyone in the community by establishing prioritization criteria to determine the allocation of funding and staff. The plan aims to provide ADA compliant pedestrian facilities throughout the community. A two-year educational period is followed by implementation of mandatory compliance with City sidewalk code. In 2012, the City will address the primary accessibility deficiencies discussed in the Mobility Task Force Report and create a program to promote sidewalk connectivity through landowner participation.

Downtown Parking Study

City of Moscow

This 2008 Transportation Commission study sought to modify downtown parking regulations. The study counted public and private on- and off-street parking within the central business zone. Council adopted revisions to parking lot permitting and overnight parking options and restrictions. Data from this study will inform parking strategies and economic development considerations in *Moscow of the Move*.

Pavement Condition Study

Idaho Transportation Department

This 2009 report identifies the pavement condition and years since last maintenance and rehabilitation on Idaho's state facilities.[1] The state highways leading to Moscow are generally in good condition, but degrade to poor or very poor within city limits. Most facilities in Moscow were maintained within the last five years, however it has been over 15 years since most facilities were rehabilitated. This evaluation of pavement conditions will inform roadway recommendations and bikeway development phasing in *Moscow on the Move*.

[1] Pavement maintenance includes preventative measures that delay road reconstruction. Rehabilitation requires actions to fix roads that have significant cracking or fissures.

Active Living Task Force Report

City of Moscow

The goal of the Active Living Task Force is to promote healthy lifestyle alternatives through community design, Complete Streets, and policies and programs that support active living. The Report proposes three strategies: staff education, community education and engagement, and a bicycle and pedestrian data collection project. Staff education involved participation in a weeklong Bicycle and Pedestrian Design and Planning workshop. The data collection effort was part of the National Bicycle and Pedestrian Documentation Project to develop standardized walking and bicycling data. The report's data inputs will be an integral component of *Moscow on the Move* strategy development. *Moscow on the Move* will also educate the community on the benefits of Complete Streets to help discern whether a citywide Complete Streets policy should be considered.

Moscow Impact Fee Study

City of Moscow

This study provides impact fee calculations for the City of Moscow based on current and projected residential and nonresidential growth, existing levels of service for public facilities, and capital improvement plans for all public services. The study also analyzes cash flow based on the projected revenues generated by the impact fees. Although never adopted, recommendations include revising the City's Capital Improvement Plan and Impact Fee Ordinance, developing an impact fee service area, and utilizing an advisory committee to ensure plans and fees are reviewed as necessary. This study will be referenced in *Moscow on the Move* as a practice used in other communities, but not necessarily appropriate for Moscow.

Legacy Crossing Urban Renewal District Redevelopment Plan

Moscow Urban Renewal Agency

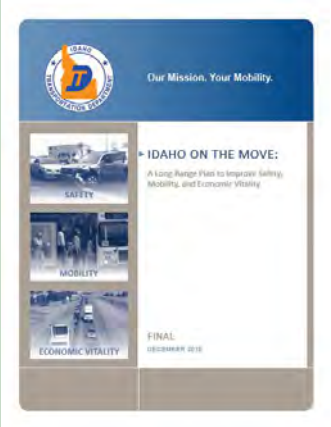
This plan seeks to diversify Moscow's economy through revitalizing the Legacy Crossing area, situated between Moscow's historic downtown and the University of Idaho campus. Strategies involve hastening the transition of properties from former agricultural or industrial use to new general business and mixed uses that are economically successful and contribute to quality of life in Moscow. Redevelopment of this area with new mixed-use developments will bridge the University of Idaho campus and the City's downtown core. *Moscow on the Move* seeks to ensure Legacy Crossing integrates into the City's multi-modal transportation system and streets within the district are well-designed.

Southeast Moscow Industrial Park Master Plan

City of Moscow

The City of Moscow has expressed the need to diversify and strengthen its economic base in the industrial sector. The loss of industrial property in the Legacy Crossing area has reduced the city's supply of industrial land substantially. Almost ¾ of 68 acres of industrial zoned land within the City are proposed for rezoning. The Master Plan presents a proposal for constructing appropriate development appealing to industrial and light industrial uses in a 78 acre area in southeast Moscow, as a way to bring in, retain, and further develop these uses in Moscow. *Moscow on the Move* will develop strategies to ensure this site is connected to the rest of the city with multi-modal options.

County and State Plans



ITD Long Range Plan: Idaho on the Move

Idaho Transportation Department

In 2010, the ITD developed *Idaho on the Move*, a long-range transportation plan for the state that lays out long-range goals and objectives, investment strategies, key management principles, and implementation strategies involving a performance management process.

Goals and objectives of the Plan focus on improving safety by implementing *Idaho's Strategic Highway Safety Plan*, enhancing mobility by improving transportation options and well-maintained facilities, and supporting Idaho's economy through the efficient movement of people and goods. Investment strategies focus on operations, preservation, restoration, and expansion that align with safety, mobility, and economic vitality needs. Management principles entail customer service; transparency and accountability; efficiency and effectiveness; partnerships, teamwork, and collaboration; employee development; and a balanced approach. Implementation requires performance management through planning, investing, measuring, and assessing. This Plan will inform the goals and objectives in *Moscow on the Move*, and the City will look to coordinate with the long-term local investments to planned investments *Idaho on the Move*.

ITD Idaho 8 Corridor Plan

Idaho Transportation Department

In 2010, the ITD developed a corridor plan for Idaho 8 that comprises 11 miles, from Mountain View Road in Moscow to Idaho 99 in Troy. This study identifies and prioritizes the most critical improvements for the next 10 years related to operations and maintenance, roadway geometry, congestion, and safety. Some of the proposed strategies include developing passing lanes, improving sight distance, widening roadway shoulders, re-surfacing pavement, installing signage, and improved passages for wildlife. The improvements specified in the plan will be programmed in the Statewide Transportation Improvement Plan to receive state or federal funding. *Moscow on the Move* will build on these improvements identified on state highways by improving the multimodal system in Moscow.

Latah County Comprehensive Plan

Latah County

This 2008 plan update involved an extensive public outreach process led by the County Planning Commission to learn what shape residents wanted their communities to take over the next 10 years. This feedback formed the basis of the Comprehensive Plan and objectives, which aim to preserve the rural character of the county, foster a sustainable economy, and keep commercial and higher density residential clustered near areas that provide public services. The plan is comprised of several elements, including: community design, population, housing, economic development, public services, facilities and utilities, school facilities, transportation, natural resource, recreation, land use, and water resources. *Moscow on the Move* will support these goals and priorities through an improved transportation system in Moscow.

Moscow Transportation Study

Idaho Transportation Department

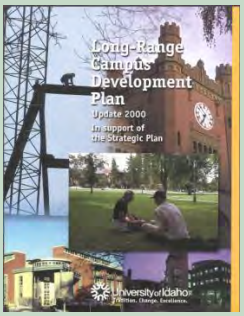
This study analyzed a US-95 and State Highway 8 bypass around Moscow due to congestion through the city center. In order to determine if a bypass would be necessary, the analysis included the current and future corridor shortcomings and traffic volumes. The study concluded that, although physically feasible, a bypass is not needed in this corridor based on projected traffic. Capacity expansions and signal improvements will be sufficient to accommodate increased traffic volumes. However, the City of Moscow Comprehensive Plan contains plans for a bypass in order to achieve livability and economic vitality goals. *Moscow on the Move* will use these findings and the Ring Road evaluation conducted by the Transportation Commission to make recommendations that both improve freight movement and respect the community's aspiration for a vibrant and walkable downtown that is buffered from freight traffic.

North Latah County Highway District Transportation Plan

Latah County

Developed in 2006, this plan provides an inventory of the existing highway district transportation system and future population growth, travel demand and future transportation system needs. Alternatives were analyzed based on safety, public needs, capacity, functionality, and feasibility. A public involvement process helped determine improvement priorities. The document presents a Transportation Plan with proposed improvements and a Capital Improvement Plan prioritizing projects and identifying funding sources. Although the highway district has jurisdiction over the facilities within Moscow's city limits, Moscow's Comprehensive Plan was considered in the development of this plan. This plan will inform highway improvements recommended in *Moscow on the Move*.

University of Idaho



University of Idaho Long Range Campus Development Plan

University of Idaho

Updated in 2000, the long-range campus development plan aims to respect the University's history by maintaining the unique physical features of the Moscow campus while also proposing a framework for growth, innovation, and change. The plan contains goals and objectives related to land use, transportation and parking, open space, maintaining a compact academic core, residential campus and facilities, utility infrastructure, and space. Coordinating the Plan's vision developed for the campus will be a key factor in the development of *Moscow on the Move*.

University of Idaho Transportation Plan

University of Idaho

A 2011 transportation analysis study by the Transportation Advisory Group (TAG), comprised of students, faculty, staff, City Council members, and community members, investigated the existing conditions of the University of Idaho's transportation system. Specifically, the plan analyzed the pedestrian, vehicle, parking, bicycle, and transit systems and circulation, including conflict zones, and suggested mitigation, capital projects, and funding sources. The plan acknowledges the relationship between the University campus and the City of Moscow in terms of parking needs and right-of-way ownership. *Moscow on the Move* will utilize the analysis and recommendations in this report to establish existing conditions and determine appropriate mobility and access solutions.

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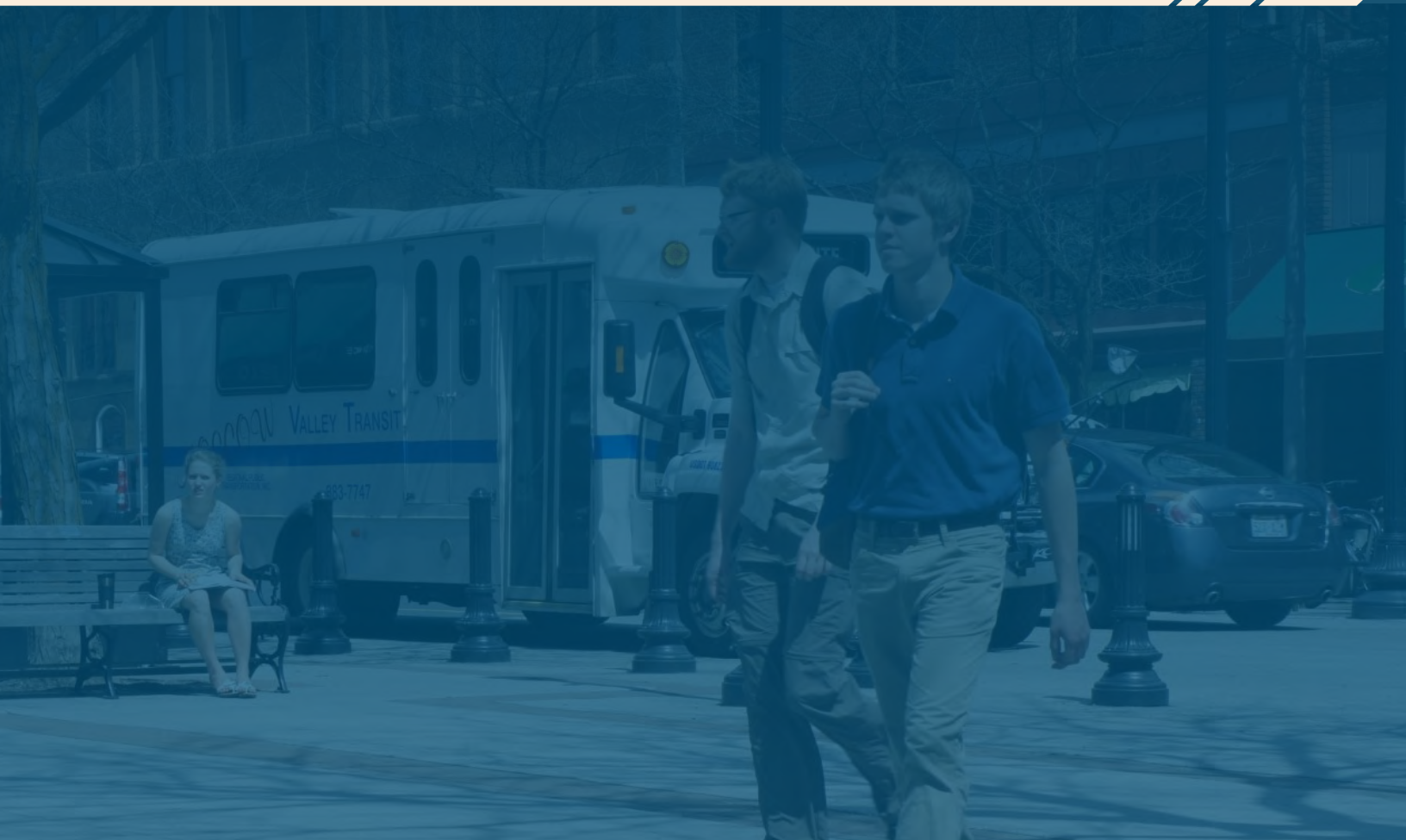
GETTING AROUND MOSCOW TODAY



This chapter summarizes current travel behavior and conditions that influence travel demand. The information and analysis compiled in the following sections will answer several important questions:

- What are the major travel patterns within Moscow and the region? How does that vary by mode?
- How effective is the current transportation system in serving the city's diverse travel needs and preferences?
- What are the demands of private vehicles, freight, and non-single occupant vehicles on the system?
- What are the conditions for residents and visitors walking, bicycling, or taking transit in Moscow?

NELSON NYGAARD

CITY OF MOSCOW IDAHO

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GETTING AROUND MOSCOW TODAY

GETTING TO KNOW MOSCOW

Moscow is a small but growing city located along the Idaho-Washington border in north central Idaho. At 6.2 square miles, the City is relatively compact in land area and is home to 23,800 residents.

Moscow is located near several regional centers including Pullman, Washington (situated eight miles to the west), Lewiston, Idaho (located 32 miles to the south), and Spokane, Washington (roughly 80 miles to the north). The most populous city and the County Seat of Latah County, Moscow is also home to the University of Idaho, which is the city's largest employer. As part of the Palouse Knowledge Corridor, Moscow and the University are leveraging the community's intellectual and creative assets to house new and growing industries, attract a diverse residential population, and grow and diversify its economy - all in the heart of the Palouse.

As home to the University of Idaho and an active and engaged citizenry, Moscow hosts a variety of community, cultural, and art events including a thriving Farmer's Market, Moscow Art Walk, and Rendezvous in the Park events.

Environmental Scan

Moscow is located in the Palouse region in the Columbia River Plateau. Known for its strong agricultural heritage, the city has grown a more diverse economy that includes education and health care. The city is surrounded by mountains and ridges: Moscow Mountain range lies to the northeast and Paradise Ridge and Tomer Butte are to the southeast. The city itself is situated on hilly terrain, especially the neighborhoods east of downtown.

Weather

Moscow experiences cold winters, with an average high of 35◦F. Summers are warm and dry, with an average high of 80◦F and few rainy days. Precipitation in Moscow falls more as snow than rain, with an average of 50 inches of snow and 27 inches of rain per year. However, the city experiences many more days of rain than snow; 130 rainy days compared to 27 snowy days. The number of snow days in Moscow requires the City to maintain a snow routing strategy to ensure people using a variety of travel options can get to the places they need to go safely and directly.

Friendship Square is a key pedestrian and traffic connection in downtown Moscow.

Image from Nelson\Nygaard

Activity Centers

Downtown Moscow (and areas immediately north of the center), Eastside Marketplace, and strip commercial on the eastern end of SH-8 consist of the city's key commercial nodes. The University of Idaho campus is located directly to the southwest of Moscow's downtown and is the city's largest employer, as shown in Figure 1. The University is bordered by SH8 and US-95 and can be accessed via Taylor Street, Sweet Avenue, College Street, Line Street, Sixth Street, Peterson Drive, Farm Road, Old Pullman Road, and the Paradise Path.

Several K-12 schools serve Moscow, including J. Russell Elementary, Lena Whitmore Elementary, West Park Elementary, A.B. McDonald Elementary, St Mary's School, Logos School, Moscow Jr. High, Moscow Charter School, Palouse Prairie Charter School, White Pine Montessori, Paradise Creek Regional Alternative School, and Moscow Senior High.

Medical facilities in Moscow are clustered in the downtown area around the Gritman Medical Center, although many are moving to West A Street, making multi-modal access more difficult. Social services and non-profits, including the United Way, Community Action Agency, Success by Six Cares Center, Opportunities Unlimited, and Inclusion North, are located in the core downtown area. The Health & Welfare Department and Latah County WIC Program are located further out, on Troy Highway and East Palouse River Drive.

Senior housing and assisted living facilities are less centralized than other uses. These facilities tend to be located outside of downtown, in less dense areas north of East D Street, south of Styner Avenue, and east of South Mountain View Road.

Housing and residential form

Residential housing is the most prevalent land use in Moscow. Housing is generally low density in nature, with the exception of multifamily and student housing in the neighborhoods immediately north, south, and southeast of the University. Residential housing can range from traditional neighborhood development (like the grid neighborhoods immediately east of downtown), planned subdivisions east of Mountain View Road, higher density apartments in portions of SE and SW Moscow, and even mobile parks. Most pre-1950s housing development occurs on a grid street network. However, 1950s- / 1960s-era and more recent suburban style subdivision development has lead to the construction of "loop and lolli-pop" style street networks—land use decisions that impact current travel behavior.

Because of urban expansion and changes to compact community form, car dependency has been instilled in many households. A sizable low-income population living along the N Polk Extension northeast of the downtown area is located outside of the area that receives transit service from Moscow Valley Transit's West and East Routes. Similarly, areas east of Mountain View Rd have limited access to transit. The lack of public transportation services, sidewalk connectivity, and bikeways may lead to higher rates of driving in these areas.

The intersection of Line and Sixth within the University of Idaho is a major campus access route for students and staff.
Image from Nelson\Nygaard

Figure 1
Activity Centers in Moscow

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Transportation Infrastructure

Streets and Network Connectivity

The City of Moscow operates roughly 80 miles of roadway within its city limits. Approximately four miles of roadway are gravel streets with a curb or sidewalk on one or both sides of the street. Nearly nine miles of roadway are local improved streets. Collectors make up the largest proportion roadway facility in the city (42% of all facilities at 34 miles).

The street network in downtown Moscow and the historic Fort Russell neighborhood form a grid pattern, with the main streets, Jackson Street, Washington Street and Main Street, running north-south. Moving outward from downtown beyond Mountain View Road to the east, the streets lose their grid form and transition into suburban-style roads that curve with the topography, end at cul-de-sacs at times, and often lack adequate sidewalks.

Highways

Two main highways connect Moscow to its regional neighbors and the Interstate Highway System:

- US-95 runs north-south through the city, connecting Moscow to Lewiston and Boise to the south and to Coeur d'Alene and I-90 to the north (I-90 is the main east-west interstate in the northern U.S.) US-95 operates as a one-way couplet in downtown Moscow using Washington Street (northbound) and Jackson Street (southbound).
- State Highway-8 (SH8) runs east-west through the City, connecting Moscow to Pullman to the west in Washington State and Troy to the east.

US-95 is a critical freight and interstate highway connection that bisects Moscow from north to south.

Image from Nelson\Nygaard

Airports

The Pullman-Moscow Regional Airport is located about six miles west of Moscow in Pullman, WA. Serving as the air connection for the University of Idaho and Washington State University, Alaska Airlines provides service to Lewiston and Seattle. The airport is accessible from Moscow via SH8, which converts to SR-270 at the state border with Washington. There is currently no public transportation between Moscow and the airport.

To the south, Lewiston Airport also connects Moscow to regional destinations in Idaho, Salt Lake City, Portland and Seattle . Spokane Airport is the region's closest international airport and has private intercity bus access.

Intercity Bus

Wheatland Express, the former operator of the highly valued Moscow-Pullman regional commuter service (no longer in operation), offers private shuttle service to Spokane International Airport (daily) and Seattle (during university vacations only). Northwestern Trailways connects Moscow to Spokane, Coeur d'Alene, Lewiston, and Boise with four daily departures. ITD is currently seeking federal (FTA) funding for this route. Valley Transit, until recently, offered a Lewiston to Moscow commuter service for a fare, with four daily departures from four locations in Moscow, including on the University of Idaho campus. This service was discontinued in March of 2011 due to lack of funding.

According to ITD's 2011 Idaho Intercity Corridor Definition report, Moscow is part of three major regional inter-city bus corridors including the Moscow – Plummer, Moscow – Spokane, and Moscow – Lewiston corridors. In 2009, the Moscow accounted for 68 average daily boardings and 16 average daily alightings along this inter-city bus system.

Regional Multi-Use Paths

Several bicycle and pedestrian path within Moscow form a backbone network that provides non-motorized connectivity. Bicycle and pedestrian paths throughout the city provide access between neighborhoods, to downtown, to the University campus, and to other regional destinations. The Latah Trail, completed in 2008, connects Moscow to Troy along SH-8. The Bill Chipman Trail, completed in 1998, connects Moscow and Pullman and is regularly used by bicyclists commuting between the two cities—especially during good weather. Paradise Path connects these two paths through the City and University of Idaho campus. These three paths together form 22 miles of continuous non-motorized pathway.

Community members that participated in *Moscow on the Move's* initial community open house communicated the need to expand the pathway network and trail connections, especially in areas east of S Mountain View Road and south of SH-8. To this end, the Paradise Path Task Force aims to create a network of linear parks and multi-use path connections.

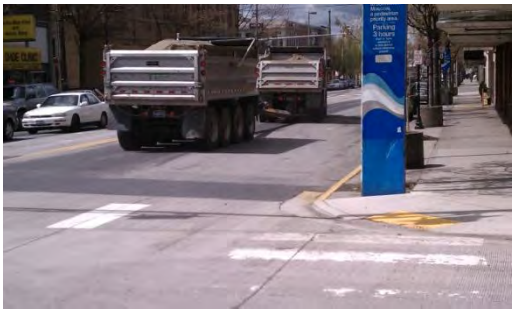
Freight

Moscow absorbs freight traffic for local deliveries and through movement to other regional destinations like Pullman, Potlach, Troy, Lewiston, Spokane, and Couer d'Alene. Freight traffic is highest in the morning. "Chip trucks" moving north and south to/from Clearwater Paper in Lewiston is a major source of truck traffic.

During the AM peak, about 5% of vehicle traffic entering or exiting Moscow through Third/Jackson and Third/Washington are freight vehicles. Other key gateway intersections to Moscow have lower levels of freight traffic: SH-8/Farm (3%), SH-8/Mountain View (2%), US-95/Styner (3%).

Although some cyclists prefer the direct routing of major roads, trails like the Bill Chipman Trail provide safe and comfortable non-motorized access to Moscow's western commercial destinations.

Image from Nelson\Nygaard



Large trucks comprise of a small percentage of total downtown traffic, yet impacts are noticeable on the downtown environment.

Image from Nelson\Nygaard

MODE SPLIT AND TRAVEL TIME

Moscow is excelling in promoting commuting alternatives to the car, according to American Community Survey 2006-2010 5-Year Estimates. As noted in Figure 2, less than 60% of Moscow residents drive alone to work and 11% carpool; a total of 69% of residents drive or ride in a car to work. While public transit ridership is low, at just over 1%, walking and bicycling rates are very high, at almost 20% and 6% respectively.

Compared to Moscow, fewer residents of Pullman drive or ride in a car to work (63%). This is partially due to Pullman exhibiting a higher student proportion than Moscow (65% compared to 52%, respectively). Due to its' more established transit system with dedicated funding sources and a higher student proportion, Pullman's transit ridership is dramatically higher than Moscow's, at nearly 9%. Residents in Moscow and Pullman walk at similar rates, but bicycling in Pullman is much lower than Moscow, at only 2%.

Compared to Latah County and Idaho as a whole, Moscow residents drive less, take public transit more often, and walk and bike at a significantly higher rate than average.

Boulder, CO is often described as a leading University town in the U.S. when it comes to maintaining a low drive alone mode split. Moscow has a near identical drive alone mode split (Boulder was at 53% in 2010).

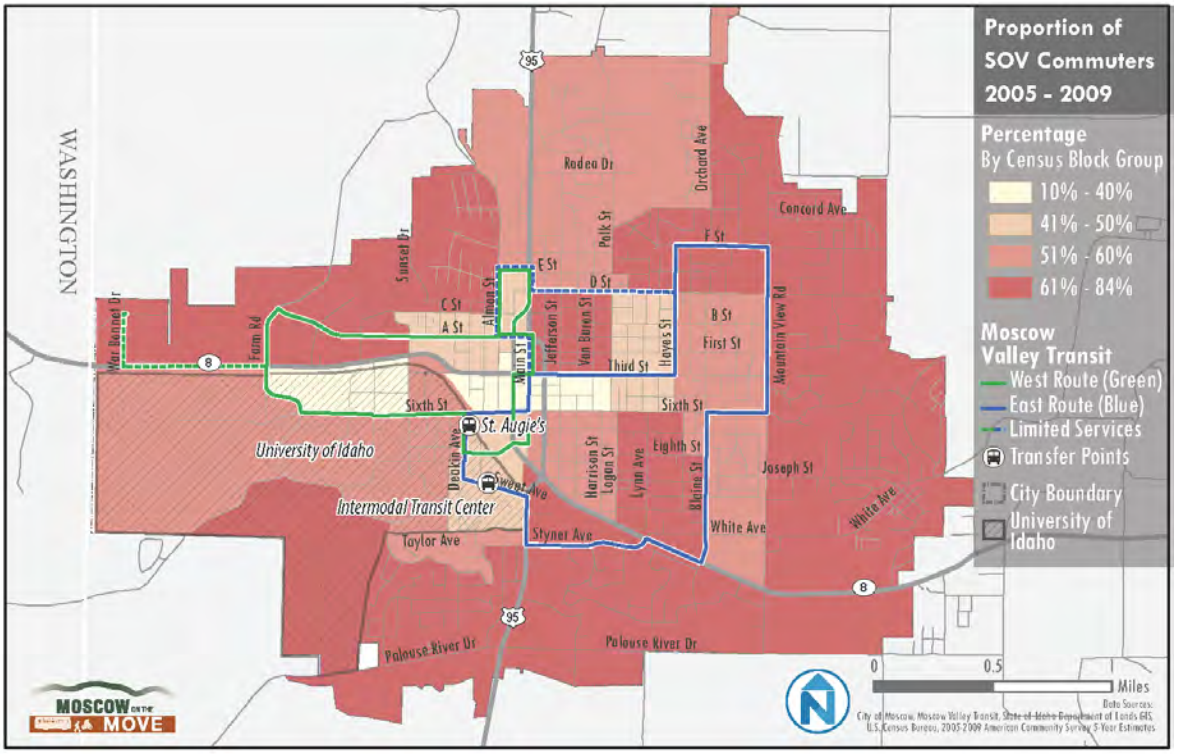
In addition, findings from the American Community Survey 2006-2010 5-Year Estimates show that the majority of Moscow residents' commute travel times are short, with over 60% of commuters traveling for less than 15 minutes for all modes. Travel times of 15 to 29 minutes make up another 30% of commuters. Less than 10% of commuters travel 30 minutes or longer. The latter 40% is a sizeable population that likely represents commuters making regional commute trips.

Figure 2 Means of Transportation to Work, Moscow, Lewiston, Pullman, Latah County, Idaho, 2006-2010

	Moscow	Lewiston	Pullman, WA	Latah County	Idaho State
Drove alone	57.6%	82.5%	54.3%	63.1%	76.4%
Carpooled	11.4%	10.2%	8.6%	13.7%	11.4%
Public transportation	1.2%	0.4%	8.8%	0.8%	0.9%
Walked	19.6%	2.5%	21.5%	13.2%	3.2%
Bicycle	5.7%	0.7%	1.8%	3.8%	1.2%
Worked at home	3.8%	2.2%	4.1%	4.6%	5.4%

Source: American Community Survey 2006-2010 5 Year Estimates

Figure 3 Single Occupant Vehicle (SOV) Commuters in Moscow, 2005-2009



Source: American Community Survey 2005-2009 5 Year Estimates

Residents who commute to work by single occupancy vehicle (SOV)—illustrated in Figure 3—mostly live in residential areas to the east, west, and south further away from downtown Moscow. However, a high percentage of residents living downtown north of Third Street and west of Polk Street also drive alone to work. Residents on the University of Idaho campus and downtown south of Third Street have lower rates of SOV use.

TRAVEL PATTERNS

Labor supply data from Census models are the best available indicator of work-related transportation because it is available for individual "places". Figure 4 shows commuting data for Moscow residents. Over half of Moscow residents stay in Moscow for work. A large proportion, 16%, travels to Pullman, WA for work. Smaller numbers of residents travel to Lewiston (5%), Boise (2%), Coeur d'Alene (2%), and Troy (1%) for work. All other locations draw 14% of Moscow's residents.

Figure 4 Commute Destinations for Moscow Residents, 2010

Work In → Live In ↓	Moscow	Pullman, WA	Lewiston	Boise	Coeur d'Alene	Troy	All Other Locations
Moscow	5,100 (56.1%)	1,450 (16.0%)	466 (5.1%)	220 (2.4%)	206 (2.3%)	92 (1.0%)	1,295 (14.2%)

Source: Census OnTheMap

Figure 5 Commute Origins for Moscow Workers, 2010

Live In → Work In ↓	Moscow	Pullman, WA	Lewiston	Boise	Coeur d'Alene	Troy	All Other Locations
Moscow	5,100 (48.8%)	507 (4.9%)	544 (5.2%)	96 (0.9%)	198 (1.9%)	89 (0.9%)	3,576 (34.2%)

Source: Census OnTheMap

As shown in Figure 5, about 10% of the workers commuting to Moscow are from Pullman and Lewiston. Fewer residents of other places, like Boise (1%), Coeur d'Alene (2%), and Troy (1%), travel to Moscow for work. Over one-third of workers in Moscow travel into the city from very small towns or unincorporated rural areas. Please note that commutes originating from Troy are likely underrepresented.

Figure 6 shows that more workers live outside of Moscow and commute in (5,348) than live in Moscow and stay for work (5,100). Twenty-seven percent of Moscow's residents leave the city to access work.

As illustrated in Figure 7, employment in Moscow is concentrated in the downtown area and at the University of Idaho, which is the largest single employer. Some employment is also located at strip commercial to the east and west along SH8.

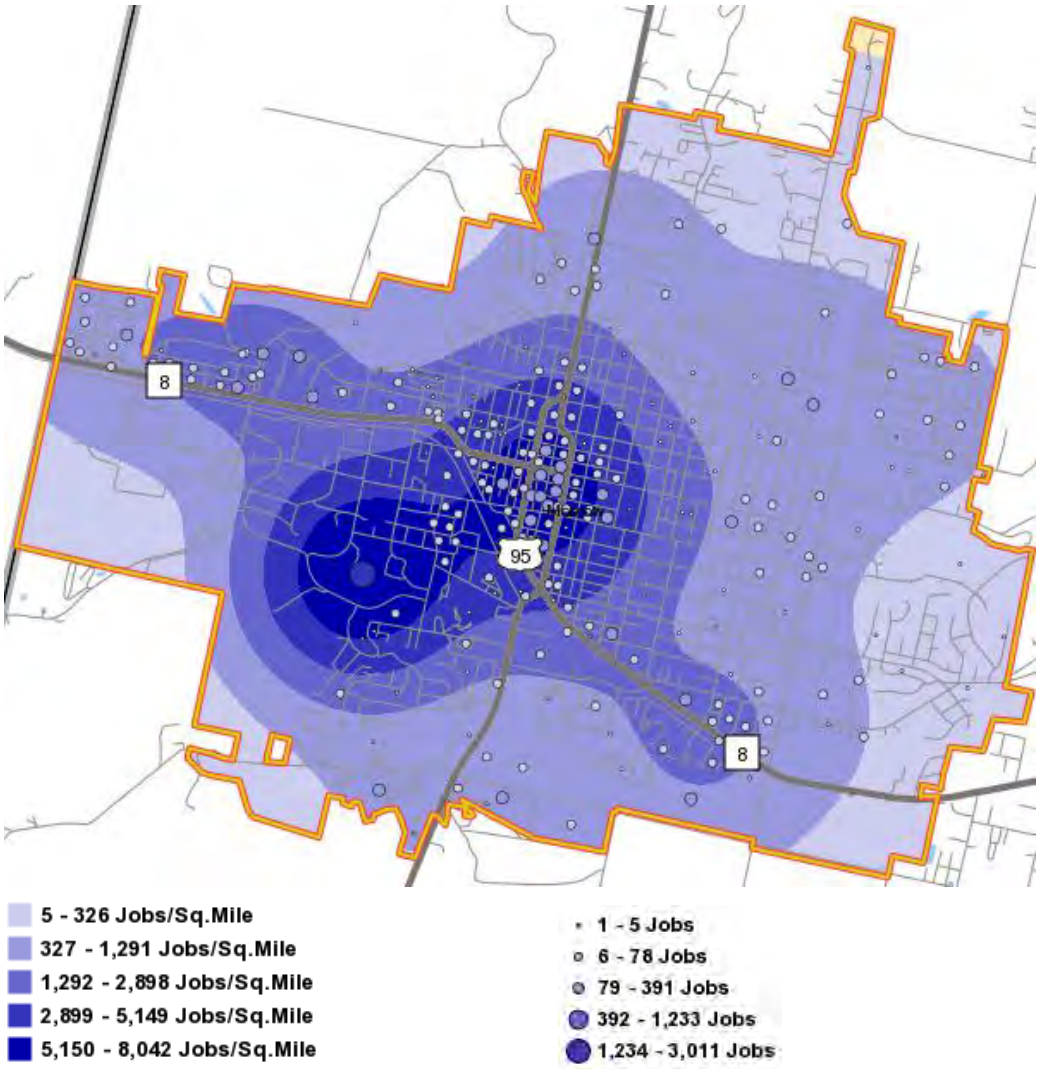
Over 60% of people who work in Moscow travel 10 miles or less to work, mostly from the east and northeast. However, 17% (1,800 people) travel more than 50 miles, mostly from the north.

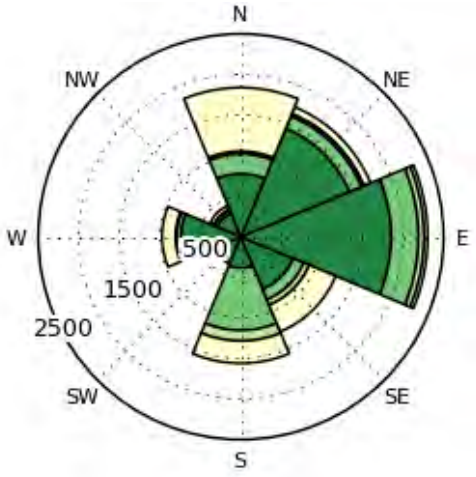
Figure 6 Inflow and Outflow of Moscow Residents and Workers, 2010

Note: Overlay arrows do not indicate directionality of worker flow between home and employment locations.

Source: 2010 Census Longitudinal Employer Household Dynamics, OnTheMap

Figure 7 Employment Density and Job Counts by Distance and Direction of Commute, 2010





	2010 Count	2010 Share
Total All Jobs	10,448	100.0%
Less than 10 miles	6,519	62.4%
10 to 24 miles	1,758	16.8%
25 to 50 miles	370	3.5%
Greater than 50 miles	1,801	17.2%

Source: 2010 Census Longitudinal Employer Household Dynamics, OnTheMap

TRAFFIC AND ROADS

Moscow's streets exhibit several key characteristics that contribute not only to the feel of the community, but also influence the transportation system. Geographically, Moscow is situated in the heart of the Palouse, with rolling terrain that influences the design of streets and the amount of traffic that uses those streets. Many of the primary east-west streets that connect the residential areas of eastern Moscow with the downtown core are characterized by steep grades making for challenging use by non-motorized users or vehicles in inclement weather.

Moscow is located at the junction of two highways, which carry regional freight trips and are impacted by seasonal traffic volume fluctuations related to tourism and recreational travel. The University of Idaho staff and student population contribute to motor traffic levels on city streets as well as use of non-motorized modes. The variations of the academic calendar (including differences between the number of midweek classes on Tuesday versus Wednesday, for example) and summer break influence how heavily streets are used at various times.

What are Moscow's roadway classifications and what is their purpose?

Moscow's Thoroughfare Plan[i] classifies streets in the City based on intended function and character. This "functional classification," illustrated in Figure 8 and described in Figure 9, serves as a general plan for streets and their role in the community.

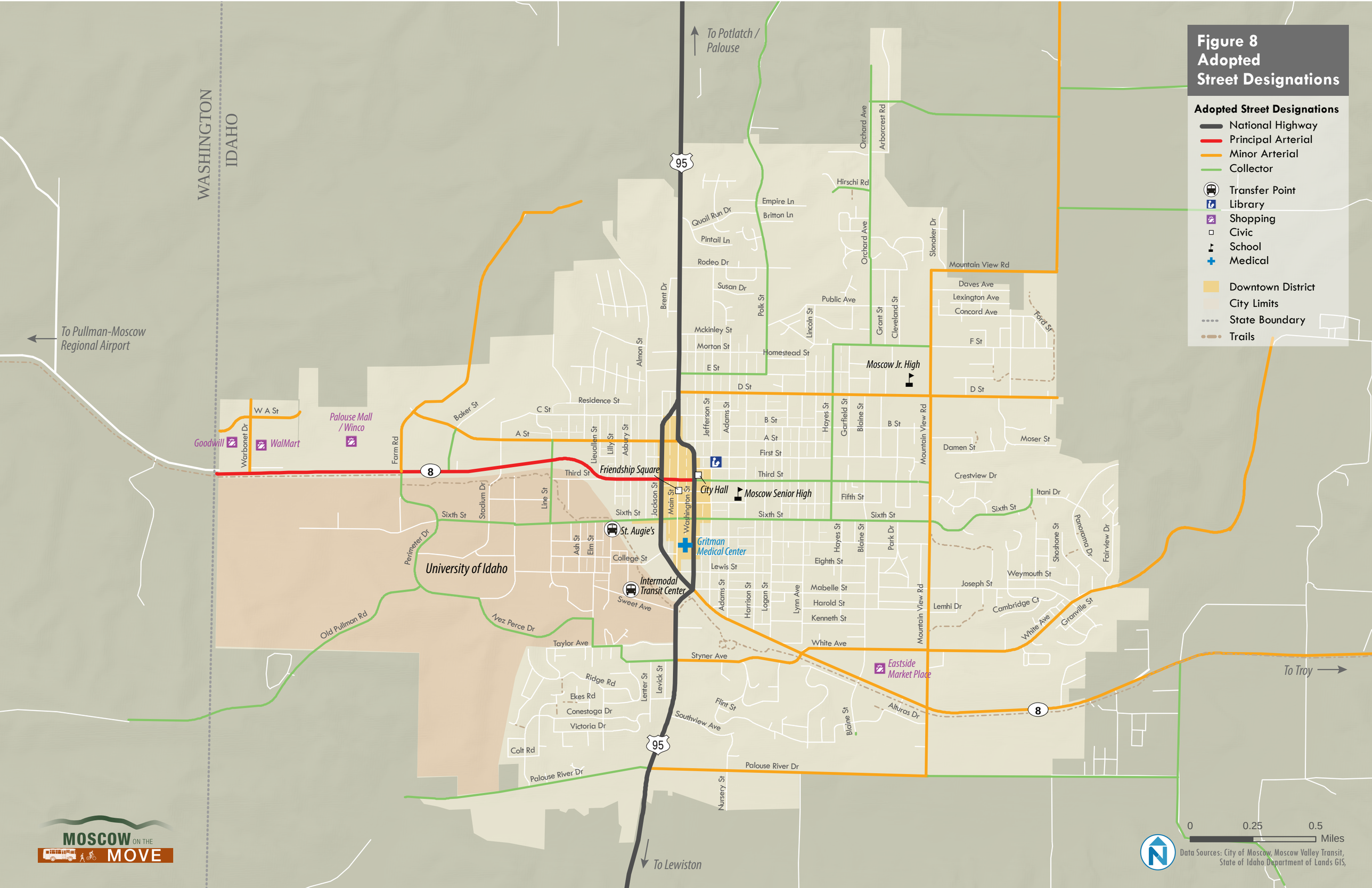
Moscow is located at the junction of US 95 and SH 8, which contribute to regional traffic passing through the community.

Image from DKS Associates

The classification not only identifies the purpose of the street, but it can be used to apply design criteria such as driveway spacing and access requirements. Streets primarily tasked to move regional traffic and freight include SH 8 (e.g., parts of Third Street and Troy Highway) and US 95 (e.g., the Washington Street/Jackson Street couplet). Other minor arterials like Mountain View Road and D Street provide access to local streets and can carry significant volumes. Streets that provide low speed and low volume environments are known as Local Streets and are the most prevalent street type in Moscow.

Streets classified for more intensive use, such as arterials, are intended to provide mobility and move large volumes of traffic through and within the City. To achieve this goal, these streets typically have higher posted speeds and more lanes, require vehicles to stop at few locations, and have limited side streets and driveways. Streets constructed pre-classification—such as D Street and Third Street—are an exception to this rule.

Figure 8
Adopted Street Designations



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Not all streets of a given functional classification look the same. Palouse River Drive (shown here at Mountain View Road) is classified as a minor arterial, though it has a rural feel with low traffic volumes.

Image from DKS Associates

Many east-west routes (such as Sixth Street as shown) have terrain that can be challenging for bicycles and local delivery trucks.

Image from DKS Associates

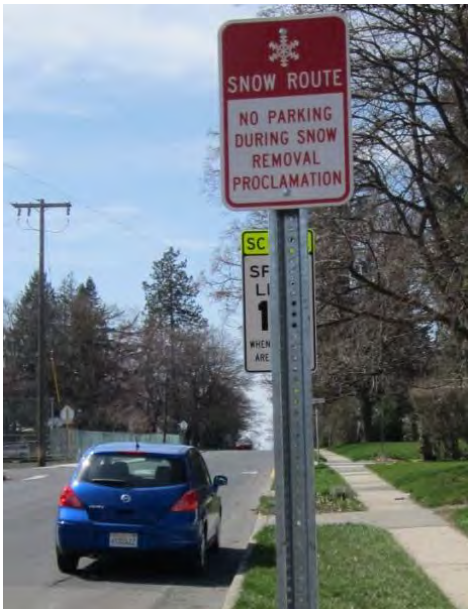
Streets with lower functional classifications, such as local streets, are intended to focus more on providing access to properties. These streets typically have lower posted speeds, one lane in each direction, and may have numerous intersections that require vehicles to stop.

Over time, changes within a community may require revision of the intended functional classification of a street. Land use changes and growth may require streets to serve a different mobility function. Likewise, updates to system connectivity, such as a road being extended, may allow for a street to serve a new mobility role. Finally, geographic limitations such as terrain and waterways like Paradise Creek may limit the ability to provide a well-connected network of streets. Increased travel distance can result for all travel modes due to disconnected segments of the street network, such as between Mountain View Road and Thatuna Street, Daves Avenue near Mountain View Road, and Third Street just east of Mountain View Road. Likewise, critical services like emergency response, sanitation, and snow removal are negatively impacted by disconnected street patterns by adding operating cost and response time.

The City of Moscow's Transportation Commission, an appointed volunteer body, played a key role in developing the City's current street classification system.

Figure 9 Functional Classification of Moscow Streets

Classification	Characteristics	Examples(s)
National Highways	Regional travel, high volumes, high speed, limited access; should include sidewalk, bike, and transit facilities	US 95, Jackson St
Principal Arterials	Regional travel, high volumes, moderate to high speed, limited access; should include sidewalk, bike, and transit facilities	SH 8
Minor Arterials	Typically fed by collectors with limited local street access; should include sidewalk, bike, and transit facilities	Mountain View Rd, D St
Collectors	Distribute traffic from local streets to arterials with low to moderate speed; should include sidewalk, bike, and transit facilities	Sixth St, A St
Local Streets	Low volume, low speed, high access; should include sidewalk facilities	Adams St, Jefferson St



Winter weather in Moscow can include snow, which directly (or through maintenance) can affect parking, degrade street markings, and add debris to bicycle lanes.

Image from DKS Associates

How does Moscow's street network perform?

There are several significant environmental factors that help to shape the local street network: terrain, regional connectivity, and the types of regular users (i.e., university population, freight haulers, etc). There are a number of sources available for measuring the use of the transportation network. Idaho Transportation Department (ITD) maintains permanent data collection stations at the four major gateways to the city. These automatic traffic recorders (ATR) collect daily traffic volumes on all days of the year.

Within the city, Moscow has been collecting traffic data at various locations since the late 1960s. Count locations are somewhat fixed, with traffic volumes typically collected over a two to seven day period. Individual traffic counts at select intersections are periodically collected for various traffic studies. In addition to the City's regular counts, morning and evening peak period traffic counts were collected at 18 intersections within the city during April 2012. High AM peak counts were observed at Third/Jackson and SH 8/Farm, representing the large contingent of residents working in Pullman. PM peak counts were highest at the same locations, but also include SH 8/US 95 and SH 8/Line indicating ingress from Pullman and egress back to Lewiston.

The City of Moscow has a database of annual traffic counts at various locations around the community that have been collected annually since the late 1960's.

Sources: City of Moscow

Based on data collected at ATR stations located at the four gateways to Moscow, the "low" traffic months (typically December or January) have traffic volumes that are generally 20% below the yearly average. Traffic volumes during the "high" traffic months (typically around August) are generally 10% higher than the yearly average.

Figure 10 Average Daily Traffic at Primary Gateways to Moscow (2011)

Location	Average Daily Traffic (ADT)
SH 8 (West)	14,900
US 95 (South)	6,300
US 95 (North)	6,200
SH 8 (East)	4,800

Average daily traffic (ADT) at three of the city's major gateways ranges from approximately 5,000 to 6,000 vehicles per day. However, the western gateway has significantly higher traffic – approximately 15,000 vehicles per day.

Source: ITD/DKS Associates

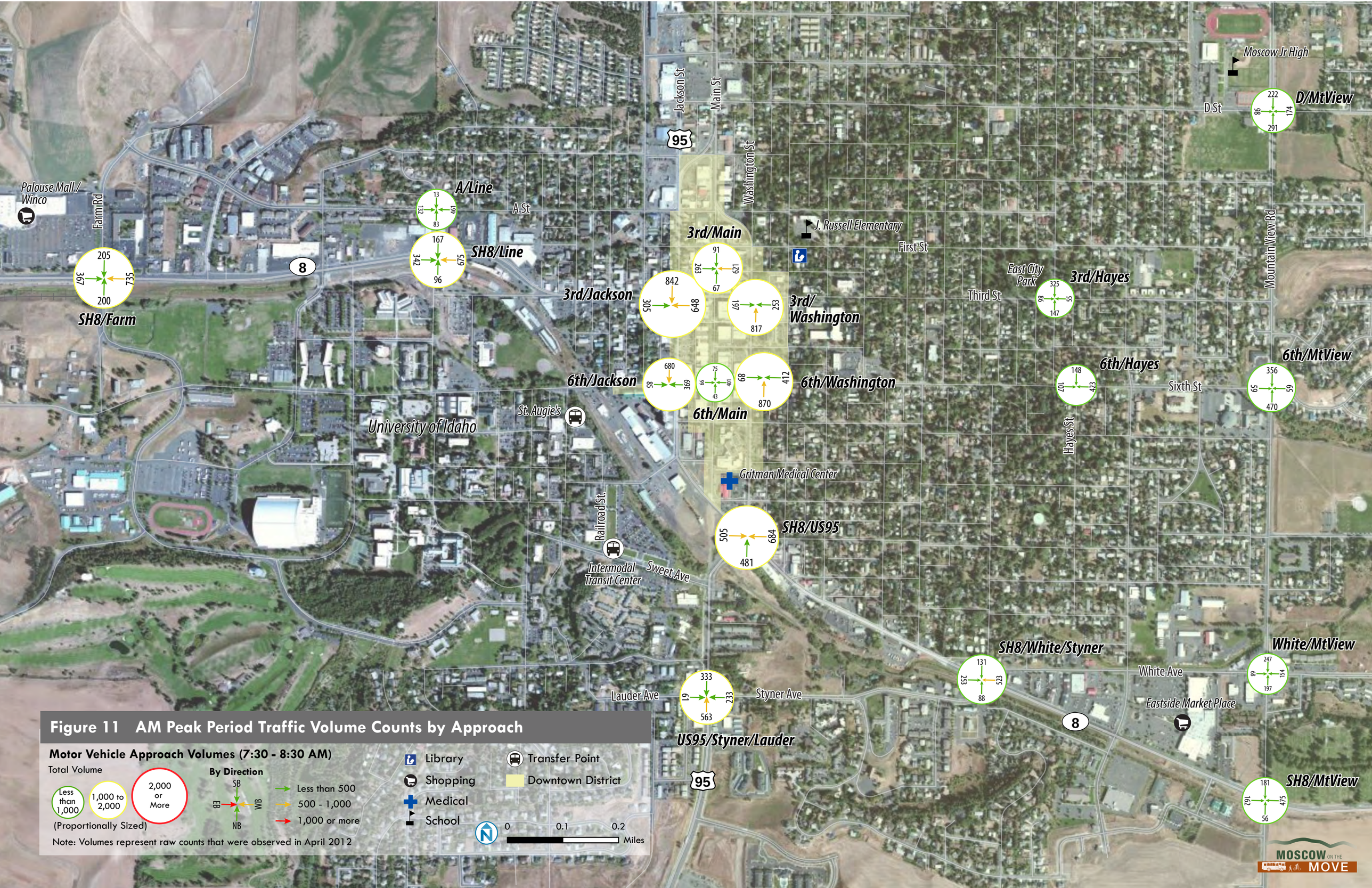


Figure 11 AM Peak Period Traffic Volume Counts by Approach

Motor Vehicle Approach Volumes (7:30 - 8:30 AM)

Total Volume

Less than 1,000 | 1,000 to 2,000 | 2,000 or More

(Proportionally Sized)

By Direction

SB, EB, WB, NB

Less than 500

500 - 1,000

1,000 or more

Note: Volumes represent raw counts that were observed in April 2012

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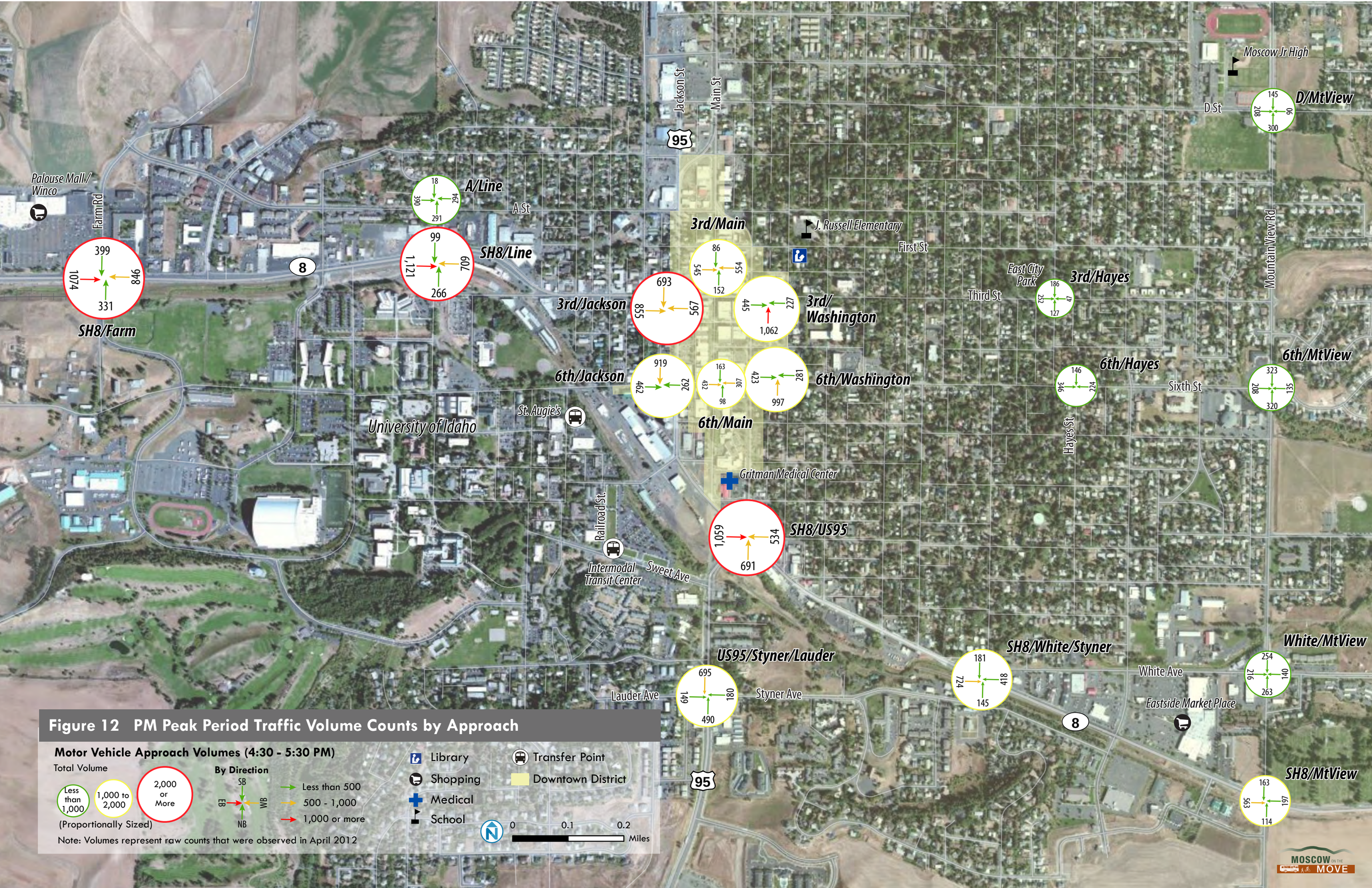

Figure 12 PM Peak Period Traffic Volume Counts by Approach

Motor Vehicle Approach Volumes (4:30 - 5:30 PM)

Total Volume

Less than 1,000 | 1,000 to 2,000 | 2,000 or More

(Proportionally Sized)

By Direction

SB, EB, WB, NB

Less than 500

500 - 1,000

1,000 or more

Note: Volumes represent raw counts that were observed in April 2012

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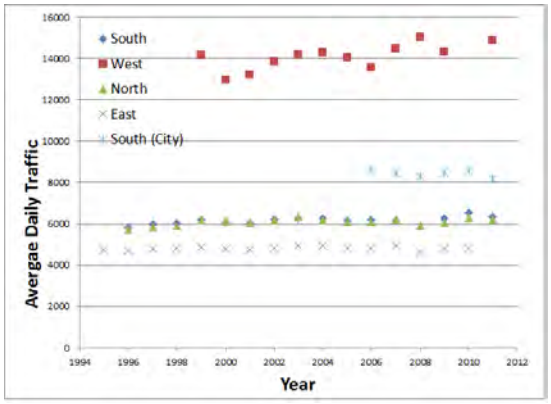
Data collected from the ATR stations also suggest that historic traffic growth over the last 15 years has remained relatively flat. The only gateway that has experienced significant traffic growth is the western portal to Washington, which has experienced a 5% increase in total daily trips from 1999 to 2011.



Traffic volumes collected at the gateways to Moscow have remained relatively stable over the last decade. Only the western gateway connecting the city to Washington has seen much fluctuation.

Sources: ITD/ DKS Associates

How is traffic capacity and intersection performance measured? Are there alternatives?

Vehicle/capacity (v/c) ratio and intersection level of service (LOS) are indicators of the speed, convenience, and quality of motor vehicle travel on a road. For vehicular traffic on arterial streets, the v/c ratio measures the number of vehicles projected to use a road in a particular period divided by its capacity of that same period. A v/c ratio close to 0.0 represents free-flowing traffic while a ratio exceeding 1.0 means that the flow of vehicles exceeds capacity. Level of service measures the average delay per vehicle at an intersection, ranging from A (representing almost no delay) to F (representing significant delay).

It should be noted that v/c ratios of 1.0 or higher do not represent system failure. Many cities consider peak hour v/c ratios well over 1.0 as acceptable, understanding that a strong local economy will result in peak hour stress on the transportation system. Allowing some level of peak hour congestion encourages travelers to consider other travel modes, including transit and bicycling which are attractive options for travel within Moscow given its small geographic size. Shifting passengers to other modes makes effective use of existing infrastructure and can be much more cost effective than expensive roadway capacity expansion projects designed to mitigate conditions that only occur during one or two hours of the day. Traditionally, public works departments have viewed capital project solutions as more essential than cost-saving measures. However, given recent cost escalations for roadway construction and tight municipal budgets, there has been a renewed interest in least cost planning and life cycle costing as methods to evaluate true costs of capital development in relation to management solutions.

NOTE: AM/PM intersection capacity analysis and V/C analysis to be completed pending ITD data acquisition and analysis and travel demand model development.

Traffic queues of 20 vehicles in a single lane heading eastbound on US 95 at SH 8 are a daily occurrence during the evening peak.

Image from DKS Associates

How many people can a lane move?

Different streets can accommodate varying levels of traffic appropriate for their respective roadway classification. This is largely due to the need to move traffic on cross-streets through at-grade intersections and the natural tendency for vehicles to limit travel speed on narrower streets. For example, a free-flowing highway lane (e.g., US 95 north of downtown Moscow) can move around 2,000 vehicles per hour, while a lane on an arterial street (Mountain View Road) can move only about 600-700 vehicles per hour. A dense network of many narrower streets, however, can move far more vehicles than a single, limited-access freeway. Where a highway like SH 8 and US 95 interrupt the local street grid, the result can be a net loss of capacity. This is particularly true for streets that meet US 95 and SH 8 at unsignalized intersections. The primary benefit of highways is not capacity but speed – they are particularly useful for moving people long distances quickly. This can be in direct conflict with key local objectives related to safety, reduced trip lengths, and access to local businesses.

The street system must ultimately balance the need to move travelers through Moscow on the regional highway network and the need for an effective local circulation system that gets travelers of all modes safely and efficiently to destinations in the community.

Is traffic delay bad?

Key determinants of automobile traffic are synonymous with the conditions in economically thriving communities. Employees must travel to work, the goods and services they produce and consume require delivery, and travel for recreation and shopping must occur to ensure a community is active. In fact, all successful cities have traffic congestion. The most successful cities simply locate their inevitable congestion in places where it has the least impact on local economic development, quality of life and other goals. Or in some cases, they encourage some level of congestion in business districts where slow moving traffic promotes business visibility and improves pedestrian safety and comfort.

While Moscow does not sustain prolonged periods of traffic queuing outside of the evening and morning peak travel periods, the City should consider future traffic increases as an indicator of economic health.

Although some motorists make the rational decision to take a different route or change their trip pattern altogether, others make a choice to sit in congestion rather than avoid the trip or use another travel mode. It is important for Moscow's decision-makers and residents to understand that, despite efforts to increase roadway capacity, no city has ever "solved" their traffic problem. A more cost effective, long-term solution to addressing traffic is to implement a range of transportation demand management (TDM) measures that incentivize and extend opportunities to use alternative transportation (i.e. walking, bicycling, transit, ridesharing, or even altering trip patterns altogether). More information on TDM can be found in the *Transportation Demand Management* best practices section in Chapter 5.

One-way streets and cul-de-sacs: What are the tradeoffs?

Several one-way streets can be found in downtown Moscow including the US 95 highway couplet (northbound Washington Street and southbound Jackson Street) and narrower local streets such as Asbury Street and Almon Street. Excluding the local street examples, one-way streets can increase traffic flow in downtown. A negative impact

of expanded traffic flow is faster vehicle speeds, which often leads to an uncomfortable pedestrian environment, more difficult crossings for all travel modes at unsignalized intersections, and decreased vitality of local retail establishments.

There are numerous cul-de-sac streets in Moscow's residential neighborhoods. This includes street ends in the areas east of Mountain View Road, in northwest Moscow, and streets with moderate density student housing. Other than the areas with student housing, these neighborhoods correspond with lower levels of households without cars, which may correlate with longer travel distances that limit the attractiveness of walking and bicycling to destinations. Cul-de-sacs are designed to prevent through traffic from adversely impacting residential neighborhoods, but can also disrupt the street grid and connectivity if it is not developed due to topographic constraints. In addition to reduced motor vehicle connectivity, it is more difficult for pedestrians and bicyclists to travel between adjacent neighborhoods and takes longer for transit riders to reach bus stops. This type of street design and development pattern can cause higher reliance on motor vehicles if not connected with bicycle and walking pathways.

One-way traffic on US 95 in Moscow.
Image from DKS Associates

How safe are Moscow's streets?

According to ITD collision data reporting, shown in Figure 13, 753 collisions were reported in Moscow between 2007 and 2011. That said, collisions in nearly every category decreased during this time. However, 2011 saw the first traffic-related fatality in five years. Collisions occurred in a variety of weather conditions, but only 13% occurred in snowy or rainy conditions. In addition, road surface conditions were primarily dry (a factor in 67% of collisions versus the 18% occurring in icy or snow covered road conditions), and three quarters of all collisions (77%) occurred during the day. Factors contributing to collisions included high travel speeds, failure to yield, limited sight distances or obstructed visibility, and failure to obey traffic control devices such as red lights and stop signs.

Figure 14 displays all collisions between 2007 and 2011 geographically, highlighting collisions involving bicycles and pedestrians. Collisions mostly occurred at intersections in downtown and along the western portions of SH 8. A relatively high number of bicycle and pedestrian collisions occurred along SH 8 at Peterson Drive. It should be noted that a large number of non-motorized collisions at SH-8 and Stadium Drive occurred prior to the Stadium Drive/SH-8 connection project being constructed. With no traffic signal at the then Petersen/SH-8 intersection, many users chose to cross the highway regardless of the 5-lane barrier. Also of note, the clustering of bicycle and pedestrian collisions in areas with higher levels of cycling and walking—most notably downtown, along Sixth Street,and crossing SH 8 to the University. Please note that this analysis could not account for user exposure due to a lack of data.

The rolling terrain of the Palouse can provide challenges to street design, connectivity, and sight distance at intersections.

Image from DKS Associates

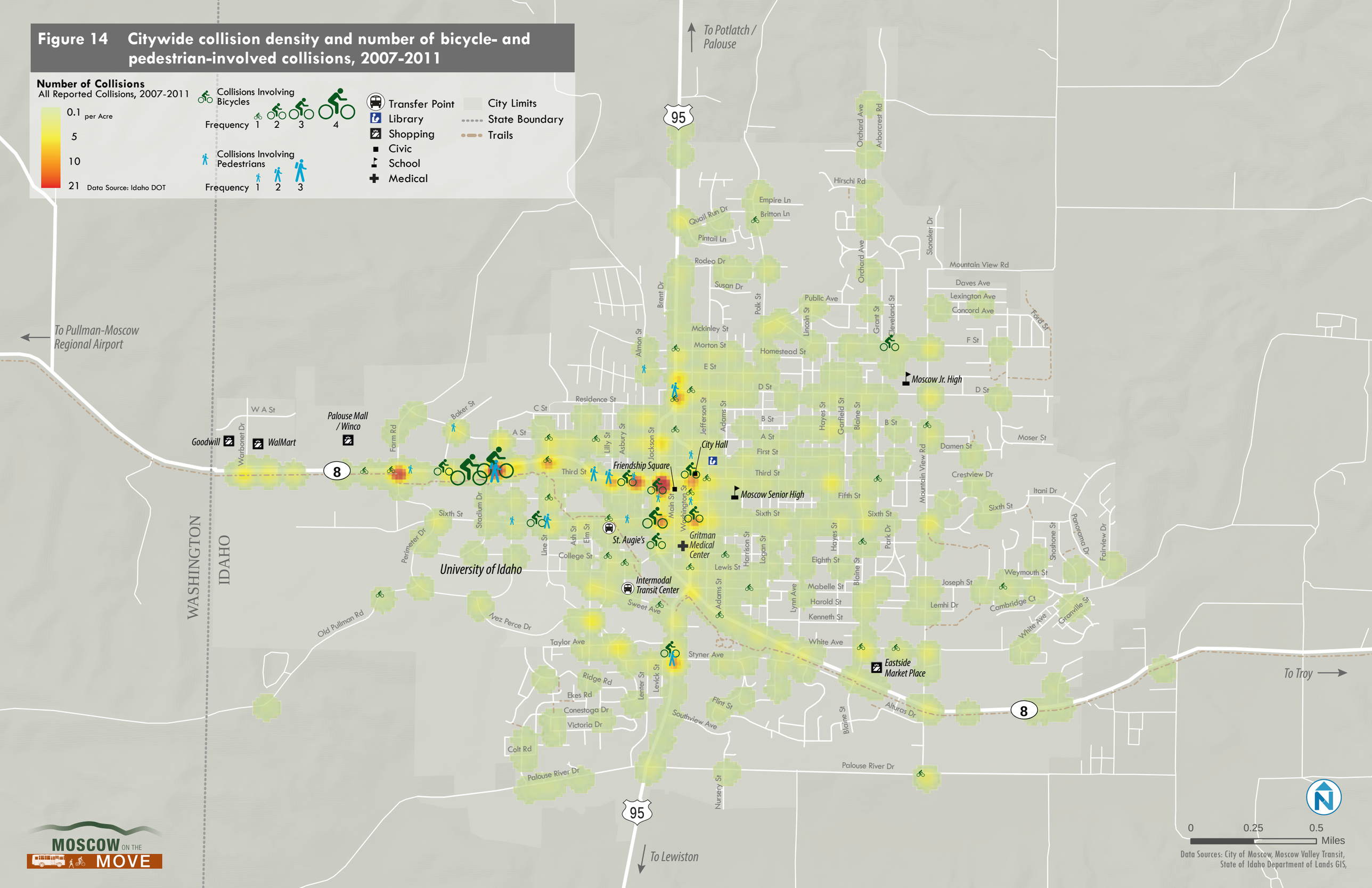
Figure 13 Severity of Reported Collisions in Moscow, 2007-2011

Year	Property damage only	Injury C (minor)	Injury B (moderate)	Injury A (severe)	Fatal	Total
2007	108	33	15	7	0	163
2008	112	30	16	2	0	160
2009	118	22	17	8	0	165
2010	94	25	10	3	0	132
2011	78	18	31	5	1	133
Total	**510**	**128**	**89**	**25**	**1**	**753**

Source: Idaho Transportation Department State Crash Database/DKS Associates

Note: The source for collision information is the Idaho Transportation Department State Crash Database. The database consists of collision reports completed by all law enforcement agencies in Idaho. All law enforcement agencies use a standard collision report, as designated in Idaho Code 49-1307. The resulting numbers are conservative since the database consists of only collision investigated by law enforcement officers.

Figure 14 Citywide collision density and number of bicycle- and pedestrian-involved collisions, 2007-2011



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How does goods movement impact Moscow's streets?

Both US 95 and SH 8 have high freight weight/size limits within Idaho (only rated lower than the Federal Interstate system), which contributes to freight use along both corridors. US 95 connects south through Lewiston to I-84 and Boise, and to the north through Coeur d'Alene to I-90 and Canada. SH 8 connects through Pullman (via SR 270) to SR 195 to the west, and through Troy to Elk River to the east.

The majority of Idaho freight travels through Interstate 84, which connects to Moscow via US 95.

Source: U.S. Department of Transportation, FHWA (Major Flows by Truck To, From, and Within Idaho: 2007)

Heavy vehicles (including delivery trucks, larger freight, and buses) generally compose between 2-5% of intersection vehicle traffic during the AM peak hour and 2% or less during the PM peak hour. School bus routes contribute to the higher heavy vehicle share at several intersections during the AM peak, particularly those located on the east side of Moscow. However, the intersections with the highest share of heavy vehicle traffic are typically those located along US 95 or SH 8. Most of the intersections counted on these facilities accommodate approximately 20-60 heavy vehicles during the AM peak hour and 10-40 during the PM peak hour.

In addition to regional freight, local freight delivery is an important component of the transportation system. Loading zones exist in place of public on-street parking along some City streets. In addition, several north-south alleys flank Main Street between A Street and 7th Street, providing alternative access for local deliveries.

Marked loading zones are provided for local deliveries in downtown Moscow.

Image from DKS Associates

TRANSIT

An overview of all transit services in Moscow is presented in this section. Moscow Valley Transit is a non-profit corporation that provides fixed route and complementary ADA paratransit service within Moscow's city limits. Fixed route transit service in Moscow is provided at no fare, while the Dial-A-Ride service is $1.50 per one-way trip. Riders that qualify for ADA paratransit service are not charged a fare.

Although various transit markets are not adequately served, transit service in Moscow provides extensive geographic coverage throughout the community—relative to similarly sized communities—and seeks to serve most major destinations in the city. The design of the current fixed route system responds to the mix of a grid network in the inner neighborhoods and dispersed pockets of other activity centers outside of the downtown and university areas.

What local and regional services exist today?

Moscow Valley Transit provides three types of transit service: fixed route, Dial-A-Ride service which includes Medicaid transportation, and complementary ADA paratransit service (see later section for a more detailed description of this service). Moscow Valley Transit's fixed route service provided 148,000 rides in 2010. Service operates roughly every 30 minutes from 6:40 am to 6:00 pm on weekdays only. Dial-A-Ride service operates during the same days and times as fixed route. DAR provided fewer than 10,000 rides in 2010.

General service characteristics for the fixed route and Dial-A-Ride services are summarized below in Figure 15.

Fixed route

Moscow Valley Transit's fixed route service includes two routes; the West Route and the East Route. Both routes operate as one-way clockwise loops every 30 minutes from 6:40 am until 6:00 pm during weekdays only. This service is provided free of charge, serving as an affordable mobility option particularly for the city's low income and student populations..

Both fixed routes begin and end each run at St. Augustine's providing easy access to the University's Student Union Building.

Image from Nelson\Nygaard

Figure 15 Moscow Valley Transit Service Overview

Type of Service	No. Routes	Total Vehicles/ Max. in Service	Weekday Service Hours	Service Frequency	Standard Fare	Annual Unlinked Trips*
Fixed route	2	5 / 2	6:40 AM – 6:00 PM	30 minutes	None	147,836
Dial-A-Ride	N/A	3 / 2	6:40 AM – 6:00 PM	Demand Response	$1.50	9,786

Source: Moscow Valley Transit

**Note: Unlinked passenger trips refered to the number of passengers who board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination.*

Major destinations along the West Route include the University of Idaho campus including dorms, Walmart, QuickCare, Palouse Mall, A Street, Robinson's Trailer Park, Rosauers, downtown, and the Gritman Medical Center.

The East Route provides access to campus, downtown, Rosauers, Moscow High School, East City Park, Moscow Jr. High, Mountain View Road, Latah County Fairgrounds, and the Eastside Marketplace.

Transit service was expanded as of February 2012 to include access to Walmart and QuickCARE medical facilities and added service along D Street between Main and Hayes. On the second run of the hour (e.g., XX:40), the West Route serves Walmart and bypasses Rosauers by traveling through to Main on A Street. The East Route makes limited runs that bypass the more direct Third Street/Hayes Street route connection in order to provide service to Rosauers and Disability Action Cention. To achieve this, the East Route is routed north on Main then uses A Street to Almon to E Street. The East Route re-enters southbound Main and turns off onto D Street traveling east and reconnecting with its normal routing at the intersection of Hayes Street and D Street.

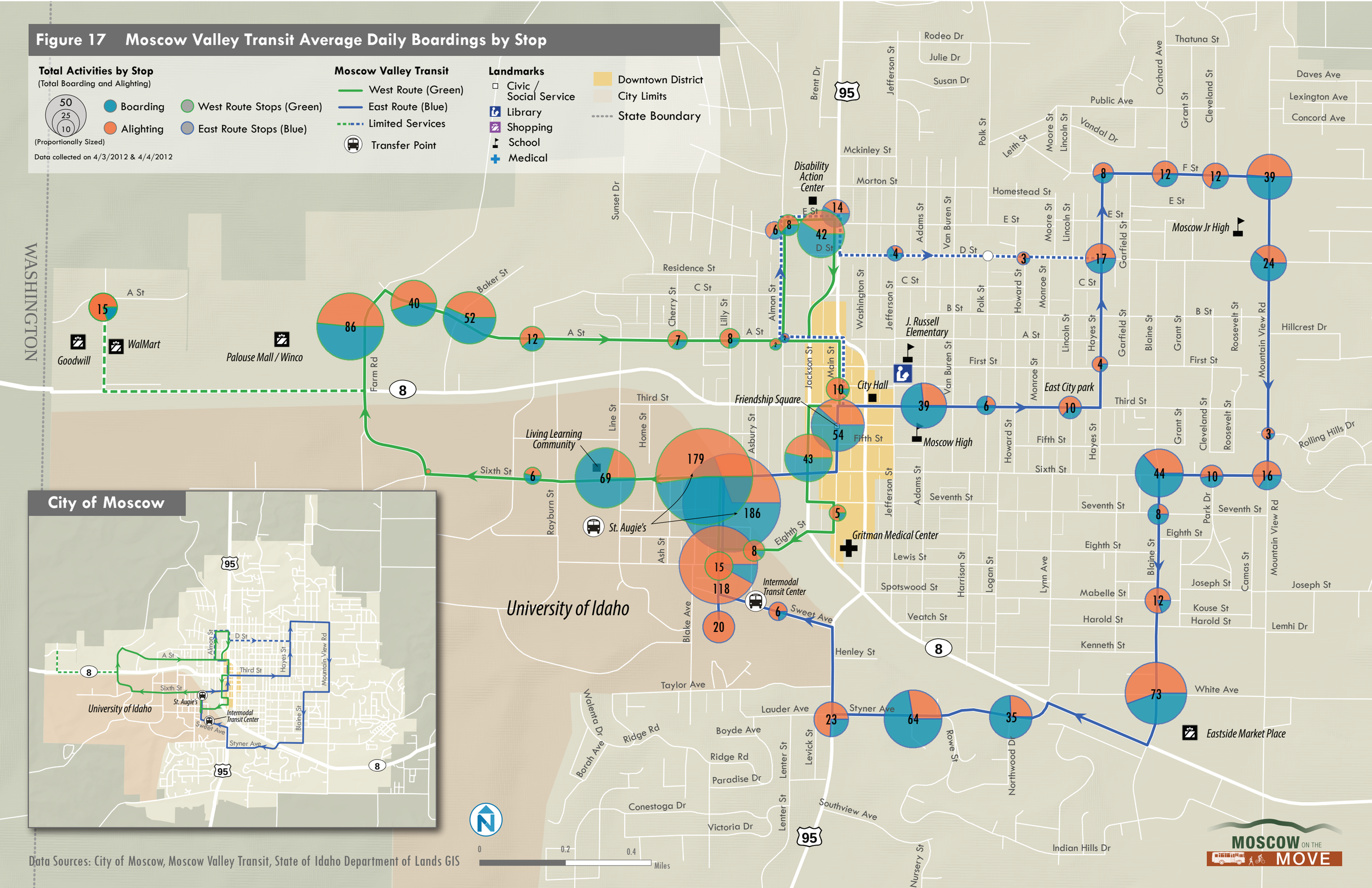
Where does Moscow Valley Transit take its passengers?

Moscow Valley Transit recently conducted a two-day ridecheck, or survey, of boarding and alighting activity by stop. Summarized in Figure 17, the ridecheck found that the system's highest boarding activity occurs at St. Augustine's—the system's hub—for both East and West routes. Friendship Square (East route), Eastside Marketplace (East route), and medium density University apartment housing along A Street (West route) and Styner Avenue (East route) were also high activity stops.

Figure 16 Moscow Fixed Route Summary

Route Name	Frequency	Service Days	Key Destinations Served								
			University of Idaho	Wal-Mart	QuickCare	Palouse Mall	Rosauers	Downtown	Gritman Medical Center	Moscow High School	Eastside Marketplace
West	30	Mon – Fri	X	X	X	X	X	X	X		
East	30	Mon – Fri	X				X	X		X	X

Figure 17 Moscow Valley Transit Average Daily Boardings by Stop



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In addition, the East Route had a higher maximum on-board load (30 passengers) than the West route and the most productive run during the survey (48 average boardings on the 3:10 PM run). High school boarding activity likely contributes to this difference. With 357 boardings on Tuesday and 383 boardings on Wednesday, total average ridership does not vary significantly by survey day. Conversely, average daily ridership by route varies by day with 438 boardings on the East route and 302 boardings on the West route.

Who uses Moscow Valley Transit?

Based on the 2012 on-board passenger survey, approximately 45% of riders are between the ages of 18 and 24, which is not surprising given the high number of students who use the service. Another 48% of riders are between 25 and 64 and just 7% of transit riders are younger than 18 or older than 65.

Half of the survey respondents had incomes of less than $15,000, indicating a strong need for transit among lower income people and students. Another 20% of respondents had incomes of $15,000 to less than $35,000. Half of respondents are students, either at the University of Idaho or other schools.

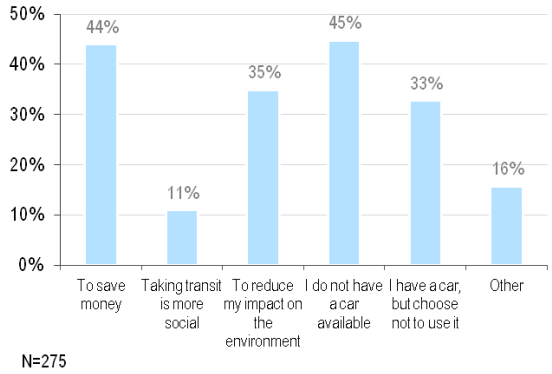
Almost half of survey respondents ride transit 5 days per week, while 40% of respondents said they ride transit 2 to 4 days per week. Forty percent of respondents said they have been using transit less than one year, and a quarter of respondents have been using transit for one to two years.

Almost all (95%) transit users get to the bus stop and to their final destination by walking.

People ride transit for many reasons. Figure 18 shows some of the reasons why MVT passengers use transit. The two strongest reasons why people use transit are "To save money" and lack of access to a car, both of which were selected by nearly half (44-45%) of riders. A third of passengers ride transit to reduce their impact on the environment and because they choose not to use their car.

All of these responses indicate that many riders very regularly use the service and depend on transit as their primary means of transportation. It is also clear that many riders choose to use transit because they do not own a car or they want to save money. There are also large numbers of new riders using the system (both due to people switching modes or new University students moving to Moscow), which points to the need to keep marketing information current and readily available throughout the community.

Figure 18 Reasons MVT Passengers Ride Transit



Source: 2012 On-board Passenger Survey.

Note: Percentages do not add up to 100% because survey respondents could choose more than one reason for taking transit

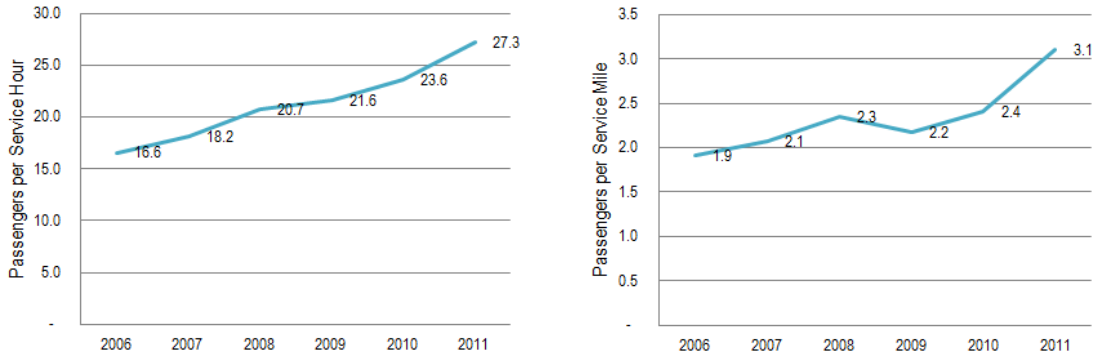
How is Moscow Valley Transit performing?

Transit performance trends are often analyzed to determine the productivity or efficiency a transit system over time. Transit systems that are underperforming in productivity (i.e. stop, route, or systemwide ridership) or service efficiency (i.e. passengers per mile or hour) often signal to a transit agency that adjustments to the route structure, among a range of other

factors, is needed. The productivity of Moscow Valley Transit's routes, detailed in Figure 19, increased 63% between 2006 and 2011, growing from just under 2 passengers per service mile in 2006 to over 3 passengers per service mile in 2011. The largest increase occurred between 2010 and 2011. Passengers per service hour increased 64% since 2006, with 27 passengers per hour in 2011. Total ridership on Moscow Valley Transit, including fixed route and Dial-A-Ride services, increased nearly 115% between 2006 and 2011.

Five-year ridership trends are highlighted in Figure 20 below. Ridership gains were sharpest between 2007 and 2008 and again from 2009 to 2010 where ridership increased over 25%. The increase is almost exclusively due to fixed route ridership gains, which saw large increases every year, while Dial-A-Ride ridership declined each year between 2006 and 2009. Flat or declining ridership on Dial-A-Ride is not necessarily a negative sign as long as people's needs are being met. However, by 2010 this trend began to reverse. Ridership on Dial-A-Ride rose by 28% in 2010 and by 3% in 2011.

Figure 19 Passengers per Service Hour and Service Mile, Fixed Route, 2006-2011



Moscow's passengers per hour (pph) performance in 2011 compared favorably to other university towns like Missoula, MT (17.5 pph), Corvallis, OR (26.0 pph), and Bellingham, WA (36.2 pph).

Source: Moscow Valley Transit

Figure 20 Moscow Valley Fixed Route and Dial-A-Ride Transit Ridership, 2006-2011

Service	2006	2007	2008	2009	2010	2011	'06-'07 Percent Change	'07-'08 Percent Change	'08-'09 Percent Change	'09-'10 Percent Change	'10-'11 Percent Change	'06-'11 Percent Change
Overall	82,286	89,363	112,359	125,843	157,622	175,958	8.6%	25.7%	12.0%	25.3%	11.6%	113.8%
Fixed Service	72,090	80,305	104,635	118,184	147,836	165,848	11.4%	30.3%	12.9%	25.1%	12.2%	130.1%
Dial-A-Ride	10,196	9,058	7,724	7,659	9,786	10,110	-11.2%	-14.7%	-0.8%	27.8%	3.3%	-0.8%

Source: Moscow Valley Transit

How do MVT passengers rate the current service and what would they prefer to improve?

The recent on-board transit passenger survey found overwhelming praise for the system and pleas to continue and expand upon current levels of service. The vast majority of MVT passengers (94%) rate overall bus service as very good or good. Other areas that were rated very well include driver courtesy, safety at bus stops, and early enough service. According to survey respondents, areas that could improve include:

- On-time performance and reliability
- Directness of route
- Availability of information at bus stops
- Bus stop sign visibility
- Crowding on buses
- Consistent bus stop announcements from drivers

The item that was the most poorly rated was the duration of service during the day. Nearly one third of MVT passengers would like service to run later. Over 30% of passengers would like service to run until 7:00pm, and another 25% requested service until 8:00pm. Eighty-five percent of passengers say they would be satisfied with service that runs until 10:00pm. Website information also has room for improvement, with 13% of survey respondents reporting this as below average or poor.

Saturday service and later evening service were the changes to MVT service that most people felt would get them to ride transit more often, with 59% and 55% of passengers requesting these changes respectively. One third of passengers say they would ride more often if Sunday service were available and 26% would like more frequent bus service. When asked to choose the one most important change, 37% identified later evening service as the most important improvement and 28% chose Saturday service. About 16% of passengers would ride more often if an additional route within Moscow was provided. This may relate to that lack of transit access to underserved neighborhoods like Polk to the north and social and senior service centers.

By far, the most commonly cited additional location people would like Moscow Valley Transit to serve was Pullman.

Demand response and other specialized transit services

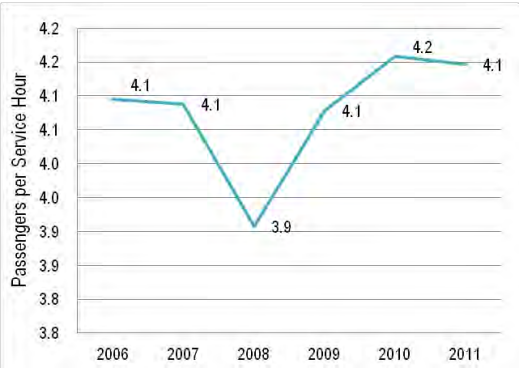
Community transit includes the family of transportation services in a community, including public and private sources, which are available to respond to the mobility needs of all community members.

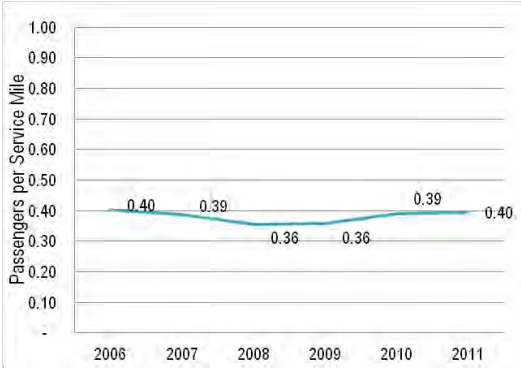
Paratransit service involves types of passenger transportation that are more flexible than conventional fixed-route transit but more structured than the use of private automobiles. Paratransit service most often refers to wheelchair-accessible, demand-response van service.

The Americans with Disabilities Act (ADA) requires transit operators that provide fixed route service to also provide comparable service to passengers with disabilities who are unable to use the fixed route service.

Moscow Valley Transit's Dial-A-Ride /paratransit service runs during the same days and times as the Moscow Valley Transit fixed route service: 6:40am to 6:00pm on weekdays. The fare for Dial-A-Ride is $1.50 per boarding and service requires at least one day advance notice. Office hours to schedule a ride are 8:00am to 5:00pm. ADA qualified riders can schedule a ride for Monday by calling and leaving a message over the weekend. The service is provided to ADA qualified riders, and no fare is charged to ADA Priority Paratransit eligible riders.

Figure 21 Passengers per Service Hour and Service Mile, Dial-A-Ride, 2006-2011





Source: Moscow Valley Transit

How is Dial-A-Ride service performing?

After experiencing a decrease in productivity in terms of passengers per service hours and service miles between 2006 to 2008 (as shown in Figure 21), Dial-A-Ride service has increased to 4.1 trips per hour and 0.4 passengers per mile in 2011. The productivity of MVT's Dial-A-Ride service is very respectable for a demand responsive service.

Community and human service transportation in Moscow

Transportation provided by human or social service agencies is usually limited to a specific trip purpose (e.g., medical trips) or client group (e.g. developmentally disabled or mobility impaired populations). However, mobility options provided by social service agencies may be contracted by one provider to arrange *shared trips* with *multiple* human service agencies. This "coordination" of services not only expands transportation options for populations with special mobility needs, but it also creates efficiencies with limited resources.

Disability Action Center Northwest (DAC) is a nonprofit in Moscow that promotes independence for people with disabilities. The DAC provides information and referrals for transportation options to people with disabilities. Another prime example of human service transportation is Gritman Medical Center's complimentary door-to-door transportation for patients so they can access the many services provided by the medical center.

Vandal Access Shuttle

The Vandal Access Shuttle provides complimentary student and faculty circulation on the University of Idaho campus. While anyone can ride the Vandal Access Shuttle, priority is given to individuals with disabilities. The Shuttle operates on a deviated fixed route on weekdays from 7:30 AM – 5:30 PM while school is in session, excluding school breaks. During summer months, the Shuttle runs on a modified route during weekdays from 7:00 AM – 11:30 AM and 3:00 PM – 5:00 PM. Vandal Access also includes a dial-a-ride service during the same operating hours and days providing access to any location on campus.

Vandal Access Shuttle is operated by Parking and Transportation Services and is funded by ASUI fees, several University of Idaho departments, ITD, and an individual donor.

Regional transit connections

Since the discontinuation of the Moscow-Pullman Wheatland Express, a now discontinued fixed route sevice between Moscow and Pullman, there is no regional public transit service available to Moscow. There are options for intercity and regional travel through private operators, like Northwestern Trailways, which connects Moscow to Spokane, Coeur d'Alene, Lewiston, and Boise. According to the passenger survey, service to Pullman is a critical need.

Northwest Trailways, a private regional transportation operator, picks up and drops off passengers at the corner of Jackson and Sixth Street. Northwest Trailways boardings will occur at the Intermodal Tranfer Center--once constructed.
Image from Nelson\Nygaard

How is Moscow Valley Transit funded?

Moscow Valley Transit's funding picture changes on an annual basis. In FY 2011/12, Moscow Valley Transit was funded through a public-private partnership between:

- Federal Transit Administration (FTA) 5311 Rural Area Program (allocated by ITD's Public Transportation Advisory Committee): $390,000
- City of Moscow: $100,000
- Associated Students of the University of Idaho (ASUI): $48,000
- New Saint Andrews College: $1,400
- Medicaid funds (for Dial-A-Ride service only): $17,000
- Walmart Foundation community grant for transit capital purchases (used for vehicle procurement): $87,500
- Dial-A-Ride fares: $2,000

For the FY2012/13 budget year, Moscow Valley Transit was awarded $392,000 in FTA 5311 Rural Area funds, and may receive $46,000 from ITD's Public Transportation Advisory Committee to continue and expand existing service in Moscow, including operating funds and funds for paratransit scheduling software. This would be supplemented with funding from New Saint Andrews College and Medicaid at current funding levels and a potential increase in funding from the University of Idaho and the City of Moscow.

Every year, Moscow Valley Transit draws from reserve funds in lieu of fares to make up the remaining difference created by operating expenses. This practice will continue until sustainable funding solutions are found.

As made evident by the fluctuating types and amounts of funding available to MVT (e.g. the one-time Walmart Foundation community grant), funding for transit services in Moscow is volatile and not sustainable—especially if fixed route service is to remain free of charge. Due to various cost and revenue pressures—such as rising labor and fuel costs, mounting calls for increased service levels, and the uncertainty and fluctuation of federal funding—a fare system may need to be introduced, an alternative funding source, or other cost saving approaches will need to be identified to meet the need for high quality transit in Moscow.

What is the "Transit Experience" in Moscow?

The usability of Moscow's transit system is explored in the sections below. The transit user's experience is measured in terms of the quality of bus facilities, shelters, and passenger information as well as the system's ability to support multimodal travel.

Access to transit

Transit access should be a comfortable experience for passengers and those considering riding transit. In many areas outside of downtown Moscow and the University, streets lack sidewalks and visible crosswalk facilities. This can create uncomfortable conditions for transit passengers seeking to access their bus stop or final destination. It is also a deterrent for some transit markets, including elderly users and persons with disabilities. In addition, during winter months when the sun sets earlier, some passengers may not feel comfortable returning home from the bus due to the lack of lighting in some neighborhoods. This is more likely on local neighborhood streets or in areas immediately surrounding downtown Moscow.

Stop amenities

Transit stop amenities vary greatly throughout the system. As shown in Figure Figure 22, some stops have enhanced amenities like a bus stop shelter with a bench, bicycle parking, route information, and a trash bin.

But, many stops are lacking basic passenger amenities. All stops have at least a sign, but less than half supply a bench. Route and schedule information is not available at most bus stops, which is important for riders who need to navigate the system. About 7% of survey respondents reported information at bus stops as below average or poor. Bus stops can be difficult to find due to poor bus sign visibility. *Moscow on the Move* will address stop amenities in the Transit Strategy development phase.

Although many stops lack passenger information or basic amenities (left), newly enhanced stops (right) at thirteen locations offer spacious shelters, benches and other passenger amenities.
Image from Nelson\Nygaard

Figure 22 Enhanced Stop Amenity Inventory

Stop Location	Amenities					
	Bench	Shelter	Trash receptacle	Bike parking	Solar powered lighting	Rail enclosure
SE corner of Sixth and Deakin at St. Augustine's Catholic Church	⦿	⦿	⦿			
Sixth Street at Wallace Complex, University of Idaho campus[i]	⦿	⦿	⦿	⦿		
Main and Eighth Street at Gritman Medical Center	⦿	⦿	⦿		⦿	
SW corner of Hwy 95 and E Street at Rosauers	⦿	⦿	⦿	⦿		
SW corner of Mountain View Rd and F Street	⦿	⦿	⦿			
Friendship Square, Downtown[iv]	⦿	⦿	⦿	⦿		
SW corner of Blaine Street and White Avenue[ii]	⦿	⦿	⦿	⦿	⦿	
Farm Road at north entrance to University Inn Plus Best Western	⦿	⦿	⦿		⦿	
SW corner of A Street and Baker Street	⦿	⦿	⦿			
NE corner of Sixth Street and Blaine Street	⦿	⦿	⦿	⦿	⦿	
Corner of Sixth Street and Line Street at LLC, University of Idaho campus	⦿	⦿	⦿			⦿
Third Street at Adams Street, in front of Moscow High School[iii]	⦿	⦿	⦿			
Styner Avenue at Hawthorne Drive[iv]	⦿	⦿	⦿	⦿	⦿	⦿

Source: Moscow Valley Transit

Notes: All enhanced stops listed above include paper system schedules posted on the shelter wall.

[i] Trash receptacle is University-owned

[ii] Only one bike parking rack with two spaces

[iii] Stop faces sidewalk due to space constraint and size of shelter footprint; no stop landing applied

[iv] Although not built as part of the bus shelter project, Friendship Square has trash receptacles and bike racks in close proxomity to the stop..

Customer Information

Customers can access information about Moscow Valley Transit's services online, in print, by asking drivers, or by calling an information hotline. Based on survey responses, about 13% of respondents say that online provision of information is either below average or poor.

On-board Experience

Most people feel that the buses are clean, with 89% of surveyed passengers rating cleanliness as good or very good. Similarly, driver courtesy was rated very high, with 97% of surveyed passengers rating this factor good or very good.

Although a new cutaway vehicle was recently procured,[1] passengers commented that the older vehicles are not very comfortable due to peak period crowding that creates cramped conditions. Passengers experience

[1] Cutaway vehicles are those in which a bus body is mounted on the chassis of a van or light-duty truck.

crowding on buses during the morning and evening peaks, and 30% of passengers rated seating capacity as "average." Most (79%) of survey respondents felt that drivers were good or very good at announcing bus stops, however 15% felt this aspect was only average.

Existing and planned facilities

St Augustine's across from the UI Student Union Building serves as the system hub where both the East Route and West Route connect. This acts as a transfer point between routes and serves as a layover location for buses. Moscow Valley Transit currently uses an open lot at the County fairgrounds for storage and maintenance.

An intermodal transit facility in Moscow is under construction to provide a centralized transit hub for Moscow. The facility would serve as an administrative and operational base for Moscow Valley Transit, University of Idaho's Parking and Transit Service Division, and ITD's District 2 Mobility Manager. The facility will also serve as a transfer location for multiple transit operators, including regional private operators like Northwest Trailways.

The location will be on the University of Idaho campus at Sweet Avenue and Railroad Street. The facility will include a park-and-ride lot, vanpool parking, and a depot for inter- and intra-state services. The facility will also provide facilities to improve integration with bicycles and other travel modes. The intermodal transit center has been funded by a $1.5 million federal TIGER II grant, 2009/2010 Community Transportation Association of Idaho transit improvement funds, and FY2011 FTA 5309 Bus And Bus Facilities for State of Good Repair grant for planning and construction. The FTA 5309 grant leverages existing funding by providing $511,360 to a local match of $127,840 for a total of $639,200.

Conceptual design of the proposed intermodal transit facility located on the University of Idaho campus. The facility will serve Moscow Valley Transit and a variety of other regional operators.
Image from City of Moscow

BICYCLING IN MOSCOW

The City of Moscow has all of the ingredients to become a great bicycling city. The entire city is characterized by bikeable distances (e.g., no point within the city limit is farther than 1¾ miles from downtown Moscow or the University of Idaho), and contains a well-used trail system and an active bicycle advocacy community. The City's aspiration to develop Complete Streets, to create a dense network of bikeways, and to expand awareness and education signal that Moscow is primed to advance cycling as a safe, fun, and convenient mode of transportation.

What are the elements of Moscow's existing bicycle network?

Moscow maintains a budding bicycle network. This network primarily runs east-west on off-street multi-use trails. A sparse network of on-street bike routes and dedicated bicycle lanes also provides limited north-south and east-west bicycle connectivity. Moscow's existing bicycle network is illustrated in Figure 23.

Bicycles come in different shapes and sizes. Bikeway design must reflect this reality.

Image from Geoff Crimmins, Moscow-Pullman Daily News

Figure 23
Existing Bicycle Network

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Trails

Three primary multi-use trails accommodate both local and regional bicycle and pedestrian use within Moscow. These trails connect end-to-end to one another providing a low stress east-west alternative to SH8 and the network's backbone for utilitarian and recreational purposes. Each trail at some point in its alignment uses the former Burlington Northern Santa Fe rail right-of-way, on which rail operations were formally abandoned in 1984.

Bill Chipman Palouse Trail. This bi-state regional trail provides an 8-mile connection between Perimeter Drive on the western edge of Moscow and Bishop Boulevard on the southeastern edge of Pullman, WA and Washington State University. This trail runs parallel with SH8 and SR-270 in Washington, and crosses Paradise Creek several times.

Paradise Path. Passing through the University of Idaho campus and the city, the Paradise Path acts as a 3.4 mile regional trail connector between the Bill Chipman Palouse Trail at Perimeter Drive and the Latah Trail at the city's eastern city limits at Carmichael Road. This trail was constructed through a joint agreement between the City of Moscow and the University of Idaho.

Latah Trail. Completed in 2008, this 12-mile trail connects Moscow with the City of Troy to the east. The trail runs parallel to SH8 with an underpass roughly ¾-mile west of Warren Road. Because of the trail's rural nature, at-grade crossings are limited to 15 local access roads, which reduces the total number of conflict points along its twelve-mile path.

Neighborhood pathways

Various neighborhoods in eastern Moscow are also supported by a network of neighborhood path connections that provide bicycle and pedestrian connectivity. Internal neighborhood path connections were developed in newer areas of Moscow including areas immediately south of the University of Idaho and east of Mountain View Road. These pathways were built as a development requirement to mitigate the loss of connectivity resulting from "loop-and-lollipop" style street patterns. Many of these paths have widths of 5-6 feet, which can create uncomfortable conditions when bicycles and pedestrians share the access way.

The Bill Chipman Palouse Trail
Image from Latah Trail Foundation

On-street bicycle routes and lanes

Moscow's Comprehensive Plan established a policy framework to expand the city's current on-street bicycle network, which is comprised of bicycle routes and bicycle lanes. Bicycle routes refer to streets where cyclists are mixed with auto traffic in the general vehicle travel lanes rather than operating in a separately marked lane. There are five bicycle route "groupings" in Moscow, all of which are located east of US95:

Eight Street/Lynn Avenue/Harold Street. This unsigned bicycle route offers access to residential neighborhoods surrounding the Eastside Marketplace. The route is commonly used as an alternative route to steeper route options to the north (especially Sixth Street).

Sixth Street / Main Street / Fifth Street / Jefferson Street / Third Street / Monroe Street / First Street. Situated centrally along Moscow's east-west center, this is the city's longest signed bicycle route providing direct routing to various destinations including downtown and East City Park. Main Street and Sixth Street in downtown are key bicycle route segments in the bicycle network, providing direct access to local businesses.

Nez Perce Street / Park Drive / Cleveland Street. This is a key north-south access route to Moscow Junior High with grid disconnections "fused" with neighborhood pathways. It also provides connections to the First Street and D Street bicycle route segments. This is a signed route.

Meadow Street. This short, unsigned north-south route segment connects two opposing cul-de-sacs to the Joseph Street bike lanes. It also links into a neighborhood pathway through Heron's Hideout on the route's south side, which connects into Mountain View Road immediately north of White Avenue. The Meadow Street bike route also connects to the Brink Park trail.

Travois Way. This short east-west route segment offers a low speed connection to the Paradise Path. The route includes no formal markings or signage indicating its' bicycle route designation.

Bike lanes are the most visible means of encouraging cycling on-street in Moscow, and they are relatively easy and inexpensive to implement by restriping existing roadways with underutilized street widths. Marking bicycle lanes on roadways defines a dedicated space for bicycles only and increases motor vehicle awareness of bicyclists in the roadway. Bike lanes in Moscow include:

Sixth Street from Line Street to Main Street. This is a vital on-street connection between the University and downtown Moscow. Between Line Street and Deakin Street, the bike lane is only available in the eastbound direction, supplemented by the Paradise Path to the north which runs parallel to Sixth Street from Deakin Street to Urquhart Street.

Styner Avenue from US95 to Troy Highway/SH8. The bike lanes on Styner Avenue are critical connections between the University of Idaho, Eastside Marketplace, and Moscow's southeastern neighborhoods. This route has a moderate grade that is manageable for most bicyclists.

Sweet Avenue from Deakin Street to US95. Supplemented with a raised landscaped median, this bike lane serves as a key bicycle portal into the University of Idaho.

Pullman Road/SH8 from the Stateline to Line Street. This arterial bikeway is considered a high stress bikeway because of the speed and volume of traffic as well as the amount of freight traffic on the corridor. The

Bill Chipman Palouse Trail and the Paradise Path offer a more attractive route option for those seeking a more comfortable ride.

Mountain View Road from Sixth Street to roughly 500 feet north of F Street. This bike lane provides access to Moscow Junior High School, Eggan Youth Center, and the Hamilton-Lowe Aquatics Center. Bicycling conditions on Mountain View Road can be uncomfortable because of the relatively high speed of traffic along certain portions of Mountain View Road.

D Street from Mountain View to Eisenhower Street at AB McDonald Elementary School. The D Street bike lane provides school access to AB MacDonald Elementary School. It is also an important connection between the path behind the Good Samaritan Village retirement community and Mountain View Road.

US-95 from Sweet Avenue to Palouse River Drive. This bike lane provides access to the University and Eastside Marketplace via bike lanes on Sweet Avenue and Styner Avenue, respectively. High traffic speeds and high truck traffic volumes create high stress bicycling conditions for most bicyclists.

Troy Highway from Adams Street to Mountain View Road. ITD's recent reconstruction of Troy Highway west of Mountain View Road included bike lanes. Although this bike lane offers a direct east-west connection between Mountain View Road and north-south local streets that provide access to downtown, bike lane gaps east of Mountain View and west of Adams Street do not provide a direct downtown connection from the east.

The on-street bicycle facilities described above offer bicyclists a dedicated space to access key destinations throughout the city. The city's existing foundation of bicycle lanes and routes is the baseline for making improvements and expanding the network to serve more people. Moscow's Transportation Commission is currently working to identify future bicycle lanes and low traffic, low speed neighborhood bicycle streets called neighborhood greenways. These efforts will be evaluated and considered as a potential recommendation for *Moscow on the Move's* active transportation strategy.

At five feet wide, the Sixth Street bike lane is relatively well designed. However, high parking turnover increases the chances of open door, or "dooring", hazards.

Image from Nelson\Nygaard

A bicycle network that is understandable and easy to navigate instills confidence in users that they are taking the fastest or even most comfortable route to their destination. Bicycle-oriented wayfinding in Moscow is located along the Paradise Path and at various locations on major bicycle routes, rather than spread across the city.

Image from Nelson\Nygaard

What makes a good bicycle network?

Despite significant progress in recent years, Moscow's current bicycle network still has major gaps and complicated and indirect routing that may discourage bicycle commuters or people who need to make short, quick utilitarian trips. Moscow residents and visitors should be offered a complete bicycle network that connects desirable destinations, closes gaps, and provides safe facilities for all users. A complete bicycle network for Moscow should be:

- **Cohesive,** making connections throughout the community, including all major destinations
- **Direct,** without unnecessary jogs or detours
- **Understandable,** with clear destination-oriented signage for cyclists
- **Integrated,** with street, intersection design, parking, buildings, and transit facilities
- **Enforced/maintained,** so that bikeways are free of parked cars and debris
- **Transparent,** so that both motorists and cyclists know whether they have shared or separate spaces
- **Safe**, to provide varying levels of separation from moving/parked vehicles for cyclists
- **Secure,** to ensure isolated, unlit, or inaccessible areas are limited
- **Gap-free,** to provide continuous routes including those connecting adjacent cities
- **Conflict-free,** with particular care toward intersections, ensuring that cyclists can safely bike on highways, arterials, and other high volume streets
- **Extensive,** City-wide coverage within ¼-mile reach to all residents
- **Beautifying,** by adding an aesthetic component to Moscow's historic and newly developed neighborhoods
- **Appropriate,** by designing and adapting to the unique needs of all types of cyclists in Moscow

Where do people ride in Moscow today?

Figure 24 and Figure 25 display the AM and PM 2-hour peak period bicycle counts at 18 key intersections. AM peak hour counts are highest along Sixth Street, the city's most frequently traveled bicycle corridor. This corridor primarily serves students, staff, and faculty traveling to class and work. High volumes are also observed in the PM peak period counts through Third and Main. High volumes at Mountain View and SH8 suggest that a large number of bicyclists choose to take a much longer route (using the Paradise Path) in order to bypass the hilly topography just east of downtown.

Figure 24 AM Peak Period 2-Hour Bicycle Volumes

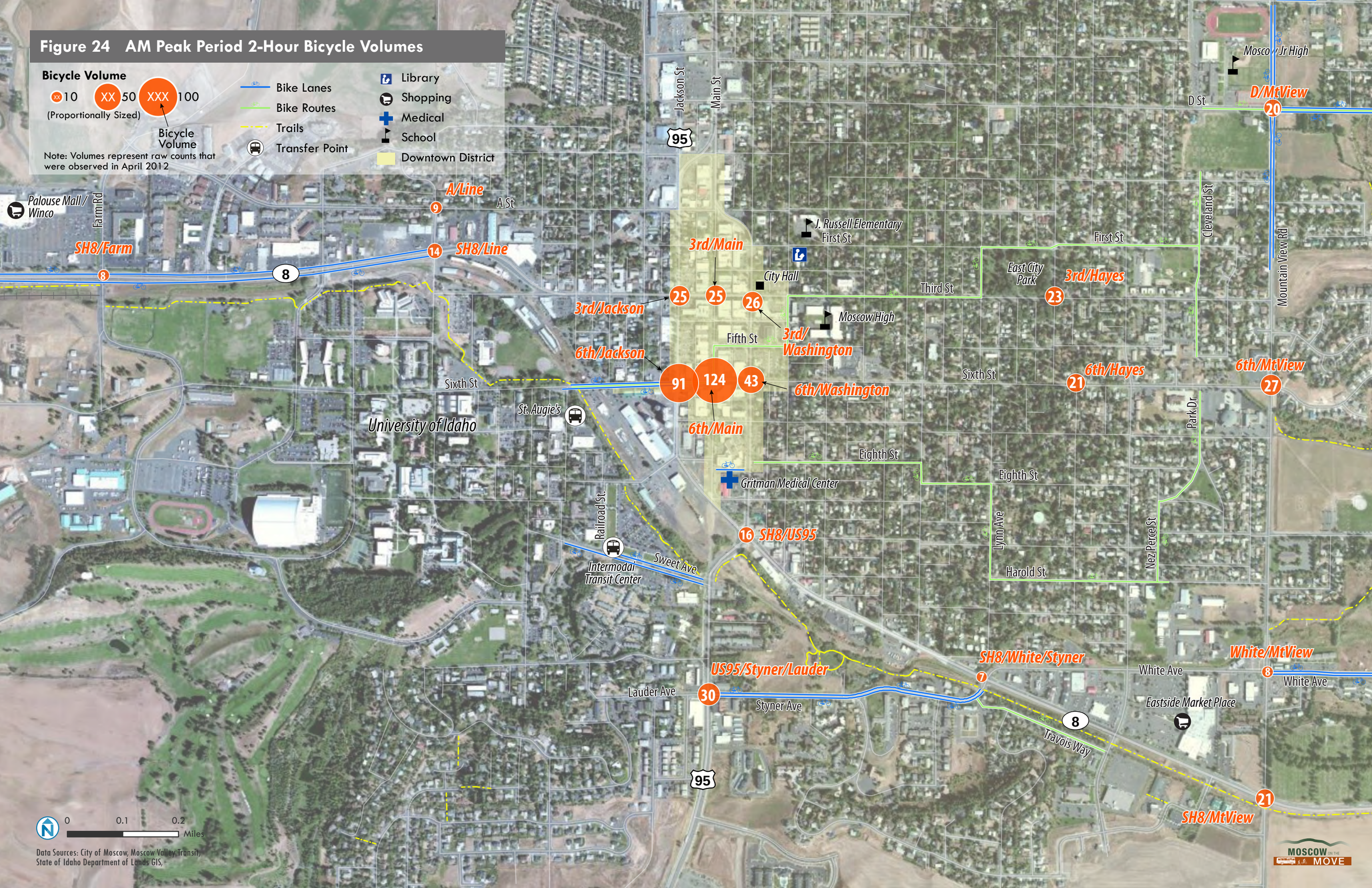

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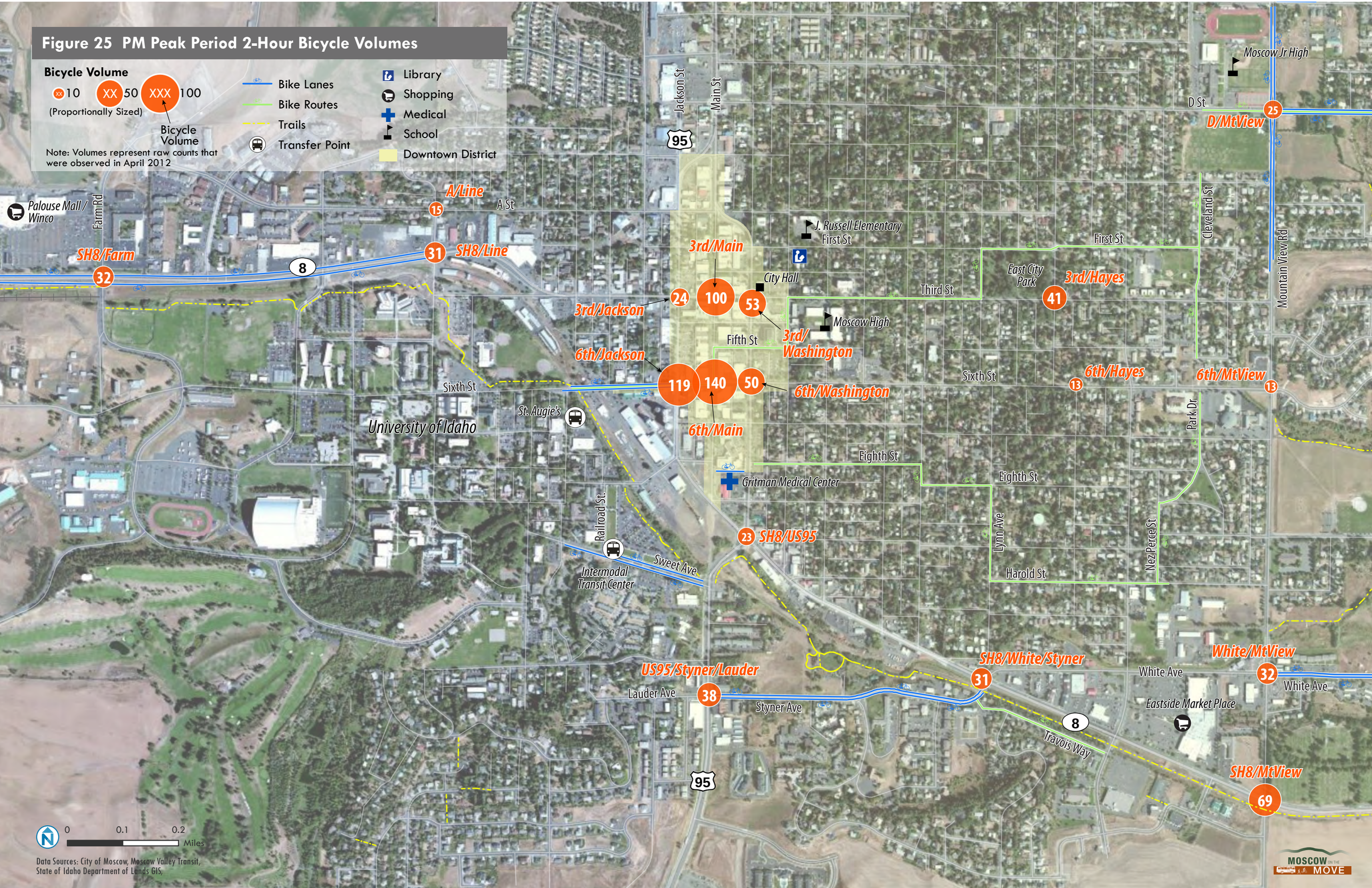
Figure 25 PM Peak Period 2-Hour Bicycle Volumes



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What are the key challenges and barriers to safe and comfortable bicycling in Moscow?

Moscow's existing bicycle network establishes the basic backbone for both recreational and utilitarian use. However, outside of the trail system, these bikeways are mostly appropriate for confident cyclists. As it stands, it will be a challenge to capture new, more timid bicyclists. The network lacks an east-west and north-south dedicated or aggressively calmed bikeway that clearly prioritizes bicycle and pedestrian movement. Neighborhoods north of downtown and south of the University of Idaho are not currently served by dedicated bicycle facilities. Developing a denser network of cycling facilities is only one challenge to encouraging broader use of bicycles by all levels of cyclists and for more types of trips.

Bicycling in Moscow is limited by a variety of barriers (many of which are displayed in Figure 26 on page 3-52). Barriers include:

Safety. Perceived and real safety concerns related to bicycle-auto conflicts inhibit bicycling in Moscow. A 2011 *Bike for Change* survey conducted by Bike for Life found that safety is the third most common concern for those who wish to bike more, behind inclement weather and the need to fulfill other obligations.

Street design. Directly related to safety, many Moscow streets, like Perimeter Drive and A Street have been designed primarily for the purpose of moving motor vehicles, often at speeds and in configurations that are intimidating to cyclists. Nez Perce Drive is an example of a street that is regulated as a 25mph street, but is designed in a way that accommodates speeding.

Public Awareness. A barrier to bicycling in Moscow is the general lack of awareness that cycling is a viable mode of transportation. This may be due in part to the fact that the city's bicycle network and, specifically, Paradise Path, are not readily visible to motorists and many perceive them to be only for recreational purposes.

Topography: Due to its location in the Palouse region, Moscow is hilly, especially east and south of downtown, with grades as high as 15-16%. Traversing such grades can be an insurmountable challenge for all but the most fit and experienced cyclists.

Winter weather. Moscow experiences cold and snowy weather during the winter months and heat during the summer months. Even with snow routes available, many people are still not willing or able to ride in cold, snowy conditions.

Highway crossings. Crossings at various locations along SH8 and US95 have limited visibility, sightline issues, and significant signal delay. Signal delay in downtown and along Pullman Road was highlighted as a key issue in *Moscow on the Move's* first community open house. Without proper signal detection cyclists are more prone to ignore traffic control signals, and thereby increase their risk of injury.

Dropped bike lanes. In several cases (e.g. along Joseph Street and on Styner at US95), bike lanes are dropped to accommodate right and/or left turn lanes. This can create conflict points as bicyclists merge back into mixed traffic conditions.

Indirect connections. Several existing bicycle network connections are circuitous and require longer travel times than the most direct routing. Some indirect routings results from the need to route cycling pathways where topography is most accommodating. These indirect connections are particularly evident for cyclists traveling in the east-west direction, such as the Eight Street/Lynn Avenue/Harold Street bicycle route.

Trail connections. At the moment, there are limited direct and clearly understandable connections to the Paradise Path and the two regional trails. White Avenue/Styner Avenue at Troy Highway is a notoriously difficult crossing location for those seeking to access the trail network. Potential solutions include developing well-lit and signed grade separated crossings and installing high visibility crossings with user actuation.

Commercial area access. People seeking to access commercial centers outside of downtown (e.g. Eastside Marketplace and Palouse Mall) by bicycle or on foot are faced with a range of challenges including topography, connectivity, traffic conditions, and lack of facility provision. *Moscow on the Move's* active transportation strategy will address these barriers with a range of bikeway options appropriate for cyclists with different skills and comfort levels.

Pavement quality. Some bike lanes in Moscow require pavement maintenance to address hazards such as pavement drift from heavy vehicles (a phenomenon where pavement corrugates or ripples due to extensive use by heavy vehicles like trucks and buses), exposed railroad tracks, and gutter seams wide enough to fit bicycle tires. In addition, bikeways need more frequent sweeping of road debris. These conditions can cause injury to bicyclists.

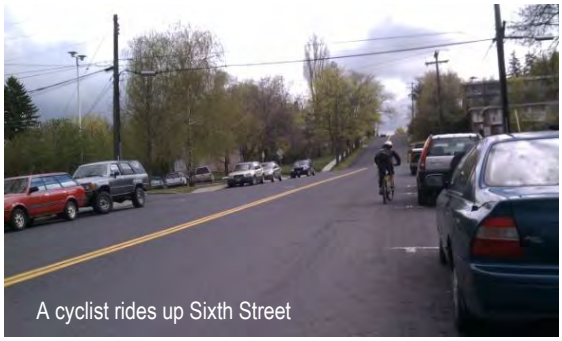
Bicyclists' behavior. Conversations with various stakeholders, including the Active Living Task Force, revealed that improper cycling behavior such as wrong way riding, sidewalk riding, and riding without a helmet, is fairly pervasive in Moscow (although these are not illegal behaviors). During a recent pedestrian count session on the Paradise Path, half of all cyclists counted were not wearing a helmet. In addition, 30-35% of bicyclists travelling on F Street were riding on a sidewalk, depending on the count location. Education and enforcement could be critical tools to ensure bicycling remains safe and predictable for all roadway users.

Figure 26 Bicycling in Moscow: Challenges and Issues Matrix

Safety

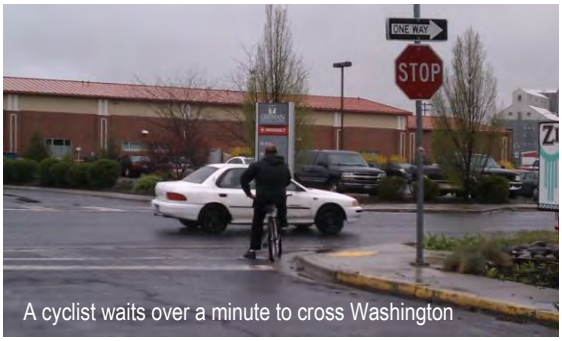
The cyclists' view of riding on SH8 does not appear safe

Topography



A cyclist rides up Sixth Street

Highway crossings

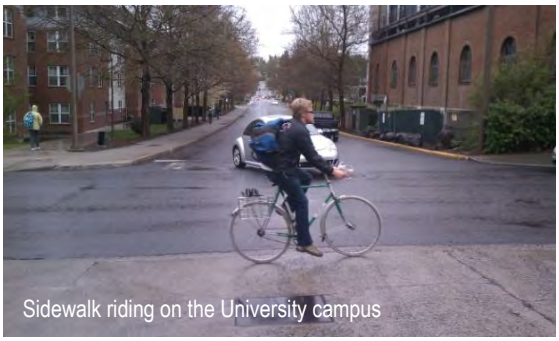


A cyclist waits over a minute to cross Washington

Dropped bike lanes

Cyclists must merge at a pinch point on Sixth Street

Bicyclists' behavior



Sidewalk riding on the University campus

Pavement quality

Decommissioned rail tracks along W Third Street

Bicycle-transit connectivity

Bicycle parking at Moscow Valley Transit facilities and other amenities are important components of a multi-modal transportation system and a key strategy to enhance the "Transit Experience"—as noted in the *Transit* section. Bicyclists may be more likely to take transit if they can ride to the bus stop, knowing that they can leave their bike at the stop. In addition, bike racks on buses allow bicyclists to extend the reach of the transit system or use transit in the case of a mechanical issue or flat tire.

Passengers with bicycles tend to get off the bus at the University of Idaho.

Image from Nelson\Nygaard

All buses in the Moscow Valley Transit fleet are equipped with front-loading bicycle racks that can accommodate two bikes. In addition to the on-vehicle bicycle racks, there are 12 bike racks located at bus stops. According to a 2012 on-board transit passenger survey, between one and two percent of respondents ride their bike to the bus or from the bus to their final destination. This transit access mode split will likely rise as the bicycle network further develops and bicycling and transit use increases throughout the city. Likewise, evidence from the transit survey suggests that an increasing number of students are bringing their bicycles on the bus to be used for daily use on campus.

What are planned improvements to the bicycle network?

The City of Moscow is actively engaging the cycling community and planning to build out the city's bicycle network. A Paradise Path Task Force was assembled to develop a linear park master plan that expands bicycle and pedestrian connections throughout the city. The Task Force's recommendations include a "Paradise Loop" pathway along the city's perimeter and several internal bikeway connections on streets like Almon Street, Hayes Street, and Third Street.

In addition, the Active Living Task Force (ATLF) was formed through a Center for Disease Control's Communities Putting Prevention to Work grant. The ATLF was formed, in part, to develop Complete Streets that accommodate active, non-motorized transportation options with the thought that infrastructure on the ground to promote more active lifestyles would result in higher levels of active living. Infrastructure that was recommended by the ATLF included development of traffic calmed bicycle routes on local streets, called neighborhood greenways. *Moscow on the Move* will build upon the Transportation Commission's work on developing a cohesive pathway network and the ATLF's assessments and inputs to propose streets for neighborhood greenway development.

Most near-term funded street construction or reconstruction projects for arterial or collector streets provide for bicycle lane striping. This includes Mountain View Road, Palouse River Drive, and College Avenue. A key opportunity is to develop policy language in *Moscow on the Move* that ensures all future roadway connections accommodate safe and comfortable bicycle travel; whether it includes bicycle lanes, bicycle routes with traffic calming, or safe highway and arterial crossings.

Bicycle parking supply and design

Public bicycle parking in the City of Moscow is mostly offered at major destinations and public facilities throughout the city. According to the City's Parks and Recreation Department, there are 157 bicycle racks varying in size, style, and capacity—located primarily in downtown and at City parks or facilities. People that participated in the first *Moscow on the Move* community open house noted that more bicycle parking should be installed at the Courthouse, the Palouse Mall, most city parks, and on the University of Idaho campus. However, where parking is present, it is usually not

protected from the elements and many are in need of replacement because they cannot ensure secure parking.

The City has embarked on a citywide bike rack replacement program to replace "wheel bender" and wave racks with inverted U- and A-frame racks (examples of bike parking that are discouraged and and preferred—per the city's bike parking guidelines—are shown below). Adding more bicycle parking options in convenient places, such as in front of office or retail areas, can encourage bike use and increase the visibility of bicycling in Moscow.

An example of well -designed racks with two points of bicycle frame contact (above, at Friendship Square) and poorly designed racks sometimes known as "wheelbender" racks (below, at Eggan Youth Center).

Image from Nelson\Nygaard

There are several mechanisms to ensure adequate supply and quality of bicycle parking is provided to meet current and future bicycle parking demand. The most common approaches include: (1) *mandating* the presence of bike parking as part of the new development process, or (2) *providing incentives for* the construction of bike parking by lowering or capping the number of required vehicle parking spaces. These approaches are typically accomplished in conjunction with zoning requirements, with bicycle parking standards established in a similar manner to vehicle parking requirements for different zoning districts.

As recently as 2011, Moscow's City Council considered amending the City Code to require the provision of bicycle parking for commercial and multi-family residential development. This amendment was not adopted. The proposed language would have established standards for installating bike parking, including acceptable bicycle rack types, bike rack placement and lighting, and bicycle rack sheltering. The amendment would have also allowed for a 10% reduction of required automobile parking in exchange for installing the same amount of bicycle parking spaces. Instead, bicycle parking is provided voluntarily by business and property owners. The City of Moscow provides financial assistance and design guidance for interested businesses through two programs:

- **Bike Rack Program.** This program offers a $100 reimbursement per standard City A-frame bike rack purchased. The City also provides assistance to business owners regarding locating and installing bicycle racks to ensure bicycles are visible and outside the line of pedestrian travel. The program also publicizes program recipients in news releases and the City website. To date, this program has seen little participation.
- **ARTful Bike Rack Program.** This bike rack enhancement program allows businesses to install bike racks that function as permanent art installations. Financial assistance for this program increases to $200 due to the increased costs of labor and materials, but includes the same siting assistance as the standard Bike Rack Program. This program also has seen limited participation.

WALKING IN MOSCOW

Walking is the most fundamental form of human transportation and an activity that nearly all of Moscow's residents do at some point every day. People that commute by car, bike, or bus typically walk to and from their origin and/or final destination. The quality of that walking environment is a key factor in determining what modes of travel people choose to use for longer trips.

Depending on the neighborhood or district that one walks through, the pedestrian environment varies in safety, comfort, and level of pedestrian amenities. Although the pedestrian experience is different in downtown, the Fort Russell Neighborhood Historic District, and the peripheral neighborhoods to the north and west of downtown, an engaging and attractive walking environment requires a set of basic conditions.

What does Moscow's pedestrian network include?

One of the most pressing mobility issues facing Moscow is the need to expand sidewalk coverage and retrofit aging sidewalk infrastructure that is not accommodating for seniors and people with disabilities. Currently only 59% of block faces are furnished with a sidewalk. This is a matter that Moscow's Transportation Commission and several volunteer task forces are studying and recommending programs and actions that will be considered for *Moscow on the Move*. Although sidewalks are the basic infrastructure of the citywide pedestrian network, various other connections, pedestrian-oriented districts, and pathways provide vital layers of infrastructure that connect city neighborhoods and allow efficient pedestrian movement. Below is a range of pedestrian environments and connections that make up the citywide pedestrian network:

- **Downtown streets** have the highest level of pedestrian amenities in the city including patterned crosswalk design, pedestrian countdown signals, spacious sidewalks, and curb extensions that reduce crossing distance and increase the visibility of pedestrians.
- **Neighborhood streets and alleys** generally provide quiet, low speed, and low traffic walking routes to collectors and major arterials. However, this network of streets and alleys provides a patchwork of sidewalk coverage, requiring pedestrians to walk on private property or on the street for certain segments. The Fort Russell neighborhood and the newer Rolling Hills neighborhood exhibit relatively good sidewalk coverage, while neighborhoods adjacent to N Polk are lacking continuous sidewalk coverage.
- **University of Idaho streets and walkways** are enlivened with pedestrian activity. In particular, the Campus Walkway system is a high pedestrian demand area between Sixth Street and University Avenue that offers car-free pedestrian circulation on the University campus. Even though this is a college campus setting, pedestrians

must compete with motor vehicles at major travel corridors like Sixth Street.

- **Signalized and unsignalized highway and arterial crossings** are critical linkages that connect neighborhoods to local and regional trails, downtown Moscow, and the University. Unsignalized crossings at high traffic, high speed locations provide a level of discomfort to pedestrians because they cannot ensure motorists will yield. A prime example of this is at the intersection of US 95 and Styner/Lauder.
- **Paradise Path** is a growing system of trail connections in Moscow used by all varieties of human-powered transportation and active recreation. As the system develops into its eventual "trunk and branch" structure—as proposed by the Paradise Path Task Force and Transportation Commission—it will provide safe, comfortable, and direct access to Moscow's neighborhoods, parks, and employment centers.

Walking in Downtown Moscow

Downtown Moscow, particularly Main Street between Eighth Street and A Street, exudes character and activity emblematic of a well-organized central business district. This vibrant, pedestrian-oriented environment includes the following key elements that should be emulated in other commercial districts throughout Moscow:

- **Public space.** Friendship Square seamlessly integrates into the streetscape, blending basic mobility functions of the street with one of the city's most used public spaces.
- **Clear pedestrian zones.** Sidewalks in downtown are typically organized into traditional pedestrian zones. This includes a curb/parking buffer zone, a furniture zone (storage space for benches, trees, bicycle parking, utilities, etc.), the pedestrian or walk zone, and the frontage zone (which typically houses café seating, store signs, etc.).

Main Street's sidewalks are organized to provide distinct pedestrian zones.

Image from Nelson\Nygaard

- **Active sidewalks.** Buildings along Main Street front the sidewalk and have open facades creating an interesting and inviting experience for pedestrians.
- **Sidewalk widths.** Sidewalks range from 10 to 15 feet wide along the primary downtown corridors. Sidewalks along Main Street are also proportionate with the height of the buildings, which counteracts not only the size of downtown buildings, but also the width of the adjacent roadway.
- **Pedestrian buffers.** Downtown Moscow provides diagonal on-street parking along several blocks, which serve as vehicle storage and also as a protective barrier between downtown patrons and the roadway.
- **Pedestrian furniture.** Seating, architectural features (e.g. the four-sided clock), pedestrian-scale lighting, and a fountain are all features that invite people to stay, rest, and socialize in downtown Moscow. The notion of the street as community space amplifies as pedestrians approach Friendship Square.

Friendship Square in downtown Moscow
Image from Nelson\Nygaard

How is the pedestrian network used today?

The City of Moscow recently conducted AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) 2-hour peak period pedestrian counts at 18 locations across the city (shown in Figure 27 and Figure 28 on pages 58 and 60). AM and PM counts were highest at Third/Main and Sixth/ Main (314 and 292 counted in the PM, respectively). The University access portals at SH 8/Line Avenue and Styner Avenue/US 95 also exhibited high pedestrian demand.

Key pedestrian trip generators

Assessing the effectiveness of Moscow's existing pedestrian facilities and current pedestrian travel patterns requires identifying the types of land uses and activity centers that generate pedestrian activity. Locations that produce pedestrian demand in Moscow include:

- Downtown offices, retail, and restaurants between Washington Street and Jackson Street
- Local primary and secondary schools and the University of Idaho
- Major employment sites, like the University of Idaho, Walmart, and Gritman Medical Center
- All three regional non-motorized trails
- Student housing south of Taylor Avenue and along A Street
- Parks and open space like East City Park, Guy Wicks Field, and the many pocket parks that line the Paradise Path

What street design and connectivity issues impact the decision to walk?

On-site reconnaissance, stakeholder interviews, and the community open house exposed several challenging spot locations and general conditions that hinder or discourage walking in Moscow.

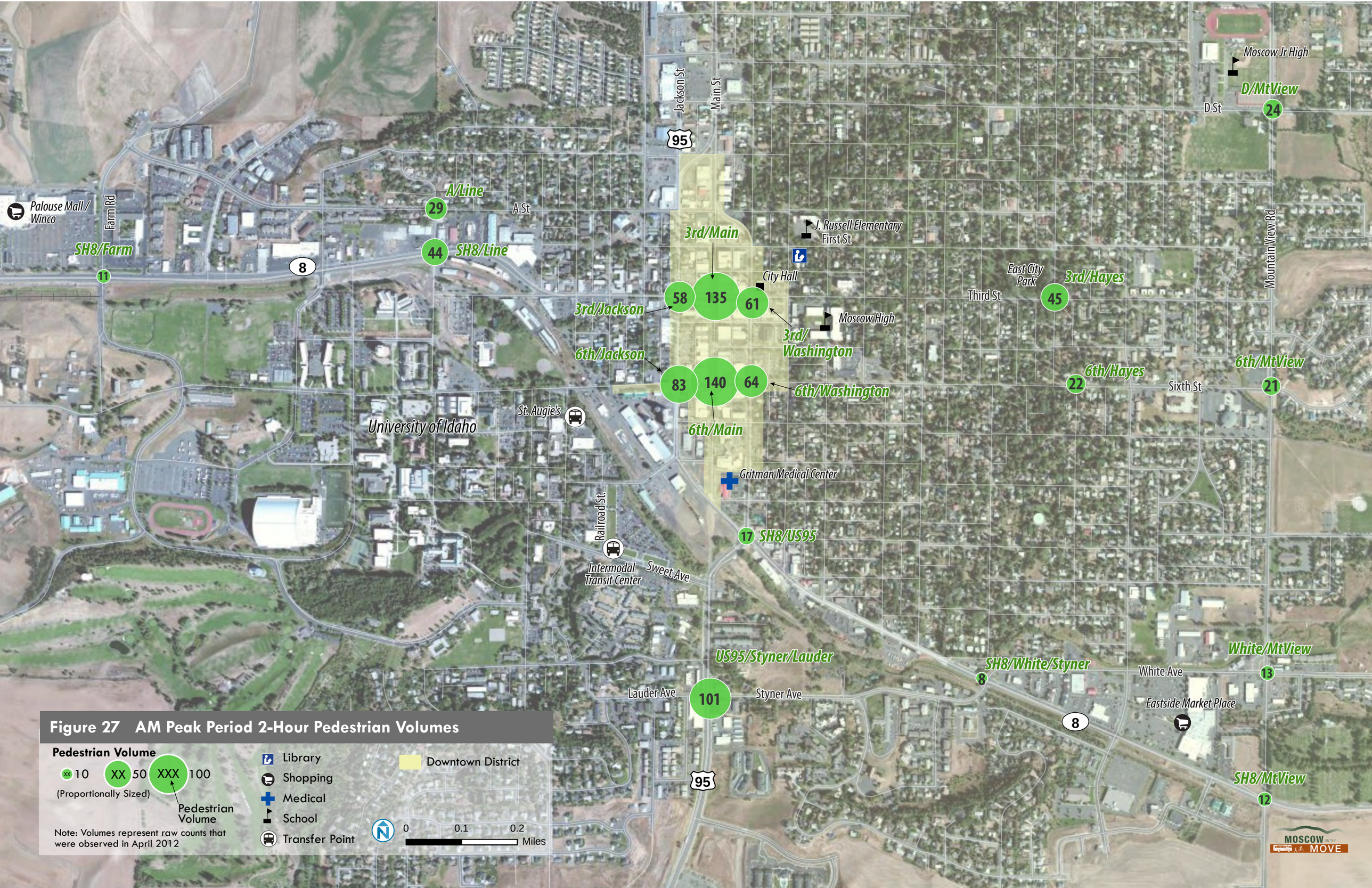


Figure 27 AM Peak Period 2-Hour Pedestrian Volumes

Pedestrian Volume

xx 10 XX 50 XXX 100

(Proportionally Sized)

Pedestrian Volume

Note: Volumes represent raw counts that were observed in April 2012

Library
Shopping
Medical
School
Transfer Point

Downtown District

0 0.1 0.2 Miles

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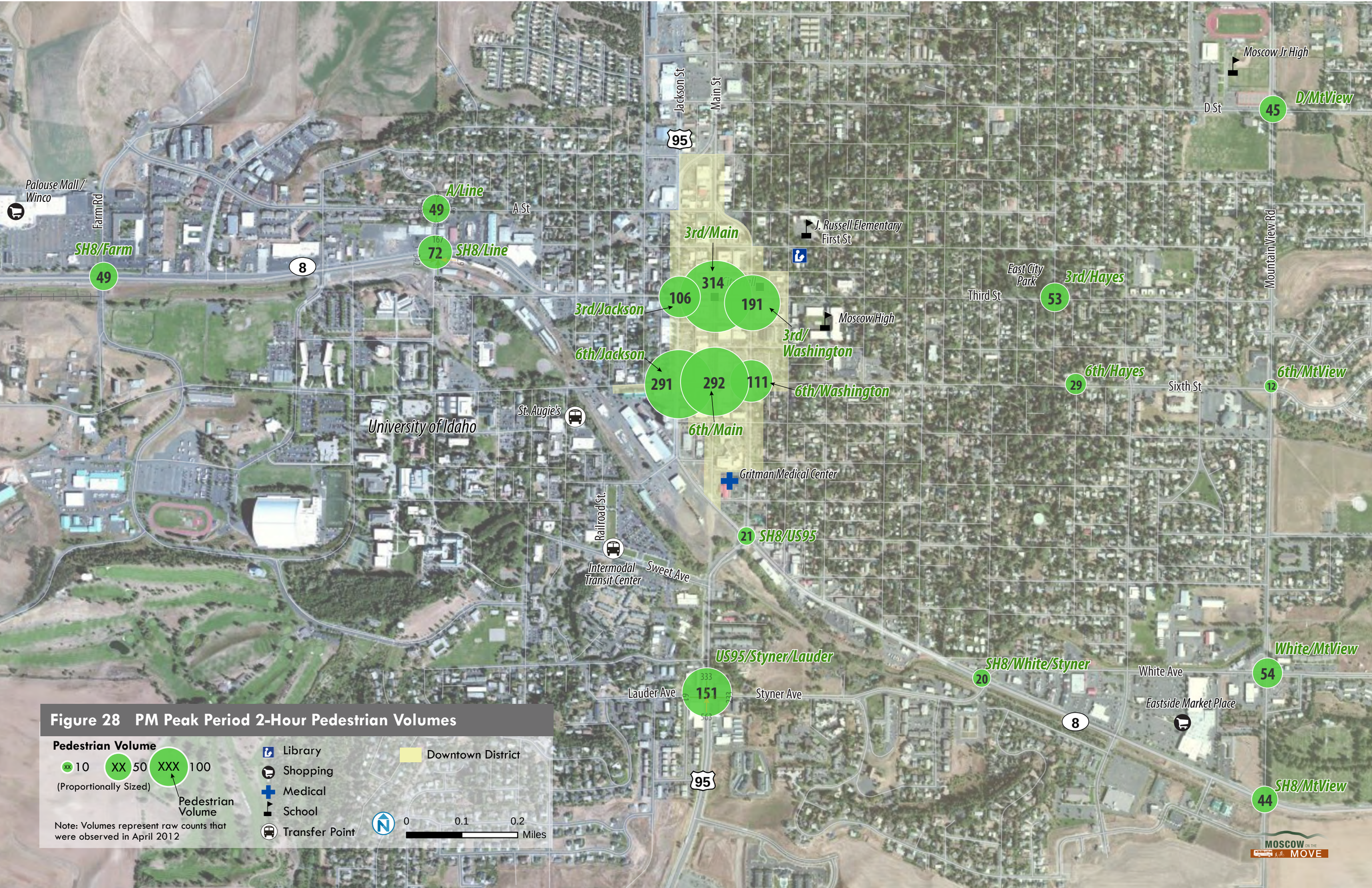

Figure 28 PM Peak Period 2-Hour Pedestrian Volumes

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General challenges

Sidewalk coverage. The most evident challenge for pedestrian travel is navigating the large number of gaps in the sidewalk network.

Pedestrian delay in downtown and along highways. Downtown signals at Jackson Street and Washington Street force pedestrians to actuate the signal instead of providing an automatic WALK phase.

Competition with vehicle storage. Several surface parking lots do not provide parking lane markings or parking stones/bollards, which allows vehicles to encroach on the sidewalk. In some cases, like on Peterson Drive at the Tri-State store, irregular parking practices force pedestrians onto or uncomfortably close to the roadway.

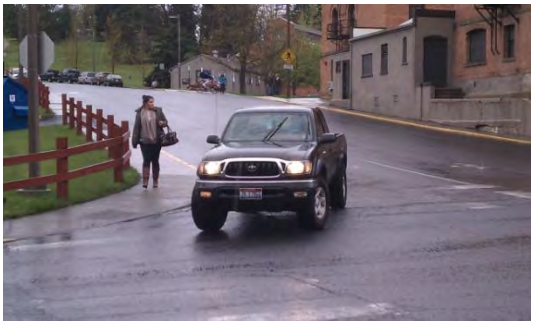
Topography. As is the case with bicyclists, some pedestrians would not consider walking from their residence to work or to a downtown restaurant because of the steep grades in eastern Moscow.

Site-specific issues

Several intersections in Moscow are designed with swooping curb radii that allow for high speed turns. This is specifically an issue at the intersections of Nez Perce Drive/Blake Avenue and US 95/South Couplet. At the latter intersection, signal phasing creates long wait times for pedestrians.

North Jefferson is one of many street segments without sidewalks.

Image from Nelson\Nygaard



Wide curb radii encourage rolling stops and fast right turns.
Image from Nelson\Nygaard

Several near miss interactions with turning vehicles were observed on SH 8 at both Perimeter Drive and Line Street during site reconnaissance. Where pedestrian numbers are high, impatient motorists will slowly creep into the pedestrian crossing to reduce their wait time. This occurs on a daily basis at Sixth Street and Line Street, mid-block on Sixth Street between Line Street and Rayburn Street, and at the diagonal crosswalks on D Street from Moscow Junior High to Eggan Youth Center. The diagonal crossing treatment prolongs the amount of student exposure to pick-up and drop-off traffic.

In addition, unsignalized crossings occur at the intersection of Troy Highway and Styner/White Avenue.

A bicycle and pedestrian underpass has been proposed at this location to eliminate the difficult crossing at Styner Avenue and Troy Highway.
Image from Nelson\Nygaard

A snapshot of Moscow's pedestrian environment

Pedestrian Environmental Quality Index (PEQI)

Indicators

In order to establish a baseline understanding of pedestrian conditions in Moscow, street segments and intersections along key arterials, highways, and other important east-west travel corridors were assessed using the Pedestrian Environmental Quality Index (PEQI). Modified from the San Francisco Department of Public Health's version, this tool provides a qualitative observation method for assessing the quality of existing sidewalk and intersection conditions. The assessment is divided into two sections (street segment and intersection safety) with indicators covering four broad pedestrian environmental categories—Traffic, Street Design, Land Use, and Intersection Safety for signalized and unsignalized locations. The table below identifies the indicators included in the analysis.

Weighted scoring for each segment/ intersection was based on each indicator's potential influence on user safety and comfort. Aesthetic design features were weighted lowest unless they contributed to vehicle speed and volume management. Street segments and intersections were scored using a 5-tier qualitative scoring system highlighted in the call out box below.

Street segment indicators	Intersection indicators
▪ Number of vehicle lanes ▪ Traffic direction (one- versus two-way) ▪ Posted speed ▪ Traffic volume (ADT) ▪ Sidewalk width ▪ Pedestrian zone obstructions ▪ Block length ▪ Number of driveway cuts ▪ Trees/Landscaping ▪ Availability of a Pedestrian Buffer ▪ Grade ▪ Pedestrian-Scale Land Use ▪ Density ▪ Active frontage	▪ Crossing distances ▪ Crossing Link-Node (ratio of marked crossings to intersection links) ▪ Countdown Signal ▪ Extent of traffic control (4-, 3-, 2-way signal or stop) ▪ Availability, type, and quality of curb ramps ▪ Availability of curb extensions

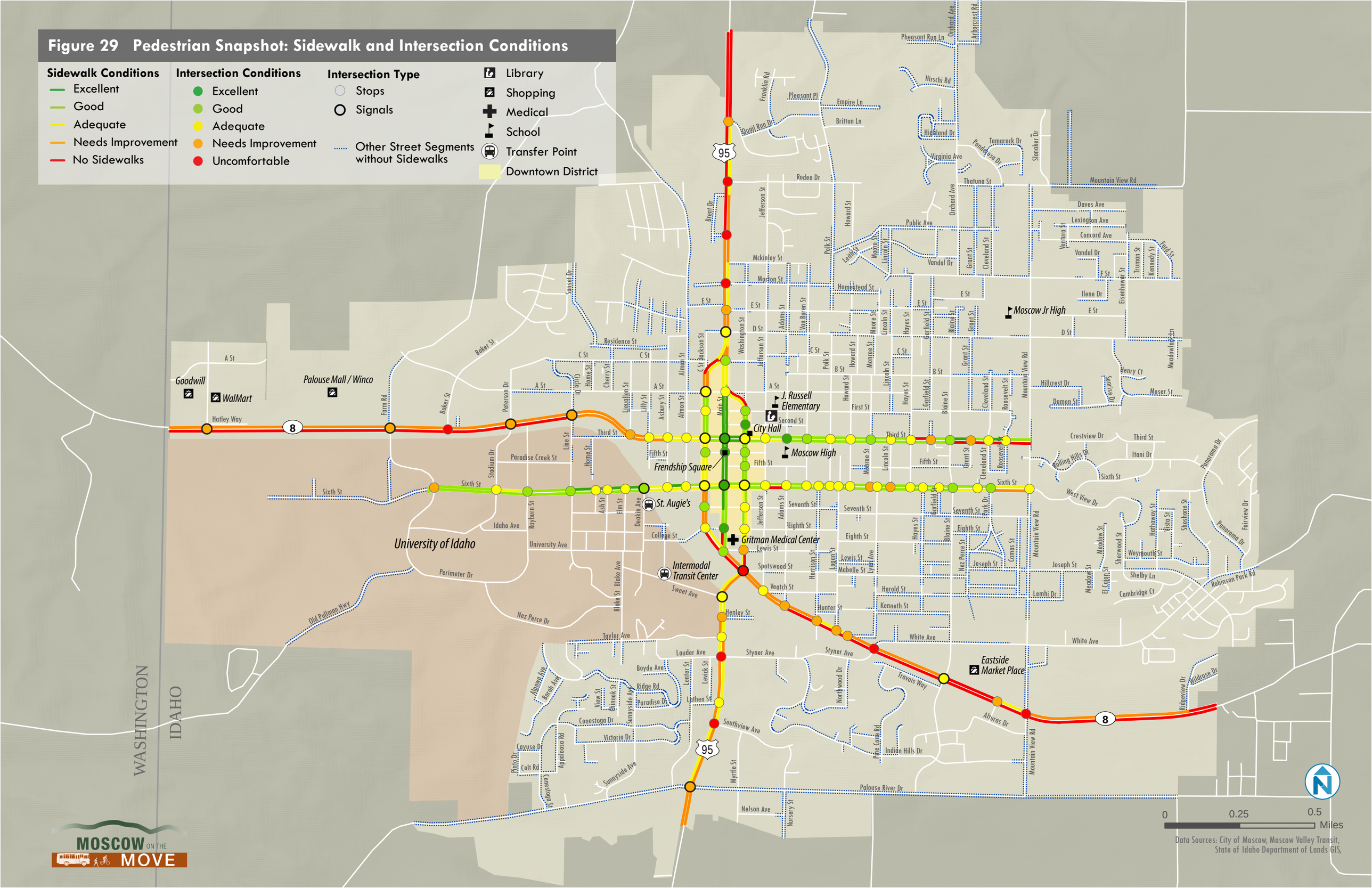
PEQI Scoring Levels Defined

- **Excellent:** Ideal pedestrian conditions exist. Facilities are fully accessible and present little to no challenges to those with mobility impairments.
- **Good:** Reasonable pedestrian conditions exist. People with mobility impairments can easily navigate pedestrian facilities and crossings, yet minor improvements could be made.
- **Adequate.** Basic pedestrian conditions exist. Facilities are navigable by people with mobility impairments, but noticeable impediments or mobility challenges are present.
- **Needs improvement:** Poor pedestrian conditions exist, including, but not limited to, narrow sidewalk space, pinch-points, uneven surfaces, and high speed and volume traffic environments. Those with mobility impairments are met with significant challenges and physical barriers.
- **No sidewalks/uncomfortable:** Environment may not be suitable for pedestrians or pedestrians may not feel comfortable using that particular street segment or intersection. The pedestrian environment offers little to no amenities. Pedestrian facilities generally are not designed for people with mobility impairments and may not be navigable by this user group.

Key Findings

Figure 29 illustrates the final results of the assessment. In general, conditions along US 95 are uncomfortable for pedestrians, largely due to its high volume, high speed nature and limited buffer from automobiles. The western portions of SH 8 are supported by high quality pathways that promote walking, but the intersections scored relatively poorly. Main Street's expansive sidewalks with active frontage, pedestrian buffers, and high visibility crossing facilities explain its high scoring. Another key finding is that Third Street's pedestrian conditions worsen as it transitions from residential character toward downtown until it turns into Pullman Road.

Figure 29 Pedestrian Snapshot: Sidewalk and Intersection Conditions



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How does Moscow promote walking as a safe and healthy transportation option?

With a 19.6% walking commute mode split—similar to Pullman (21.5%)—the City of Moscow actively and successfully promotes walking as an attractive, cost effective, and healthy transportation option. The City publishes a **Pedestrian Safety Program** brochure that highlights safety practices and traffic laws geared toward both pedestrians and motorists. In addition, the brochure markets future improvements to areas along Pullman Road.

Moscow Safe Routes to School (SR2S) is a joint partnership between the City of Moscow and the University of Idaho seeking to increase walking and bicycling to school and thereby increase traffic safety, reduce pollution, and improve student health. The joint partnership employs the 5E approach to safe routes to school, consisting of Education, Encouragement, Enforcement, Engineering, and Evaluation. The 5E's are described in greater detail in the *Walking* best practices section.

The SR2S Coordinator, housed at the University, focuses mostly on non-infrastructure programs (Encouragement and Education) and subcontracts those activities to their College of Education Department of Movement Sciences, while the City of Moscow focuses on Enforcement and Engineering. Both the City and University perform their own program evaluation. On average, 18% of students walk from school in the afternoon. Moscow Junior High sees 36% of its students walk to school.[ii]

How does Moscow accommodate its mobility-impaired citizens?

In 2010, the City of Moscow established the Mobility Task Force to assess the condition of City streets to determine the efficacy of a continuous network of accessible pedestrian facilities including curb ramps for those with mobility impairments. The Task Force developed a set of mobility route principles that guided mobility improvement recommendations and sidewalk construction priorities. In the Mobility Task Force Report, these principles include the following:

Moscow should be accessible to citizens of all ages and physical abilities. We should be able to use sidewalks to move safely and without serious impediments from any neighborhood to and throughout the downtown business district, to major shopping centers, to the University of Idaho, to major medical complexes and care facilities, and to schools, parks, and major recreational complexes.

The estimated cost of installing sidewalks on at least one side of every street, including replacing all nonconforming pedestrian facilities and building accessible curb ramp improvements, is $19 million. This may be supplemented by the City's planned enforcement of City Code Title V Chapter 7, which requires property owners to maintain their sidewalks "in good repair and safe condition" and indicates that "where no sidewalks exist on a street, the Council may require construction by the property owner."

Image from Nelson\Nygaard

How does Moscow prioritize investments?

The Mobility Task Force established the following pedestrian network and accessibility principles in their report to the Transportation Commission:

"There should be an ADA (Americans with Disabilitys Act)-compliant sidewalk with pedestrian drops on at least one side of the street on all snow routes, since the sidewalks as well as the roadway receive the highest priority for plowing. Furthermore, streets within the central business district (CBD) should have ADA-compliant sidewalks and pedestrian drops on both sides because of the high concentration of destinations. The streets immediately around schools and parks should also be ADA-compliant."

Currently, the City has about $50,000 in its annual budget for sidewalk repairs and curb ramp construction; not enough to construct the entire backlog of sidewalk construction projects in the near term. Thus, a system of prioritizing improvements was developed. The Mobility Task Force developed a suggested list of sidewalk construction priotrities and highlighted specific "hot spots" that have the potential to provide substantial connectivity benefits for relatively small capital costs. The hot spots identified in the Mobility Task Force report include (side of the street in parenthese):

- Sixth Street between Almon and Jackson (southside)
- Sixth Street at Hayes (northside)
- West Sixth Street at Deakin (northside)
- Mountainview and Sixth (eastside)
- Third Street Main to Mall (northside)
- Third Street Main to Mall (southside)
- North Main Street at Brent Drive (westside)
- Farm Road between SH-8 and West A Street (northside)
- East A Street between Jefferson and Adams (northside)
- East A Street between Jefferson and Adams (southside)
- Jefferson at Fourth Street (westside)
- Troy Hwy between White and Blaine (northside)
- Troy Hwy between White Avenue and White Place (northside)
- North Polk at E Street (northside)

The sidewalk repair/construction budget will be allocated to implement the highest priority improvements set by the City considering recommnedations made by the Mobility Task Force and other city-wide needs. In addition, Moscow's sidewalk program has established priorities and procedures for contacting property owners to repair sidewalks, with limited engineering assistance from the City.

Over the past five years, Moscow Safe Routes to School (SR2S) has received $270,000 in infrastructure funds and $103,000 in non-infrastructure grants. The program was most recently awarded a $100,000 SR2S grant to construct concrete sidewalks and asphalt path improvements to provide safe walking routes in the vicinity of local schools (such as D Street).

PARKING IN DOWNTOWN MOSCOW

A healthy, well-managed supply of parking is critical for the long-term health of downtown Moscow. The City of Moscow controls approximately half of the downtown parking supply. City-controlled parking gives the City an opportunity to implement effective parking management practices that both capture the full value of downtown parking resources and improve the downtown parking experience and access for residents, employees, and visitors.

Public Parking Facilities

As of 2008, there were 959 public parking spaces downtown, including on-street and off-street parking. One thousand ninety additional spaces in downtown are privately owned. Figure 31 on page 3-71 provides a map of public and privately owned downtown parking spaces.

Parking Signs and Wayfinding

Wayfinding is an important component of a well-managed downtown parking system because it makes finding parking more convenient and reduces time and distance spent searching for parking. Parking in the central business district is marked by "3 Hour Parking" signs as shown above. These signs let patrons know they are in the downtown business district and clearly define the parking rules. The length of stay enable employees to abuse the system. Many downtowns use 2 hour time stays to prevent employee use and encourage parking turnover.

Parking in downtown is clearly marked with signs indicating time restrictions.

Image from Nelson\Nygaard

On-Street Parking

There are a total of 736 on-street public parking spaces in downtown Moscow. On-street parking is free and is limited to 3 hours, Monday through Friday between 8:00 AM and 5:00 PM (see Figure 32 on page 3-72).

On-street parking in downtown is both angled (head-in) and parallel. Angeled parking is found primarily on the streets surrounding Friendship Square on First, Second, Fourth, Fifth, and Main Streets. Where angled parking does exist, it is found on one side of the street; parallel parking is on the other. Although head-in angle parking provides a more prominent pedestrian buffer and easier parking maneuvering, back-in or head-out angle parking offers additional benefits for downtown patrons and roadway users. See

the callout below for more information on back-in or head-out angle parking.

Off-Street Parking

There are four public off-street parking facilities in downtown Moscow–including the North Jackson Lot, the South Jackson Lot, the City Hall Lot, and the Third and Jefferson Street Lot—with a total of 223 parking spaces. Patrons can park in the City Hall and Jefferson off-street parking lots all day in designated "all day parking" spaces for free. All other designated spaces in off-street parking lots are restricted to 3-hour or reserved permit parking. Permit parking spaces are also reserved for those who pay $75 per year – called Green Permits. These spaces are available on a first come first serve basis. One hundred thirty Green Permits are available for purchase each year. Off-street parking facilities are well-used in downtown (see Figure 30).

Figure 30 Off-Street Parking Utilization (2011)

Parking Lot	# of Spaces	Average Utilization (permits)	Average Utilization (all cars)
North Jackson	29	30%	72%
South Jackson	129	27%	65%
City Hall	30	69%	82%
Jefferson St.	35	33%	52%

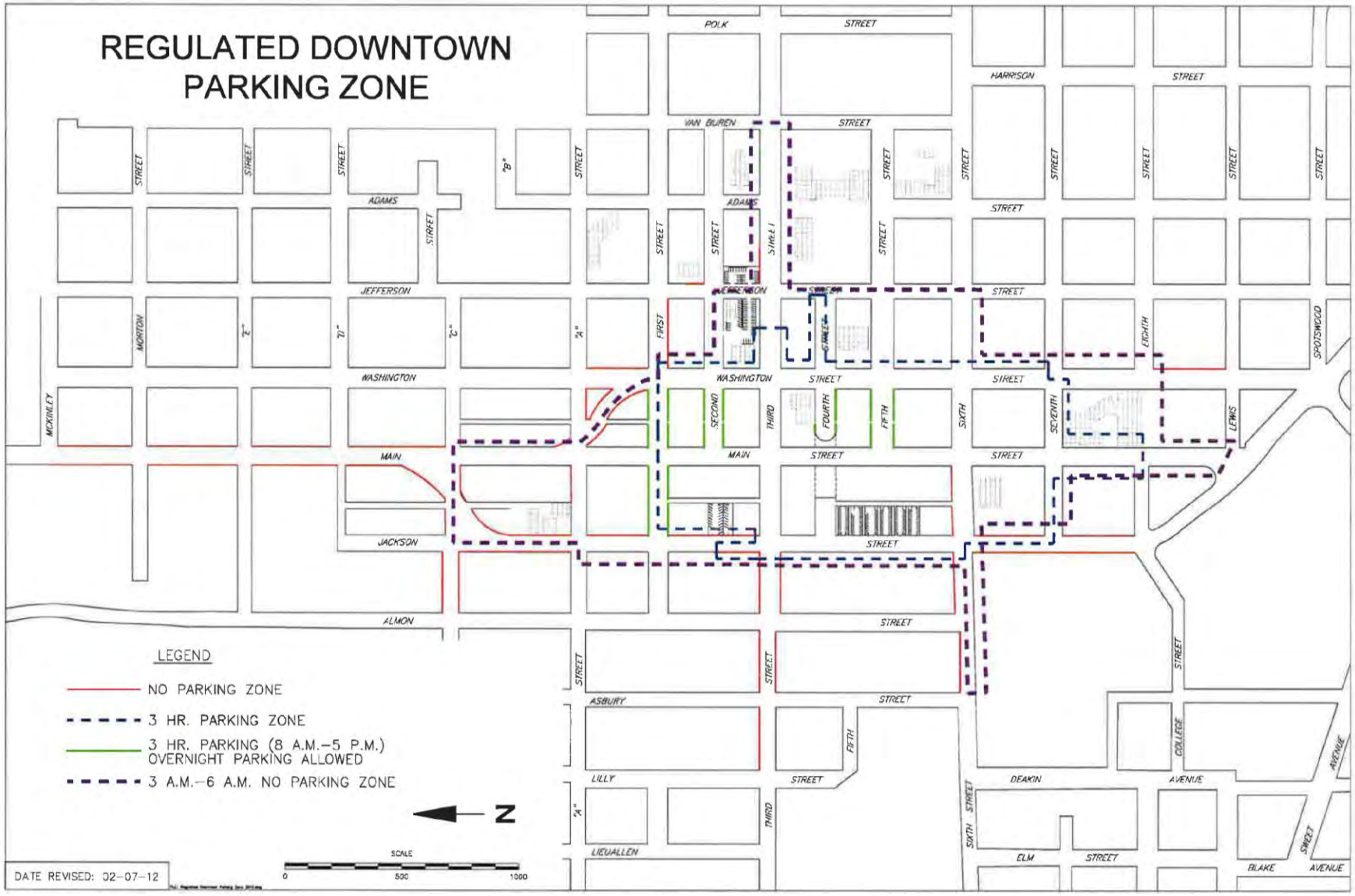
Source: City of Moscow

Parking Citations

A parking ticket costs $25 for exceeding the 3-hour time limit downtown Monday through Friday, 8:00 am – 5:00 pm. A citation for parking in a fire lane is $40, while a citation for parking in a handicap space is $200.

Figure 31 Downtown Moscow Public and Private Parking Map (2008)

Figure 32 Moscow Parking Zone Map (2012)



TRAVEL OPTIONS

A number of organizations and programs in Moscow seek to educate residents about their travel options for daily trips. Programs range from the city-run vanpool program to non-profit led efforts that encourage people to ride bikes, walk, and take transit.

A key aim of these programs is to provide a variety of attractive and affordable transportation options as an alternative to driving alone. See the *Transportation Demand Management* best practice section for more information on effective travel options programs.

City of Moscow Vanpool

In 1993, Palouse-Clearwater Environmental Institute (highlighted in more detail below) received funding from the Idaho Transportation Department and matching funds from local supporters including the University of Idaho to purchase three 15-passenger vans (since 2003) primarily to service the University of Idaho. In 2003, PCEI secured state rideshare funds to enhance, market, and promote the service. PCEI ran the vanpool program until July 2010, when it became too big for the non-profit to manage.

The City of Moscow now manages the vanpool program. The program currently offers a regular Commuter Route from Lewiston to Moscow and a Conference Commuter Service that provides a transportation alternative for those one-time trips out of the area for conferences and training opportunities.

The City of Moscow vanpool program offers daily fixed route service between Lewiston and Moscow.

Image from Nelson\Nygaard

The Lewiston-Moscow service is available for $107 per month. The program is paid for in its entirety by these fares; there are no subsidies. Between January 2010 and March 2012, the vanpool program has provided an average of 338 passenger rides per month.

Moscow Valley Transit

Moscow Valley Transit provides fixed route and ADA paratransit service. Moscow Valley fixed route service provides service between 6:40 am and 6:00 pm on weekdays only. The fixed route buses run every half hour and provided 148,000 trips in 2010. Dial-a-ride service runs during the same days and times and provided almost 10,000 trips in 2010.

See the *Transit* section for additional information on transit services in Moscow.

University of Idaho

The University of Idaho is a key player in travel options program delivery for students, faculty, staff, and visitors. The campus Parking and Transportation Services operates the Vandal Access Shuttle service—a weekday deviated fixed route service prioritized for use by individuals with disabilities—which offers inter-campus circulation and connections to Moscow

Valley Transit service at the Student Union Building.

In addition, the University stores two Zipcar car share vehicles at dedicated car share spaces on Rayburn Street. Car sharing programs allow people to have on-demand access to a shared fleet of vehicles on an as-needed basis. Vehicles must be picked up and dropped off at the same location. Usage charges are assessed at an hourly and/or mileage rate, in addition to a refundable deposit and/or a low annual membership fee. The fee structure typically emphasizes short-term rentals rather than daily or weekly rentals.

The University recently launched ZimRide—an online social network ridesharing platform that provides real-time ride matching for students and faculty. The system uses market-based financial contribution that allows car owners to set the price of a ride. Users can search for one-time rides or daily carpools/vanpools. Each user sets up a commute profile that can be viewed by other students and faculty seeking to find rides to and/or from campus. On the profile, users may provide feedback on each user's behavior, vehicle condition, and commute experience. On the administrator side, ZimRide cost-effectively provides marketing services and on-the-fly performance measurement and monitoring for the University.

In addition to these three key programs, the Division of Student Affairs at the University also hosts a transportation website that provides information on Moscow Valley Transit, taxi service, and transit options for people with disabilities.

The University is deploying programs that limit the need to bring a car on campus and reduce on-campus parking demand. The University offers two Zipcars (left) available to students, staff, and the general population. In addition, ZimRide's web-based ride matching platform makes daily carpooling and one-off local and regional rides not only feasible, but also a normal activity. ZimRide's web interface is pictured on the right.

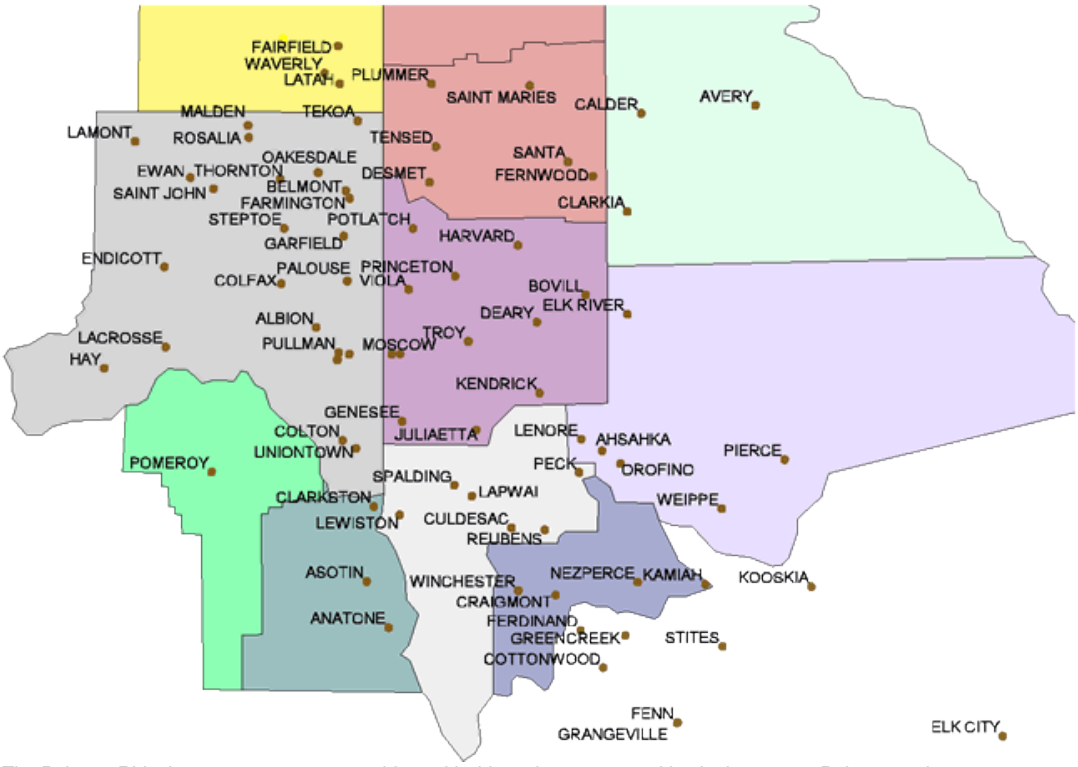
Images from Nelson\Nygaard (left) and the University of Idaho (right)

Palouse-Clearwater Environmental Institute Rideshare

The Palouse-Clearwater Environmental Institute (PCEI) is a non-profit organization with a mission to increase citizen involvement in decisions that affect the region's environment. This mission has played out in a number of ways since the organization's inception in 1986, including a community transportation program that helped launch the region's first vanpool program in the early 1990s. The vanpool program has since been turned over to the City of Moscow (see the "Vanpool" section above). Today, PCEI coordinates the Palouse Rideshare program that helps connect riders with drivers in the Palouse region and beyond (see map below).

Bike for Life

Bike for Life is a local advocate organization that provides safety information and organizes bicycling-related events in Moscow. Its mission is to encourage people to travel by bike during National Bike Month and throughout the year. The Bike for Life website provides safety tips and a running list of bicycle events and articles in Moscow including educational opportunities, Bike to Work Week, Bike to School Day, and the multi-activity Bike Fest, among others.



The Palouse Rideshare program connects riders with drivers in 75 communities in the greater Palouse region.

Image from PCEI

At Bike to Work 2012, Bike for Life provided snacks and refreshments for cyclists on their morning commute to school and work.

Image from Bike for Life

Safe Routes to School

Safe Routes to School (SR2S) is a state funded program with a mission to encourage teachers, parents, and children to walk, bike, and share rides to school. SR2S programs can result in increased walking and bicycling to school, safer walking and bicycling environments, less pick-up and drop-off traffic, and a new generation of children that are enthusiastic about walking and bicycling.

The program works with all of Moscow's elementary schools to educate teachers, students, and parents about safe ways to walk and bike to school. The "Fill the Racks" campaign, sponsored by the City of Moscow and the SR2S program, invites K-9 students to bike, walk, carpool, or take transit to school. See the *Walking in Moscow* section for more information on SR2S program success in Moscow.

Moscow's Safe Routes to School program offers a variety of services like developing city-wide walk- and bike-to-school maps that show possible school access routes and other important information like availability of sidewalks and crosswalk facilities.

Image from Moscow SR2S program

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[i] Moscow Comprehensive Plan, Figure 3.1
[ii] 2011 Moscow Safe Routes to School participation survey data

WHERE IS MOSCOW GOING?

This chapter discusses future trends that will impact transportation system performance and the need for investment. The chapter focuses on key demographic trends, where residential and commercial growth is anticipated, and how future travel demand will be distributed on local and regional facilities. Included is a discussion of new travel demand modeling tools that will be introduced in the *Moscow on the Move* process.

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WHERE IS MOSCOW GOING?

As a small college town of 23,800 Moscow offers a high quality of life for its citizens and student population. Moscow mixes small town character with the educational and cultural resources of a larger city. This combined with access to outdoor recreation will help to ensure Moscow continues to be great place to live and do business.

As the city and University continue to grow, pressures to maintain quality access to all of Moscow's offerings will increase. This chapter describes the current and projected population and job growth and where that growth will be located per the Moscow Comprehensive Plan (2009) and multiple economic development initiatives. The next section provides a discussion of vulnerable populations, such as the low-income population, the elderly, and youth that deserve special consideration in *Moscow on the Move*.

This chapter ends with a discussion of planned transportation improvements and a primer on citywide travel demand modeling.

DEMOGRAPHIC PROFILE AND GROWTH

Current & Projected Population Growth

Of Moscow's 23,800 residents in 2010, 48% were enrolled in the University of Idaho (graduate and undergraduate). Relatively dense pockets of population and employment are concentrated in downtown, within and just south of the University, and in the neighborhoods immediately east of downtown. Figure 2 on page 4-3 shows the population and employment density in 2010.

Based on past ratios and the University's targets for future enrollment, roughly half of the projected population growth is likely to be students at the University of Idaho. Figure 1 on the following page provides a snapshot of historic population growth since 1900 (2,500) and projected population growth in 2030 (31,761). Expanding Moscow's boundary is limited by the city's ability to serve outlying areas with costly infrastructure like streets, sewer, and water. All across the U.S., cities are struggling to maintain and expand infrastructure and services to sprawling communities that were developed in better economic times and often initially financed through developer fees. In many recent cases, this burden has contributed to City insolvency. This trend indicates that, without a large increase in

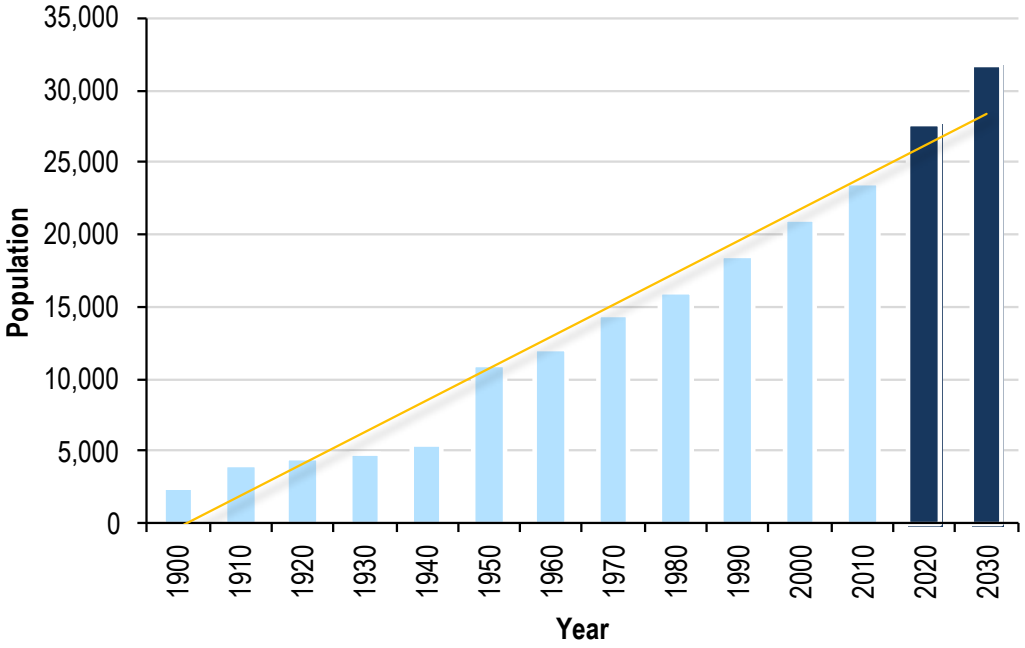
funding, much of the 32% projected increase in population in Moscow between now and 2030 will need to occur within the existing community to avoid building and operating costly new infrastructure outside of Moscow's area of impact. This is consistent with the Comprehensive Plan's general land use and community character goal: "Direct land uses to meet current and future community desires and needs while conserving natural resources and protecting agricultural lands from scattered development through efficient and orderly development."

Current & Projected Employment Trends

Moscow is a key player in the regional economy, providing jobs, retail, and services to Latah and Nez Perce County communities, and Pullman and Whitman County communities in Washington. Analysis of Census data has revealed that Moscow is increasingly an attractive place for residents and for workers employed throughout the region (see Figure 5 "Inflow and Outflow of Moscow Residents and Workers, 2010" in the *Getting Around Moscow Today* section for a discussion on current commute patterns). As an attractive place to live, job growth needs to match the pace of population growth. As such, concerted effort is noted in the Comprehensive Plan to create a better jobs/housing balance, not only making more jobs available, but also distributing employment near existing activity centers and housing to allow workers the opportunity to commute by transit, walking, and bicycling.

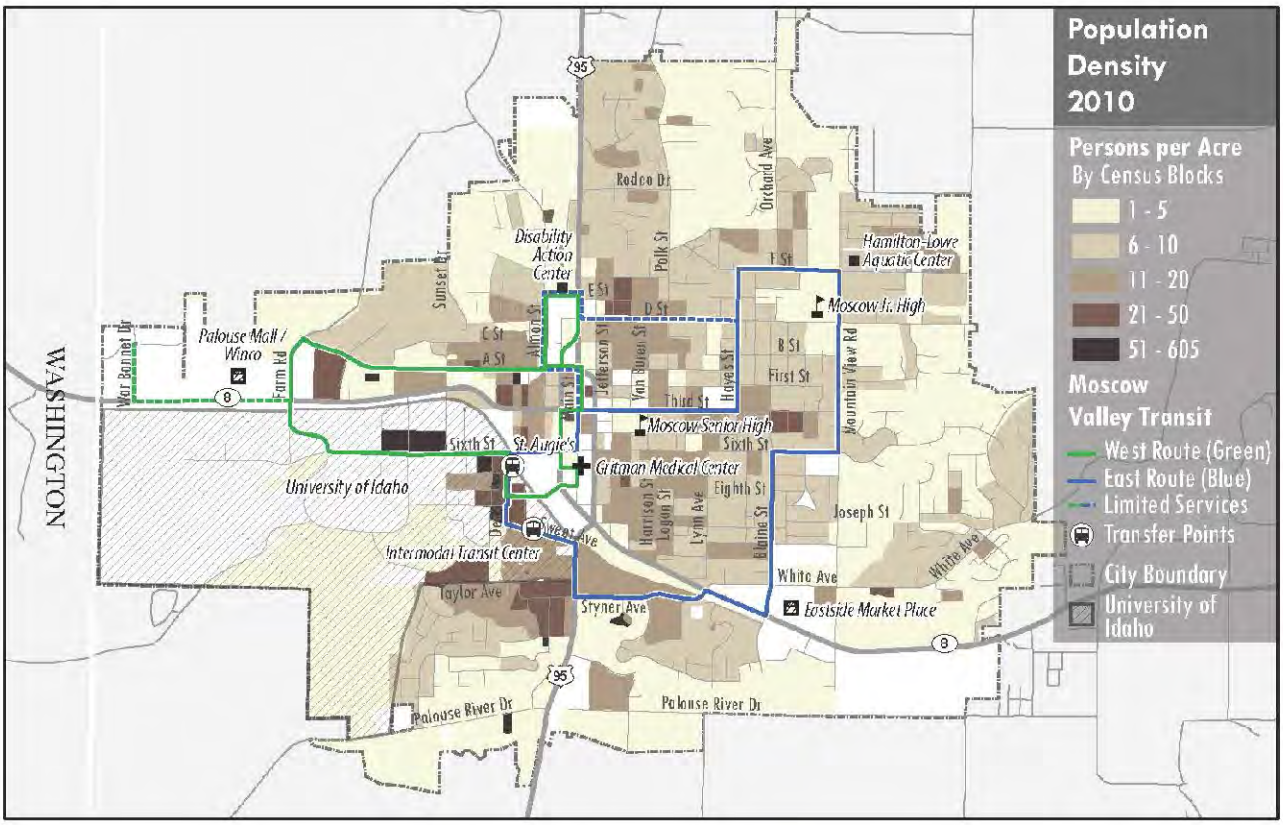
As shown in Figure 3 on page 4-4, the number of employed residents in Moscow has fluctuated considerably in the last ten years. In 2011, the Moscow unemployment rate was almost a full percentage point below the state of Idaho.

Figure 1 Historic & Projected Population in Moscow, 1900-2030



Source: City of Moscow Comprehensive Plan (2009)

Figure 2 Population and Employment Density, 2010



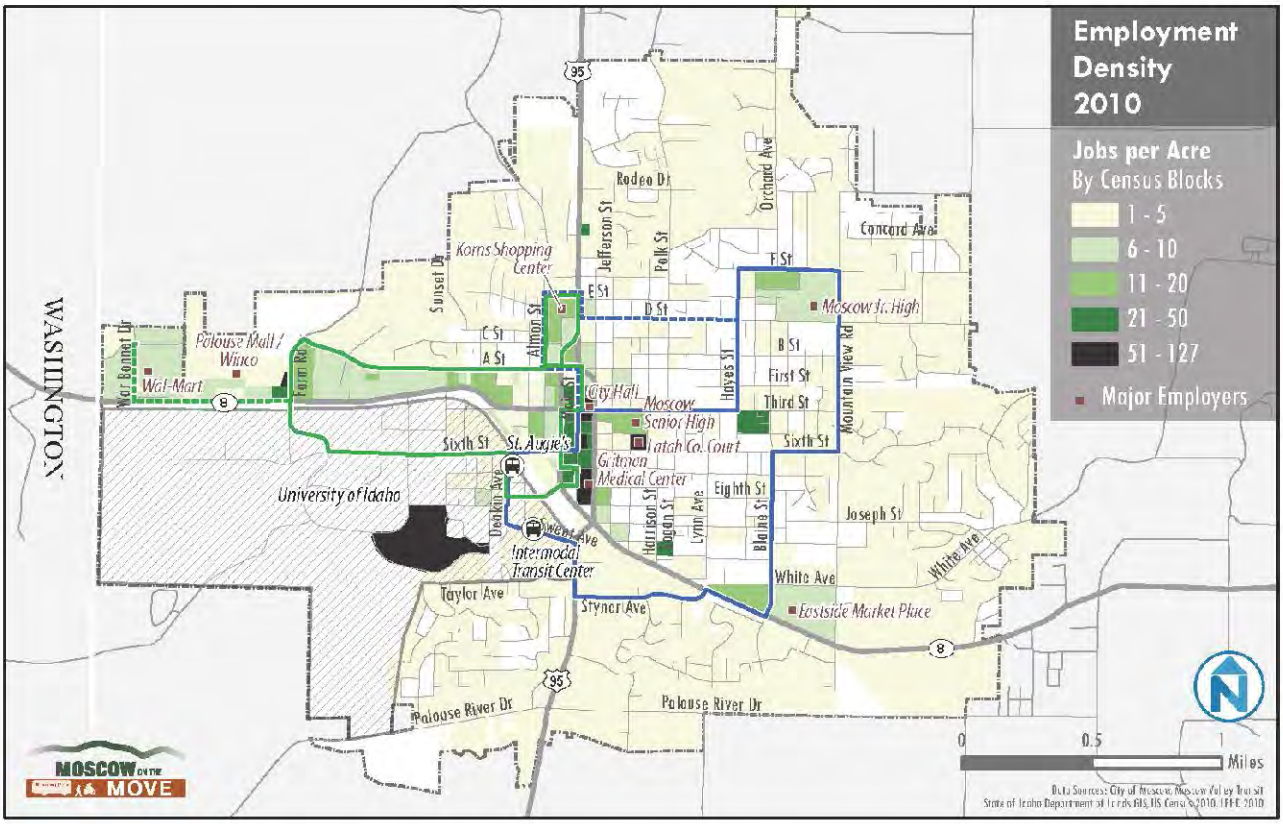
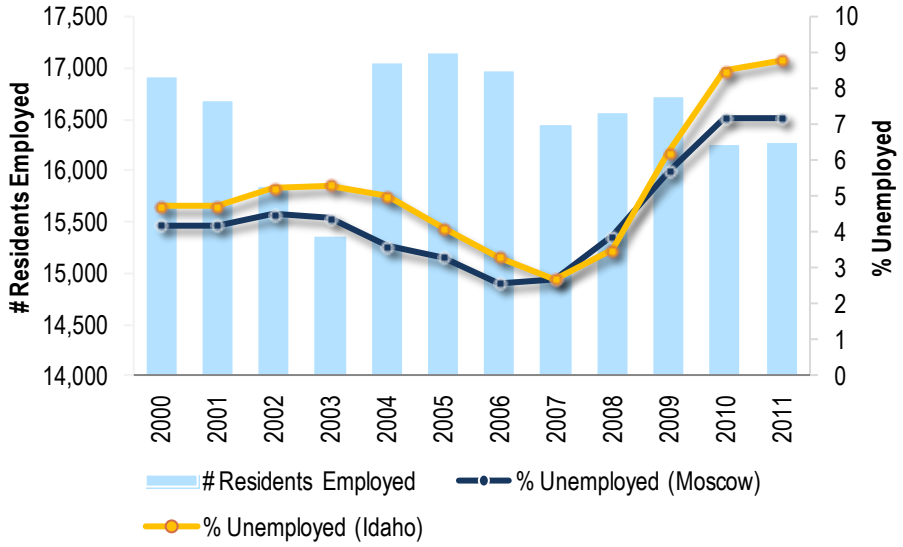
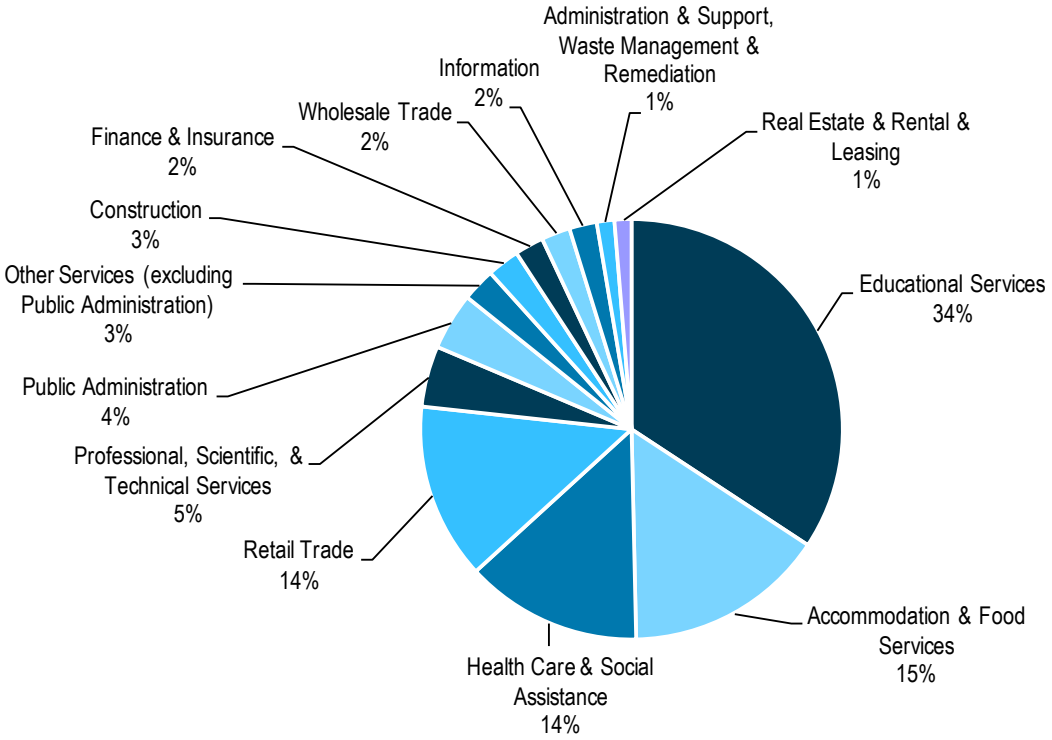


Figure 3 Moscow Employment Trends, 2000 - 2011



Source: Bureau of Labor Statistics Local Area Unemployment Statistics

Figure 4 Moscow Employment by Sector, 2010



Source: Idaho Department of Labor, Lcoal Employment Dynamics On the Map, U.S. Census, 2010

Figure 4 above profiles the percent of employment by industry. The Educational Services sector (the University and Moscow School District) employs the greatest number of residents, followed by

accommodation and food services, retail trade, and health care and social assistance.

Figure 5 below profiles the top ten growing industries in Clearwater, Idaho, Latah, Lewis, and Nez Perce counties between 2008 and 2018. Some of the top growing industries and job sectors (noted below) include information services, and professional, scientific, and technical services. Given the proximity of Moscow to the University of Idaho and Washington State University, new jobs in these industries could likely be located in the Moscow region.

Figure 5 North Central Idaho Employment Projections for Top Ten Growing Industries, 2008-2018

Industry	2008 Employment	2008 % of Employment	2018 Employment	2018 % of Employment	% Change 2008-2018
Health Care and Social Assistance	6,070	12.4%	6,896	13.3%	13.61%
Finance and Insurance	1,864	3.8%	2,266	4.4%	21.58%
Transportation and Warehousing	1,305	2.7%	1,461	2.8%	11.92%
Agriculture, Forestry, Fishing, and Hunting	1,006	2.1%	1,388	2.7%	37.95%
Professional, Scientific, and Technical	983	2.0%	1,139	2.2%	15.92%
Administrative and Support and Waste Management and Remediation Services	968	2.0%	1,175	2.3%	21.37%
Information	644	1.3%	755	1.5%	17.18%
Arts, Entertainment, and Recreation	436	0.9%	532	1.0%	22.21%
Real Estate and Rental and Leasing	414	0.8%	518	1.0%	25.12%
Utilities	102	0.2%	132	0.3%	30.05%

Note: Percentages do not add up to 100% because they account for the top ten industries only.

Source: Idaho Dept. of Labor, 2008-2018 Industry Projections

Growing the Regional Economy through Strategic Initiatives

Palouse Knowledge Corridor

The Palouse Knowledge Corridor (PKC) is a consortium of companies in the Latah County-Whitman County region dedicated to developing high tech talent and technologies with the aid of local university expertise and research. Given the close proximity of Washington State University and the University of Idaho, there is opportunity to recruit highly qualified graduates to grow local industry. The PKC expects to add over 1,000 residents in the next 5 years, pushing the population well over 75,000 by 2012. Workforce-aged inhabitants between the ages of 20 and 64 make up 65% of the total population.

The University of Idaho and Washington State University's proximity – located just eight miles apart – contribute to a high concentration of knowledge and innovation. One indicator of this innovation is the number of patents produced per capita; the PKC consistently generates more patents per 1,000 people than the nation as a whole. According to a study conducted by Economic Modeling Specialists Inc., the PKC generated 0.7 patents per 1,000 people in 2007 compared to 0.4 patents per 1,000 people in the nation.

The region also shows a proportionally high concentration of educated residents as indicated by educational attainment data for 2006. Twenty-one percent of residents 25+ hold a graduate degree compared to ten percent at the state and national level. A key strategy to grow the PKC will be to encourage young educated adults to remain in the community after graduation.

KEY TRAVEL MARKETS

The demographic indicators analyzed below highlight populations within Moscow that are transit dependent or are in need of low-cost and readily accessible transportation options. Although automobile travel is and will continue to be a vital component of citywide mobility and access to services, the cost of owning and operating an automobile can consume a disproportionately high percentage of household income for low income populations. It should be noted that high incidences of very low income and households without cars shown in Figure 6 can be attributed to the large student population in Moscow.

Low Income

Twenty-three percent of households in Moscow are considered low-income, defined as households earning at or below the federal poverty level,[i] which is based on household size. As shown in Figure 6, the highest density of low-income residents is concentrated along Sixth Street on the campus of the University, which are dormitories occupied by students. Although the highest density clusters are generally served by transit, portions of moderate density low-income clusters, such as those located south of Styner Ave, are not in close proximity to transit.

Households Without Cars

Households without access to a car may represent households without economic means to own a vehicle, as well as households with individuals that choose not to own a car or are unable to drive. *Moscow on the Move* will identify projects, policies, and programs to help carless households access transit, and bike and walk for all trip types.

Six percent of households in Moscow do not have access to a vehicle. Figure 6 shows that the distribution of these households roughly aligns with the distribution of low-income households and seniors shown in Figure 7. The one distinction is the pocket of students living on campus between Third Street and Sixth Street. Although these students are low-income, many have and store a vehicle on campus.

Residents living near Mountain View between Sixth Street and D Street have a noteable population with car access, which corresponds with the relative high neighborhood transit boarding activity shown in the *Getting Around Moscow Today: Transit* section.

Image from Nelson\Nygaard

Youth & Senior Population

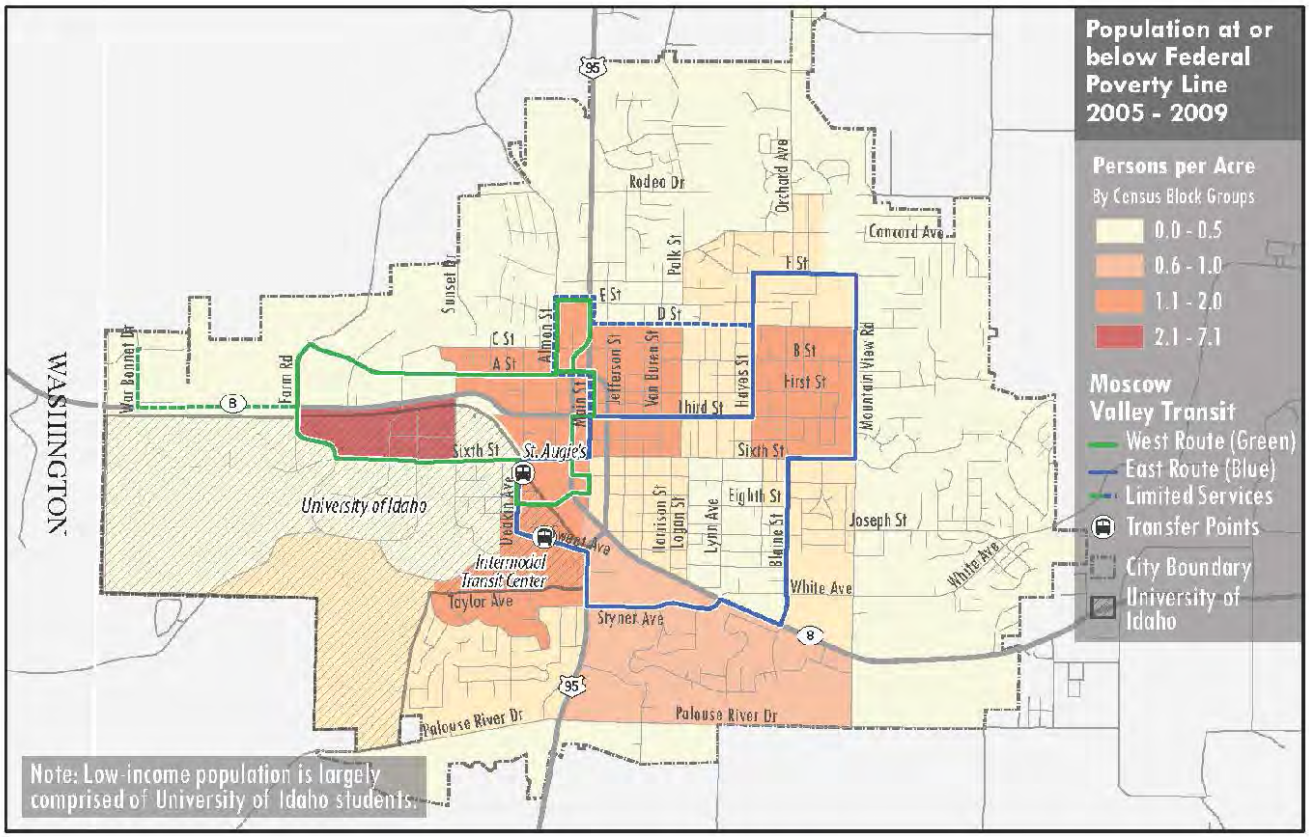
Public transportation and walking serve as critical means of transportation for older adults (65 years and above) and youth (10 to 21 years) because of their limited ability to drive a car—physical, financial, or otherwise. Older adults often exhibit higher demand for transit (especially door-to-door demand response service like Moscow Valley Transit's Dial-A-Ride service) as they become less capable or willing to drive themselves, or can no longer afford to own a car on a fixed income. Young people without driver's licenses or those unable to drive need reliable transit service and safe and convenient biking and walking routes to access school, after school activities, part-time jobs, recreation, and entertainment.

In Moscow, the highest concentration of youth is located in close proximity to the University of Idaho campus (see Figure 7 on the following page). Moderate concentrations of youth are scattered throughout the community.

The greatest concentration of senior residences is at the Good Samaritan Village on North Eisenhower Street northeast of downtown roughly ½-mile from the closest transit route. Other concentrations of senior residences are located at the Kindred Nursing and Rehabilitation Center on Styner Avenue, directly on the Moscow Valley Transit's East Route, and the Good Samaritan – Fairview Village located on the outskirts of Moscow

A large number of college students in Moscow walk or use public transit to access their daily needs.
Image from Nelson\Nygaard

Figure 6 Low Income Population and Carless Households, 2005 – 2009



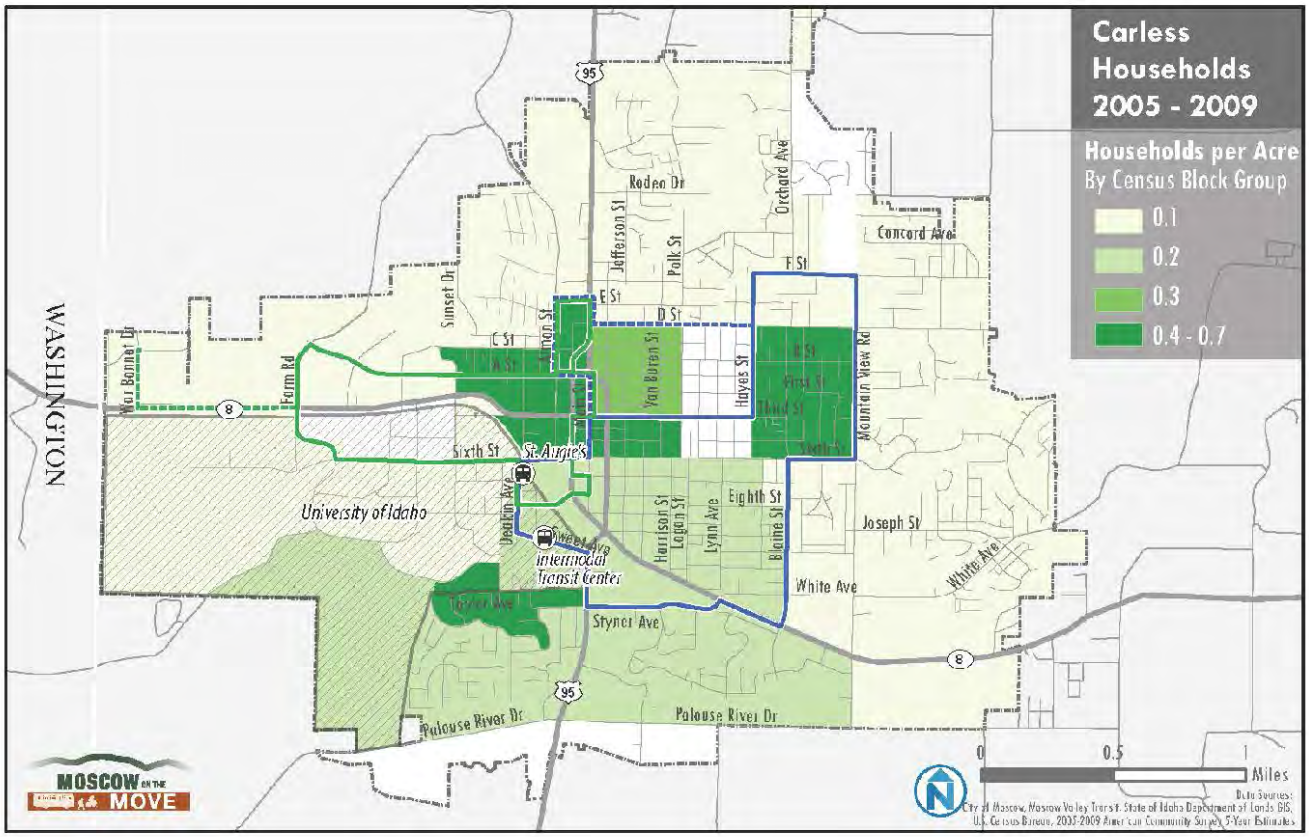
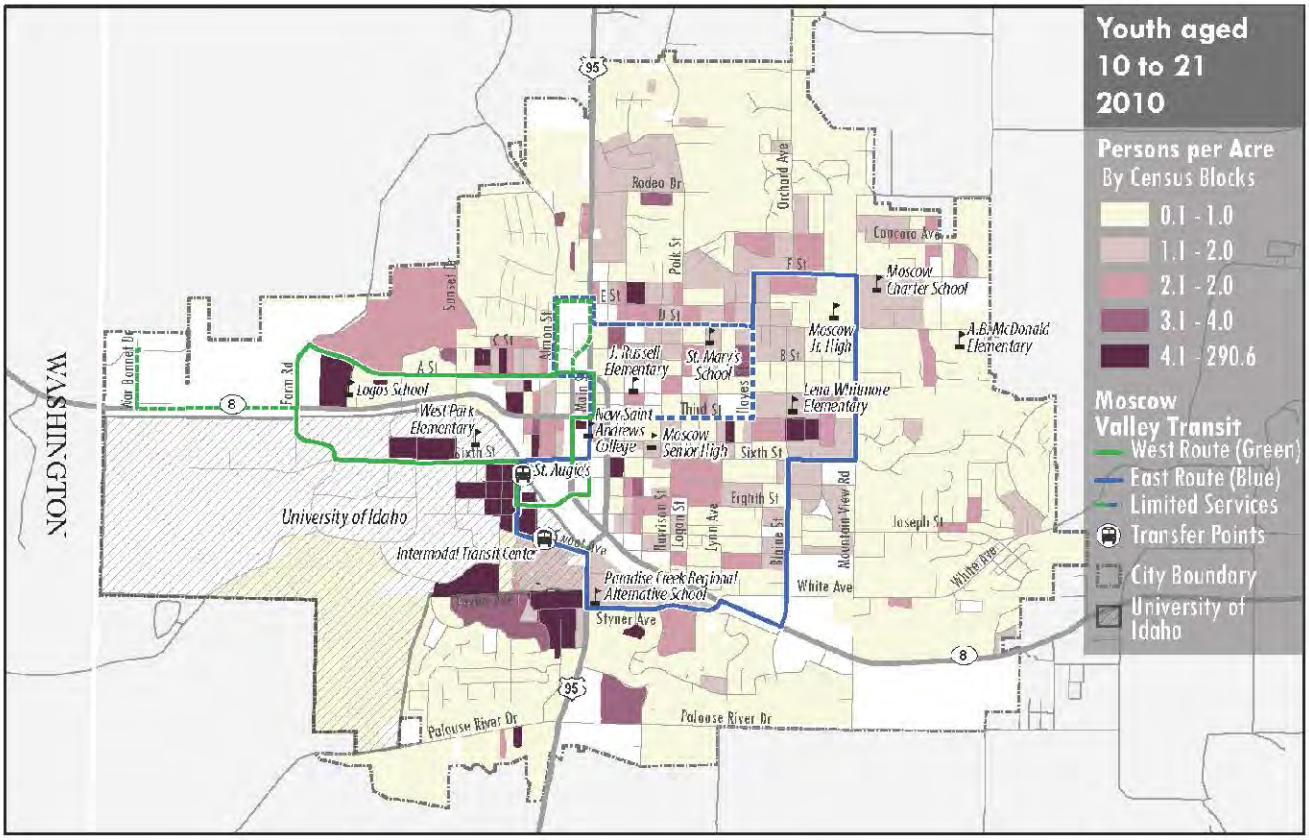
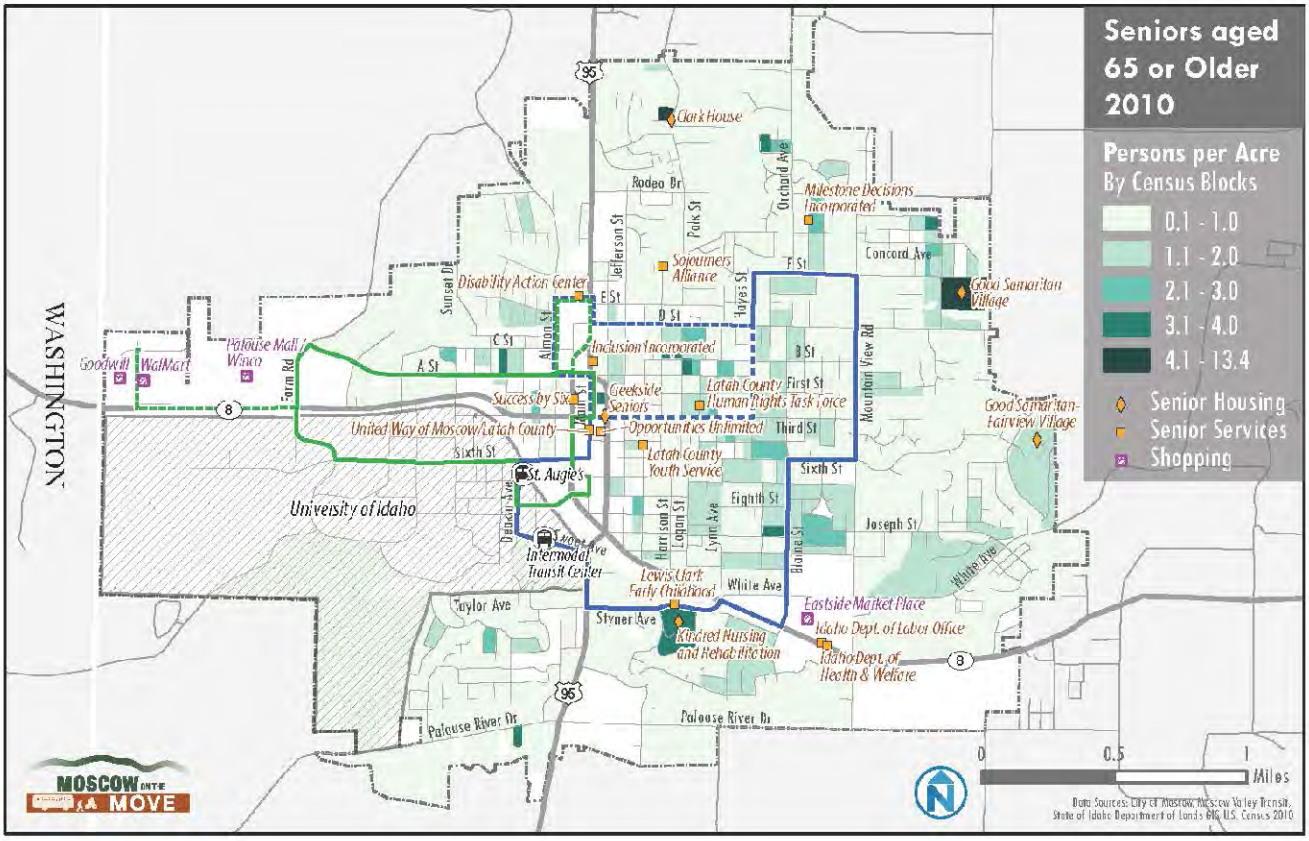


Figure 7 Youth & Senior Population, 2010





WHERE WILL GROWTH BE FOCUSED?

Since incorporation in 1891, Moscow's city boundaries have grown commensurate with the pace of population and University growth. Figure 9 on page 4-13 illustrates the expansion of Moscow's city boundaries and highlights future growth areas. This section highlights future land uses and growth areas.

Future Land Uses

In 2009, the City of Moscow adopted its Comprehensive Plan—a 20-year plan that envisions sustainable population and economic growth while maintaining and enhancing Moscow's unique small-city character. Maintaining the character of the City and its neighborhoods and providing for the needs of all its residents were of paramount importance.

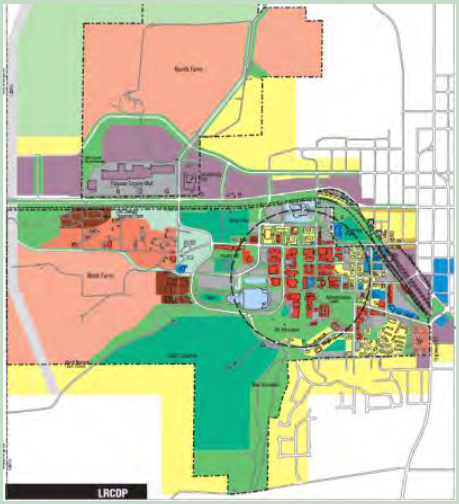
Moscow's population is forecast to grow from 23,519 in 2010[ii] to 31,761 in 2030—a 35% increase. Residential use is currently the dominant land use in the community. The Comprehensive Plan envisions a Moscow that:

- Protects existing neighborhood identity and character
- Provides a mix of housing that meets the needs of the diverse population
- Preserves and enhances special areas of the community
- Guides the expansion of downtown development while considering the needs for parking and the desire to maintain the existing historic character
- Provides a continuum of land uses that allow a variety of uses and housing types to meet the needs of the community

Figure 8 on the following page maps future land use and growth plans for the City of Moscow. A substantial amount of land in the Comprehensive Plan has been designated as "neighborhood conservation" land. Mixed-use and commercial development are slated for east of the University between A Street and Taylor Avenue. Neighborhoods north of the University are planned for Auto-Urban Commercial uses.

University of Idaho

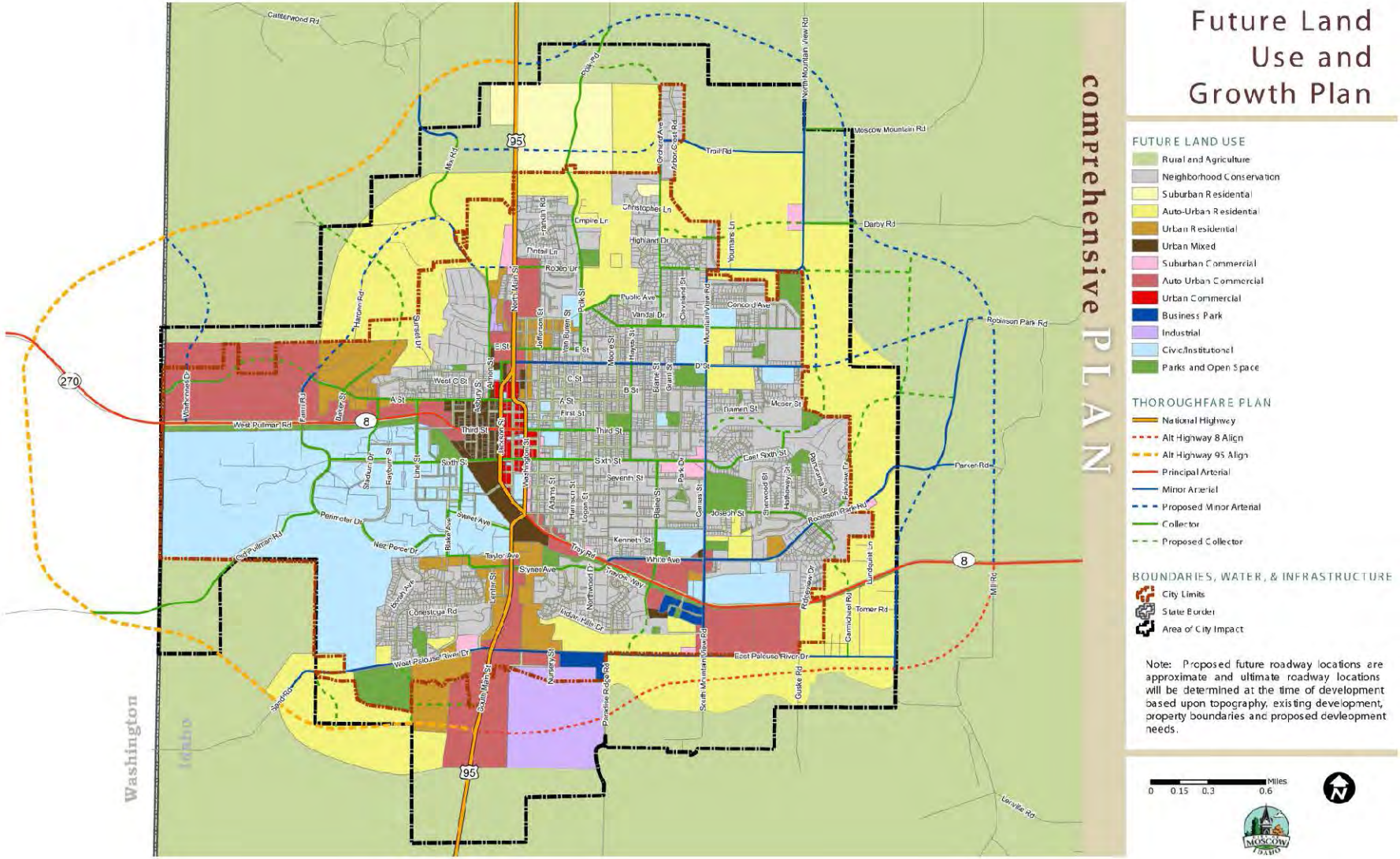
Long-Range Campus Development Plan



The footprint of University of Idaho's 1,585 acre campus encompasses a major portion of southwest Moscow. The goal of the University of Idaho Long-Range Campus Development Plan (LRCDP) is to optimize land use, preserve historic qualities and features, and improve the experience for students. Increased density within the existing land area of campus will allow the campus enrollment to reach 15,000-17,000 before new clusters of buildings are needed in areas beyond the central area.

The University envisions a "compact academic core" that will accommodate much of the growth (circled in the graphic above). Infill sites within the existing campus have been identified. The University has also reserved the "West Farm" area to accommodate growth after infill development has been maximized. As the University grows, surface parking will be replaced with residential and academic buildings. Providing a range of travel options for faculty, students, and staff will help the University meet its growth projections while providing a safe and attractive transportation system that meets the needs of everyone.

Figure 8 Future Land Uses, Moscow Comprehensive Plan



Future Growth Areas

The following is an overview of areas within Moscow's existing city limits that are slated to absorb future population and job growth. Figure 9 displays the spatial distribution of these growth areas.

Downtown

Downtown Moscow is the cultural and economic heart of Moscow. Friendship Square is located in the middle of the city, providing benches, a fountain, a playground, and central bus connections. The 2002 Downtown Revitalization Plan establishes a vision for downtown Moscow as a "vibrant, mixed-use district with attractive streetscape, public spaces and buildings serving the regional population's needs and desires for shopping, eating, entertainment, government services, education, culture, recreation, medical and other professional services." The 2009 Comprehensive Plan sets a vision for a mixed-use commercial center from the University east to Jefferson Street and from B Street south to where S Main Street meets S Washington Street (the south couplet).

Urban Renewal Areas

The Moscow Urban Renew Agency was formed in 1995 to encourage redevelopment of designated areas. Since its inception, two urban renewal areas have been established.

Alturas Technology Park

The Alturas Technology Park Urban Renewal District was established in 1996 to encourage business development south of SH8/Troy Road and west of Mountain View Road. Today, Alturas is home to a growing cluster of high-tech companies that benefit from their proximity to the University of Idaho and Washington State University.

The urban renewal area has increased the value of property considerably. In 1996 when the area was formed, the assessed value of property within the revenue allocation area was approximately $6.4 million. Improvements and developments made as a result of the Alturas Research and Technology Park Urban Renewal Plan have helped increase property values to more than $22 million. This district is due to expire in 2015.

Legacy Crossing

The formation of the Legacy Crossing Urban Renewal district came about from the community's desire to eliminate conditions impeding the City's economic growth between Moscow's historic downtown and the University of Idaho campus. The Legacy Crossing project is important because it reinforces the connection between downtown and the University. A well-designed redevelopment project at Legacy Crossing provides an opportunity to develop dense, urban residential development and prime retail space for students and faculty at the University and visitors to downtown.

SE Industrial Corridor

As described in the Comprehensive Plan, the area between the Indian Hills subdivision and the Palouse River between South Main Street and Carmichael Road would provide opportunities for residential, commercial, and industrial development. Adjacent to the industrial corridor, the Southeast Moscow Industrial Park Project Plan, completed in 2010, provides a vision for 68-acres of industrial land. The proposed plan includes 22 business park parcels ranging from 0.60 to 1.5 acres each and 18 Industrial Park parcels ranging in size from 1.1 to 4.1 acres.

Other Targeted Areas

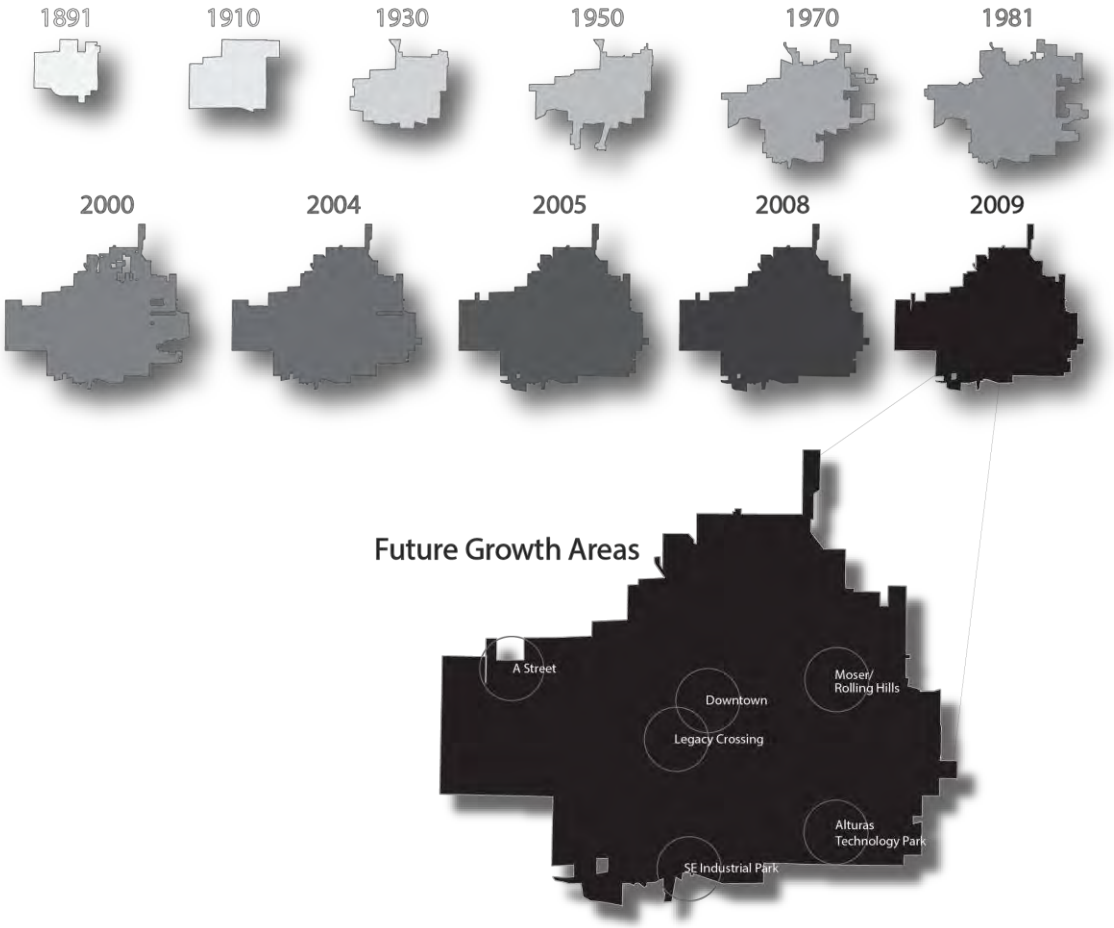
In recent years, the City has targeted two other areas for growth:

- "A" Street between Warbonnet Drive and Farm Road; and

- Mountain View Road between the Moser and Rolling Hills neighborhoods.

Without a change in transit routing to serve new development near the "A" Street extension, this development would be about a half mile walk to existing transit service on Pullman Road; development along Mountain View Road would have easy access to existing transit service along N Mountain View Road.

Figure 9 Historical growth patterns and future growth areas



PLANNED TRANSPORTATION IMPROVEMENTS

Since 2006, the City has made major improvements to Moscow's transportation system, including road improvements, installation of sidewalks and bicycle lanes, and bus infrastructure improvements. Some of these projects were made possible by American Recovery and Reinvestment Act funding, which is no longer available. As the federal transportation funding picture shifts, Moscow will need to develop new funding mechanisms and tap into a variety of different funding sources to implement planned improvements. Planned projects in Moscow that have received funding include:

Pedestrian improvements planned for 2013-2020:

- Sidewalks and asphalt path improvements on D Street to improve walking routes to school
- Installation of new ADA compliant pedestrian ramps along SH8 and US95
- Sidewalk improvements along Sweet Avenue, N Main Street, and Hatley Way
- Installation of sidewalks on west side of N. Polk Street and south side of F Street
- Improvements to the downtown streetscape including installation of vintage lighting, street trees, artwork, benches, and bicycle racks
- Additional hotspot projects

Roadway improvements planned for 2013-2020:

- Reconstruction—including widening, curb, gutter, and sidewalk construction, and striping bike lanes—of several streets including A Street from Peterson Drive to Home Street, Mountain View Road from Fairgrounds to Sixth Street, including a potential roundabout at Sixth/Mountiain View, and Mountain View Road from White Avenue to SH8
- Installation of new bridge across Paradise Creek at College Street
- Add signalized intersections at Line Street/A Street, and Mountain View Road/White Avenue

Planned transportation improvements in Moscow aim to expand roadway capacity and improve signalized intersections on key roadways including A Street and Mountain View Road, in future growth areas. Most roadway improvements include pedestrian improvements and some projects include bicycle facilities. Pedestrian-specific improvements are focused on downtown, the University campus, and along SH8 and US95 (part of an ITD ADA ramp program).

The recent bus stop and sidewalk enhancement project was funded through the American Recovery and Reinvestment Act.

Image from Nelson\Nygaard

TRAVEL DEMAND MODELING

As part of *Moscow on the Move's* planning process, a multi-modal travel demand model will be developed to help inform impacts and benefits of proposed near- and long-term transportation projects. Travel demand models are one of the primary tools for estimating future travel demand for transportation planning projects in the United States. Traditional "four-step" models were originally developed in the 1950s to forecast demand for highway infrastructure, but have evolved for use on local streets and to include non-automobile modes of travel.

How does a travel demand model work?

Multi-modal travel demand modeling uses computer software to replicate the "real world" transportation system around us such as roads, intersections, traffic control devices, congestion delays, use of a transit system, and bicycle and pedestrian activity, among other factors. It uses current and projected land use, socioeconomic, and roadway information to estimate travel patterns and roadway traffic volumes.

Once the computer model can accurately replicate the existing conditions of a study area, it can then be used to anticipate future travel patterns and demands based on changes in the transportation system (e.g., new roads, wider roads with more capacity, closed roads); changes in land use (e.g., more residential development, a new industrial site, etc.); and changing demographics (more or fewer people in a specific area, access to a vehicle, etc.).

The conventional travel demand forecasting model consists of four steps:

1. **Trip Generation.** Determines the number of trips that will be generated in each analysis zone based on land use and socioeconomic data. For example, highly populated zones with affluent households in low-density developments tend to generate more trips. Step 1 answers the following questions:
   - How often do people travel?
   - How many workers are drawn to any given employment center?
2. **Trip Distribution.** Determines the originating and destination zones for each predicted trip, based on the relative "attractiveness" of individual zones. For example, zones with more retail space will attract more shopping trips. Step 2 answers the following question:
   - Where do people travel to work, school or shopping?
3. **Mode Choice.** Determines the means of travel for individual trips based on cost, convenience and travel time comparisons between modes. Modes typically include single-occupant vehicle, carpool, or transit trips, although the multi-modal model being developed for Moscow will also assign trips to walking or cycling. Step 3 answers the following question:
   - How many people drive alone, bike or walk, share a ride, or take transit?
4. **Trip Assignment.** Determines which route each trip will take between its origin and destination. This step assigns automobile trips to specific roadways, transit trips to specific bus routes, and bike or walk trips to specific streets or pathways. It may reassign trips to alternate routes to

minimize overall travel time. Step 4 answers the following questions:

- What routes do travelers use?
- How much congestion results?

Strengths and Weaknesses of Modeling Traffic

The key strength of travel demand models is that they can offer technical support when prioritizing or determining need for improvements. By simulating the current roadway conditions and the travel demand on those roadways, transportation system needs and deficiencies can be identified. Once these deficiencies are identified, potential improvements are evaluated by reassessing the model with an "improved or modified" transportation system. A range of different street networks, and even different land use patterns can be tested this way. These alternatives may include developing future network enhancements and analyzing currently proposed projects.

The travel demand model provides a foundation for analyzing and comparing the performance of potential plans, aiding decision making and strategic development.

However, it is important to note that future-year traffic projections are based on numerous assumptions about how population, employment, automobile operating costs, roadway system, and other factors will change over time. While the model is a tool used to guide the analysis process, it requires careful interpretation.

The following limitations can cause inaccurate results when analyzing potential transit use and/or demand for non-motorized travel modes:

- **Trip purpose.** Traditional four-step models focus on work trips that originate from home and return there afterwards. However, the number of non-work trips (shopping, school, etc.) typically exceeds work travel and comprises up to 70% of peak hour travel in some national studies. Some models have a limited number of trip purpose categories and/or data on non-work trips may not exist in many locations.
- **Zone-based travel.** The model analyzes trips that start and end at the center of analysis zones. Many non-automobile trips travel just across zone boundaries or occur within a single zone. As a result, trips can seem longer than they really are and models can underestimate use of walking and bicycling.
- **Homogeneity.** Demographic and land use characteristics are considered constant across a single zone, however factors that determine use of alternate modes can vary within even small zones.
- **Mode bias.** The basic model does not account for individuals' propensity to use enhanced transit service (bus rapid transit or rail) over conventional bus service. In addition, few applications of the model account for land uses that facilitate walking and bicycling when making mode choice decisions.
- **Travel time.** Most models do not account for changes in peak-period travel. Trips are typically assigned to peak or midday periods at the start of the modeling process and manual intervention is required to account for changes in travel time to avoid congestion or in response to Transportation Demand Management (TDM) measures.
- **Parking parameters.** Models may not be accurate if the cost of parking or the time required to park and retrieve a car are not accurately represented.

How will the multi-modal transportation demand model be used in this plan?

A travel demand model will be developed for Moscow through the multi-modal transportation planning process. The model will consider relevant local data (land use, demographics, transportation system, etc.) and will be used to project future travel demand in Moscow. The model will also estimate future traffic volumes on city roads, assess system needs, and test network alternatives to address the identified needs. As mentioned above, the multi-modal nature of the model will ensure that trips are assigned to non-auto modes where those trips are most viable.

How can these conditions change as a range of citywide transportation improvements are implemented? This is a key question Moscow's multi-modal transportation demand model will aim to address.This photo is of 6th Street immediately east of Deakin Avenue near the University.

Image from Nelson\Nygaard

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[i] In 2012, the poverty level for a one-person household was $11,170; 2-person household was $15,130; 3-person household was $19,090; 4-person household was $23,050. Source: the U.S. Department of Health and Human Services.
[ii] 2008-2010 American Community Survey 3-Year Estimates.

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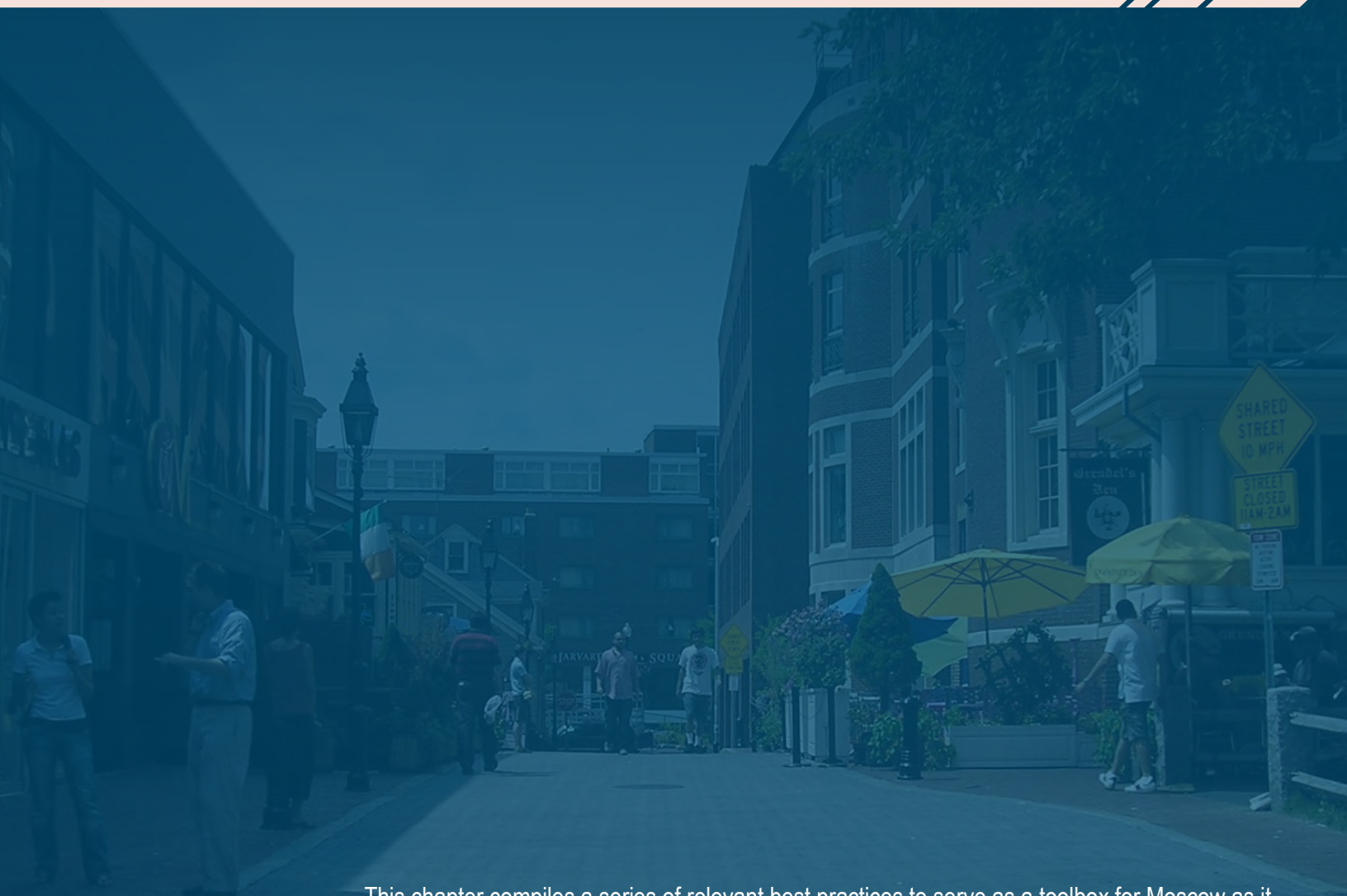
BEST PRACTICES



This chapter compiles a series of relevant best practices to serve as a toolbox for Moscow as it develops and implements *Moscow on the Move*. Best practices presented on the following pages include community design, roadway design, transit service, bicycle and pedestrian improvements, transportation efficiency measures, funding, and performance measurement. Many of the best practices detailed have been implemented in small cities and college communities.

NELSON NYGAARD

CITY OF MOSCOW IDAHO

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BEST PRACTICES

TRANSPORTATION & LAND USE INTEGRATION

WHY IS THE DESIGN OF A CITY IMPORTANT?

The shape and design of a city play a critical role in the length of people's journeys, the quality of the experience, and how they chose to travel. Households make fewer vehicle trips when neighborhoods are designed with people's daily needs in a few minute's walk, bike ride, or a quick transit trip.[i]

In communities small and large, there is a strong correlation between clustering housing and employment and people's transportation choices.

Focusing employment and residential growth strategically where there is transportation service and travel options available will help Moscow provide efficient transit service and allow people to access the majority of daily needs within a short biking or walking trip.

There is a mutually supportive relationship between land use and transportation from which multiple community benefits are derived. *Image from Nelson\Nygaard*

The Five D's

A large body of research has demonstrated the relationship between land use and transportation. Literature on this subject has come to characterize those features of land use and urban form that encourage more concentrated development by the shorthand of "the 5 D's."

Well-designed pedestrian realms attract users and provide a well-connected street network that feed into the streetscape to support broad access to downtown.

Image from Flickr User: Neighborhood organization

Attainment of the 5 D's represents best practices in development of land use patterns that support resilient, sustainable transportation systems that accommodate different transportation modes:

- **Density**: Even modest increases in population and employment density by geographic unit (e.g., per square mile, per developed acre) supports walking, bicycling and transit use.
- **Diversity**: Mix of land uses, typically residential and commercial development, and the degree to which they are balanced in an area (e.g., jobs-housing balance).
- **Design:** Neighborhood layout and street characteristics, particularly connectivity, presence of sidewalks and other design features (e.g., shade, scenery, presence of attractive homes and stores) that enhance the pedestrian and bicycle friendliness of an area.
- **Destination accessibility**: Ease or convenience of trip destinations from point of origin, often measured in terms of distance from the central business district or other major destinations.
- **Distance**: Ease of access to transit from home or work (e.g., bus or rail stop within 1/4–1/2 mi of trip origin) and a dense network of pedestrian and bicycle connections.

Providing incentives for mixed-used development near transit service promotes walking and transit use.

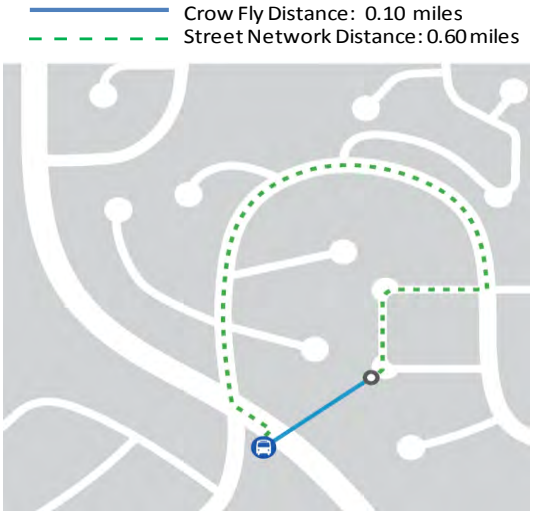
Image from Flickr user Lisatown

Neighborhood Design

Related to the Distance "D", street connectivity and block length have strong relationships with walking, bicycling, and transit use. Interconnected streets organized in a grid pattern tend to shorten distances for walking and biking trips. Neighborhoods where all roads are designed to connect to arterials or collector streets also allow transit customers to reach bus stops without walking out of their way and provide more efficient routing options that can support more productive transit service. Block length and street network connectivity often represent strong qualities of community design. Short blocks and well-connected streets contribute to a higher-quality pedestrian experience and pedestrian realm,

and they often occur in places where other elements of good design, such as adequate sidewalks, are also in place.

A well-connected street network enables more direct walking connections and is easier to serve cost effectively with transit.



A disconnected street network with long blocks and indirect streets results in long walking distances and less efficient transit operations.

Source: TransLink Transit Oriented Communities (2011)

HOW DOES LAND USE AND TRANSPORTATION AFFECT LOCAL ECONOMIC DEVELOPMENT?

The relationship between land use and the provision of transportation infrastructure and services is inevitable, even in a city that slowly accommodates growth such as Moscow. Improved transportation infrastructure and service increase access to land, which in turn encourages development and increases travel demand. Since growth is important to the economic health of any region, Moscow should focus on *integrating land use with sustainable transportation* to allow growth to occur in a way that allows people the opportunity to take bike, walk, and transit trips, while improving access to jobs and services, and reducing the environmental impacts.

Street retrofits, bike and pedestrian improvements, and frequent transit service to business districts can make downtowns more appealing to residents and visitors, help attract more patrons to local businesses, and increase the value of real estate.

Downtown revitalization: Safe and attractive streets downtown that are built for people and bicycles and are served by convenient transit service can improve the retail environment. For example, Toronto, Canada recently conducted a study that found that patrons arriving by foot and bicycle spend more money at local retailers than do those arriving by car.[ii]

Real estate value: Real estate values over the next 25 years are expected to rise fastest in pedestrian friendly communities that incorporate a mix of residential and commercial districts. A 2012 Brookings Institution study found that "on-the-market"-sale residential home values increase as neighborhood walkability factors

increase, and that property values are higher in walkable neighborhoods that are connected to other pedestrian-friendly areas.[iii]

Another study found that residential properties in more walkable areas command a 12% premium, all else being equal.[iv]

WHERE DO YOUNGER GENERATIONS & BABY BOOMERS WANT TO LIVE?

A growing body of research suggests that the next generation – Generation Y and the Millennials – have different transportation and housing preferences than their parents (the baby boomers). This research suggests that people increasingly value a walkable community with easy access to restaurants, employment, and services, rather than larger lot homes located far from these necessities and amenities.

Many of America's young generation prefer to live in places where they can easily walk, bike, and take public transportation. According to a recent study by the National Association for Realtors, most young people prefer to live in an area characterized by nearby shopping, restaurants, schools, and public transportation as opposed to owning a house in the suburbs.[v]

Commensurate with changing housing preferences, younger generations are less likely to drive or to own a car. According to a recent survey by KRC Research and Zipcar, 55 percent of young people (18-34 years old) polled said they have consciously made an effort to replace driving with transportation alternatives—this is compared with approximately 48 percent of all older populations.[vi] Furthermore, data from the National Household Travel Survey show that 16 to 34-year-olds drove 23% fewer miles in 2009 compared to 2001, decreasing from 10,300 to 7,900 miles per capita.[vii]

Baby boomers are also increasingly valuing the "20-Minute" neighborhood concept where they can access daily services within a short – 20 minute – walk (see sidebar). A community that is well connected and has accessible sidewalks for people with walkers and wheelchairs will allow baby boomers to "age in place" and remain connected to their community.

The demographic shift of both young and old residents in towns large and small across the U.S. will influence community design. As cities age and attract young professionals and college age students, changing housing and travel preferences will continue to materialize. Moscow has an opportunity to continue to build a community that will entice college graduates to stay in the community, which will help build businesses and support the local economy.

[i] Holtzclaw, John W. (2000). "Smart Growth – As Seen from the Air. Convenient Neighborhood, Skip the Car." Natural Resource Defense Council; Sierra Club.
[ii] The Clean Air Partnership, 2009, "Bike Lanes, On-Street Parking and Business: A study of Bloor Street in Toronto's Annex Neighbourhood," http://www.cleanairpartnership.org/pdf/bike-lanes-parking.pdf
[iii] Christopher Leinberger and Mariela Alfonzo, May 2012, "Walk this way: The Economic Promise of Walkable Places in Metropolitan Washington, D.C." Metropolitan Policy Program at Brookings.
[iv] Joe Cortright. (2009) "Walking the Walk: How Walkability Raises Home Values in U.S. Cities." CEOs for Cities.
[v] U.S. PIRG Education Fund. (2012) "Transportation and the New Generation: Why Young People Are Driving Less and What it Means for Transportation Policy." April 2012.
[vi] Zipcar. (2011). "Millenials and Driving." http://www.slideshare.net/Zipcar_Inc/millennial-slide-share-final
[vii] Benjamin Davis and Tony Dutzik, (2012) "Transportation and the New Generation: Why Young People are Driving Less and What It Means for Transportation Policy." Frontier Group and U.S. PIRG Education Fund.

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BEST PRACTICES

COMPLETE STREETS

WHAT IS A STREET?

Streets are often narrowly defined as a means to move and store cars.

In reality, streets are our most abundant public spaces and serve people using different modes, including:

- Pedestrians, including those who require special accommodations such as senior citizens, persons with disabilities, and children
- Bicycles
- Public transportation
- Private automobiles
- Freight and goods movement

Streets have many functions including:

- Moving people and vehicles
- Connecting people to transit, public services, and amenities
- Providing public space to meet, play, and shop
- Providing storage for cars

Using Street Design to Achieve Community Goals

Transportation is a means to an end. Transportation should be seen as a conduit that supports the larger community goals we care about, like neighborhood livability, local economic development, public space, safety, ecological sustainability, and public health. A key outcome of *Moscow on the Move* is to establish Complete Streets design guidance as a way to realize the broader community goals described in Chapter 2.

Complete Streets encompass the entire right-of-way, including the sidewalks and landscaping between the curb and the property edge.
Portland, OR

Image from Google Maps

What is Complete Streets?

The term Complete Streets refers simply to streets and intersections planned, designed, and operated to consider the needs of all travelers, including people of all ages and abilities who are taking public transit, biking, walking, or driving. While the City of Moscow has not formally adopted a Complete Streets policy, designing streets using Complete Streets principles improves safety and accessibility for all users.

Elements of Complete Streets

Key considerations in planning, designing, and operating Complete Streets include:

- Travel lane widths and signals that ensure safe and efficient travel

- Accommodations for pedestrians and bicyclists along and across the street
- Parking design, both parking widths and angle from the curb, and parking policy, including time limits
- Intersections designed to safely and comfortably accommodate vulnerable users that are crossing the street as well as safely moving people in cars
- Street lighting for cars and pedestrians
- Accessible streets for mobility-impaired citizens, seniors, and youth (ideally surpassing the minimum requirements established in the Americans with Disabilities Act)

In addition to these elements, communities are beginning to expand the traditional definition of Complete Streets from complete design to complete operation. This includes appropriate signal phasing and signal dedication as well as incorporating proper maintenance procedures. What good is an expanded sidewalk if there is not a plan or guidelines for snow removal or sidewalk preservation?

Why are Complete Streets important?

Complete Streets are inclusive of people using many ways of getting around, not just driving. Complete Streets improve communities and regional mobility by:

- Providing transportation choices
- Removing barriers to all transportation modes
- Improving safety for all road users, especially those that are most vulnerable (disabled, pedestrians, bicyclists)
- Creating great streets that connect people to jobs, neighborhood and downtown shopping, schools, and recreation
- Improving roadway efficiency by moving more people in the same amount of space
- Supporting community goals such as economic resilience and vitality, physical fitness, reduced public health costs, and reduced air and noise pollution

Complete Streets improve safety for pedestrians, encourage walking in downtown Main Streets, and support healthy communities.
Portland, OR

Image from Nelson\Nygaard

Complete Streets require making tradeoffs

Complete Street design requires negotiation and coordination. In order to develop more balanced streets, the rationale for reallocating space to pedestrians, cyclists, and transit users must be communicated to the public and local decision-makers; the needs and concerns of each user must be understood; and trade-offs for allocation of limited right-of-way must be based on adopted policies. The needs of all users, from freight to pedestrians, must be identified, understood and managed throughout planning and design. Developing Complete Streets in Moscow will require a coordinated effort between City Departments (including Public Works, Community Development, and Fire/Police), the Idaho Transportation Department, the University of Idaho, and local stakeholders that deserve consideration in the design and policy setting process.

How could Complete Streets work in Moscow?

Wide street widths, relatively low traffic volumes, and a grid street pattern provide a great opportunity for applying Complete Street principles to relatively low-cost street redesign projects. As Moscow's street infrastructure continues to age, it will need to be maintained and, in some cases, rebuilt. At such time, the City can choose to reconstruct streets as they were or seize the opportunity to redesign streets that better serve the community.

Reclaim underutilized space

Public rights-of-way are one of a city's most valuable assets. Rising fuel prices, public health concerns, and increasing concern about our environment have strengthened the argument that streets should be usable public infrastructure *and* public space. Complete Streets extends the canvas of street design beyond the travel lanes of the roadway to all portions of the right-of-way. It takes into account walking areas, open space, parking space (for cars and bicycles), and travel lanes.

Reducing curb radii returns underutilized space back to pedestrians and cyclists, while making intersections safer. Portland, OR

Image from Nelson\Nygaard

There are several tools that are used to rebalance limited street right-of-way. Reducing curb radii at intersections not only slows turning cars, but it also extends the sidewalk. This improves pedestrian comfort and reduces crosswalk width. In addition, lanes can be reallocated to ensure safer travel by all users without the need to widen the roadway at the expense of the pedestrian realm. See page 5B-4 for more information.

Make more efficient use of lanes

Complete Streets can improve roadway efficiency and capacity for all users by moving more people in the same amount of space – reducing traffic so all modes work better. Lane width has an influence on the safety and comfort of all street users. Drivers travel at higher speeds on roads with wider lanes, despite posted speed limits. Reducing lane widths where appropriate allows more use of right-of-way for other users and can help to control vehicle speeds because of the narrower space available to each motorist.

Reducing lane widths provides space for other modes. Seattle, WA

Image from Nelson\Nygaard

Streets designed for 20-30 mph can carry their maximum amount of traffic, due to reduced spacing need between vehicles in the same lane as they move more slowly. This serves the dual benefit of preserving vehicular capacity, while benefiting the pedestrian environment substantially.

Make Complete Streets the norm

For decades, communities across the U.S. have embraced wide arterials with minimal pedestrian and bicycle amenities as the basic mechanism for mobility. Communities are

now realizing Complete Streets should be the new norm as high speed arterials were 50 years ago. The following section provides examples of how other communities have developed policies and design toolboxes to achieve Complete Streets.

Develop a policy framework

Boulder, CO

Boulder's Transportation Master Plan (TMP) provides a policy foundation that guides funding, project, and program direction for transportation services through the year 2035. The first TMP was developed in 1989, with subsequent regular updates.

Image from City of Boulder

In 2008, the TMP update added a Complete Streets Investment Plan. This package of investments calls out transportation programs and services that are of the highest priority to achieve by 2025. In response to the rollout of regional transit improvements, the Complete Streets investment program aims to connect the community to this service through improved street conditions for all users.

Multimodal corridor segments will be improved according to their priority as established through a local goal-oriented prioritization process. The city and its community partners joined together over the course of two years to review investment priorities with regard to community connections to the planned transit improvements. The Complete Streets program aims to:

- Improve access to transit facilities in key locations and corridors, like the downtown transit hub, park-and-rides, and high frequency transit corridors
- Invest in highest priority multimodal improvements
- Improve the 28th Street corridor including transit facilities
- Establish frequent neighborhood bus circulators serving downtown and north Boulder
- Fund the City's contribution to the regional transit service
- Increase the effectiveness of transportation demand management strategies
- Raise annual operations and maintenance funding levels annually by $1 million

Integrating Winter Maintenance Plans into Complete Streets

Delaware Department of Transportation

As part of the implementation of a Complete Streets policy in Delaware, the Delaware Department of Transportation developed exemplary guidance for local governments to ensure winter maintenance meets the needs of all users. While planning, design, and construction of facilities for pedestrians, bicyclists, and transit users is the first step of implementing Complete Streets; adequate maintenance is also essential to keeping the facilities functioning over the long-term in all seasons. Delaware DOT's *Winter Maintenance of Pedestrian Facilities Guide* covered the following maintenance issues in detail:

Image from Fairfax Advocates for Better Bicycling

- Optimal practices related to timely sidewalk maintenance, ensuring connectivity and pedestrian/ADA accessibility, and providing commercial/school access
- Snow removal management planning
- Developing priorities (e.g., school routes, high demand areas, accessibility facilities)
- Sharing responsibility between State DOT, transit agencies, local municipalities, and private property owners
- Establishing enforcement practices and appropriate penalties

Establish a street design toolbox

Traffic management measures are used to ensure traffic impacts like speeding do not impact citywide livability or spread into neighborhood streets. Below is a sampling of effective measures for managing traffic:

Channelization

Narrow the roadway through the intersection allowing only one car through at a time. Reducing roadway space for cars frees up space for other modes and also slows speeds and volumes of cars, improving the pedestrian environment.

Curb extensions

Reduce intersection widths by extending a section of the sidewalk into the road at an intersection. Pedestrians standing on the bulb can see and be seen by drivers before crossing. Crossing distances and the time needed to cross on foot are reduced. Shorter intersection widths are particularly important for elderly, children, and people with disabilities who may need more time to cross the street.

Lane reductions

Reduce the width or number of travel lanes to better accommodate bicyclists and pedestrians, often by converting a 4 lane street into 2- or 3-lanes plus a bike lane and/or a center turn lane. This reduces crossing distances for pedestrians, reduces vehicle speeds, and limits the number of travel lanes pedestrians must negotiate when crossing.

Traffic circles

Direct traffic around a central island with entering traffic yielding to the circulation flow. Traffic circles are safer for drivers and pedestrians because traffic has to slow down through the intersection. Since all cars drive in the same direction around the circle, certain types of collisions, like head-on and left-turn collisions, are nearly eliminated.

Speed cushions

A bump in the roadway, ranging in length from 10-22ft, encourages traffic to slow down and indicates entry into a pedestrian zone. Effective at reducing traffic speeds, speed cushions don't require removal of parking and don't interfere with the flow of bicycle traffic.

High visibility pedestrian crossings

At-grade crossings with high visibility pavement markings continue the pedestrian zone across the street, slow drivers, and increase motorists' visibility of pedestrians. Raised crosswalks (pictured) are hybrid version of a marked crossing and a speed cushion. It is highly effective at reducing vehicle speeds and ensuring motorists yield to pedestrians.

Images from Nelson\Nygaard, Flickr User Richard Drdul, and the City of Portland

Establish a street design toolbox (continued)

Shared streets

A street does not need to have bike lanes or other dedicated cycling facilities to be a Complete Street. Streets that are designed as a low speed and/or low volume environment can attract cyclists of varying comfort levels. This is usually the case along neighborhood streets. Speed reduction measures, recessed parking, verdant landscaping, curbless pedestrian design, and stormwater features are common features of successful shared streets.

Community gateways

Community gateways and speed reduction transition zones function as arterial or even highway traffic calming. Using an iconic structure, warning pillars, signage, and paint communicates to motorists that they are entering a vibrant "pedestrian first" town center along multiple points as motorists approach a town (including the periphery, the edge, and the center of a downtown). The end result is to slow through traffic entering into downtown and possibly even attract new retail customers.

Images from Nelson\Nygaard and the City of Monrovia

BEST PRACTICES

TRANSPORTATION DEMAND MANAGEMENT

WHAT IS TRANSPORTATION DEMAND MANAGEMENT?

Transportation Demand Management (TDM) is a general term for strategies that increase overall transportation system efficiency by encouraging a shift from single-occupant vehicle (SOV) trips to other means of travel such as transit, bicycling, walking, and carpooling, by eliminating trips, or by shifting auto trips out of peak periods when roads are most congested.

Moscow on the Move is a multi-modal transportation plan that recognizes cars are an important and viable element of Moscow's transportation system. However, a focus of the plan is to develop strategies to reduce reliance on automobile travel and open up opportunities for alternative transportation. Even shifting one or two household trips each week from auto trips to walk, bike, or transit modes can yield substantial user and system benefits. TDM strategies make it easier to reduce reliance on automobiles by:

- Increasing travel options;
- Providing incentives and information to encourage and help individuals adjust their travel behavior;
- Providing information about travel options and their personal benefits; and/or
- Reducing the physical need to travel through use of technology, community design, and facilities.

What are examples of TDM strategies?

TDM programs and supportive strategies accommodate residents and commuters that want to shift trips to non-SOV travel options. In Moscow, there a number of potential organizations that can help implement TDM strategies, including major employers, the University of Idaho, elementary and secondary schools, local government agencies, and non-profit organizations.

Examples of common TDM strategies that have been successful in small cities and college communities are described in further detail below.

Transit programs

Although Moscow currently provides free transit service, fares could be implemented in the future. If a fare structure is implemented, there is still opportunity to provide free or subsidized transit passes to employees, university students, and residents. Employers can provide free or subsidized transit passes, vanpool vehicles

or fares, and/or shuttle services to reduce the cost of these high-capacity modes and create cost-competitive alternatives that unlock costs-savings that are unachievable through SOV travel.

Ridesharing

Vanpooling and carpooling provide travel options for commuters who typically travel more than 15 miles one way to get to work. A regional or municipal agency – either a transit agency or other organization – can help facilitate ridesharing by providing an online ridematching service to help people coordinate rides. Large employers can also help coordinate and/or sponsor vanpooling at the employment site level. Preferred parking for carpool and vanpool vehicles can help promote ridesharing in areas with limited parking. Moscow's vanpool program and Palouse Clearwater Environmental Institute's ridematching service (both detailed in the *Getting Around in Moscow Today* chapter) offer an excellent tool for people making local and regional commute trips.

Guaranteed-ride-home

To encourage employees to take the bus, bike, and share rides, the City of Moscow, employers, or even a non-profit organization can offer a guaranteed-ride-home (GRH) program that provides a set amount of employer-provided free taxi rides for unplanned trips home that cannot be accommodated by the employee's normal commute mode (e.g., a bus rider who works late past the last scheduled bus or a carpool passenger with a sick child at school). GRH, also referred to as Emergency Ride Home, is a highly effective tool that ensures people who bike, walk, or take transit can get home even if they miss the last bus or if the weather changes.

Key Supporting Strategies

Transit service enhancements

Transit service enhancements, such as comfortable and safe transit stations, legible schedule information, and bicycle racks on-board buses, can encourage people to ride transit.

This bus station in Whatcom County, Washington, provides a comfortable seat and legible signage for waiting passengers.
Image from Whatcom County

Pedestrian improvements

Every transit, car, and bicycling trip starts and ends with a walking trip. As such, improvements to the pedestrian environment – sidewalks, safe and visible crossings at intersections, and landscaping – can encourage people to walk more often and make walking a more pleasant experience regardless of how people choose to get around town. Completing a network of sidewalks that reach all residential neighborhoods is particularly important—work that has already been started in Moscow.

Bicycling facilities

Bicycle facilities such as off-street bike paths, on-street bike lanes and low-traffic neighborhood streets coupled with secure and covered bicycle parking at workplaces, and on-site shower and locker facilities help make bicycling a convenient mode of travel.

Bikesharing

Public bicycle sharing is gaining popularity across the U.S. in cities large and small. Bikesharing systems allow residents and visitors to conveniently check out bikes at

key locations. In many communities, they are being promoted as both an amenity for tourists and visitors and a critical component of the transportation system to help people make short trips and errands by bike instead of by car. University towns are early adopters of bikesharing, given the need for frequent mobility and short-trips they create. Examples of small towns with bikeshare systems include Pullman (32 bikes at 4 stations) and Boulder (200 bikes at 25 stations), with many more near implementation.

Flexible scheduling

Flexible scheduling allows employees to reduce their number of weekly commute trips and shift work trips to non-peak travel periods. Examples of flexible scheduling are:

- **Telecommuting** allows employees to work from home or a non-office location one or more days a week. With technological improvements in videoconferencing and webinars, this is increasingly being used at universities (known as "tele-lecturing"). In fact, UI currently offers podcasts and on-line lectures that can be expanded to reduce travel and parking demand on-campus.
- **Compressed workweeks** enable employees to compress regularly scheduled hours into fewer work days per week.
- **Flexible hours** allow employees to offset work hours from the typical 8-5 standard and shift commute travel to off-peak hours.

Incentives and encouragement programs

Public agencies, non-profits, and other organizations in a city can provide important marketing and outreach to encourage and educate commuters and residents about travel options. Education, marketing campaigns, and incentive programs can take multiple forms in smaller cities, such as:

- **Individualized marketing campaigns** – like SmartTrips in Whatcom County, WA - provide individualized travel options materials to people in a specific neighborhood who have expressed interest in changing their travel behavior.
- **Commuter challenges** and public awareness events are often managed by a regional or non-profit organization as well as large employers to encourage and incentivize commuters to change their mode of travel for a day, week, or month.
- **Commuter outreach** can be provided by a non-profit (as Palouse-Clearwater Environmental Institute has done for years) or another organization in the

SmartTrips

Individualized Marketing Program in Whatcom County, Washington

Whatcom County, Washington launched its individualized marketing program, branded as *SmartTrips* in 2006. In 2008, neighborhoods on the west side of the city were targeted. Nearly 5,000 households received individualized travel information to help them walk, bike, or take transit. Between 2007 and 2009, mode shift was notable in the target area as a result of the campaign:

- Transit trips increased 10%
- Walking trips increased 22%
- Bicycling trips increased 35%
- Drive alone trips decreased 13%

SMART TRIPS

Make a difference anywhere you go

case where an on-site TDM coordinator is not present.

- **Requirements to consider TDM in new development** can be an effective public sector tool for encouraging residents and employers to bike, walk, or take transit. This can also be used to encourage new development by replacing the need to build large amounts of surface parking. This can often increase the chances of projects "penciling out" or achieving profitability. This has been effectively demonstrated in Portland and Boulder, among others.

In Missoula, Montana, thousands of residents participate in the annual Bike Walk Bus Week program that celebrates active transportation. The event is put on in partnership with the City, the local marketing and outreach organization *Missoula In Motion,* the local transit agency, and the University of Montana.
Image from City of Missoula

Parking management & pricing

Managing the price and supply of parking – particularly in downtowns – can influence how people travel. While employers may provide free parking, parking is never free. Programs that charge for parking or allow employees to cash out the value of employer paid parking are effective strategies for reducing drive alone trips. Parking management strategies can also benefit downtown businesses by ensuring that the most convenient parking stalls are available for customers, not occupied by employees.

Although Moscow offers monthly, quarterly, and annual paid parking permits for its four off-street public parking lots in downtown, on-street parking is free with time restrictions. A first step for the City of Moscow could be to implement paid on-street parking in a designated downtown district with residential parking permits established for adjacent neighborhoods to avoid neighborhood spillover parking. Many cities now use an 85% occupancy rule to determine the right time to start charging a fee for on street parking. In brief, when on street parking in a district is consistently more than 85% occupied at peak times (or less than 1-2 spaces per block are available) it is the right time to implement a fee. As described in the Funding chapter, revenue from a parking district could be used to implement other TDM strategies, such as bicycle parking, marketing and outreach materials, and safe pedestrian crossings at key intersections.

User information

Employers, the public sector, or a regional travel options organization can provide information on available alternatives to driving alone through a designated Employee Transportation Coordinator; use of print marketing; information kiosks at a central location; and on-line travel tools such as bus schedules, bike routes, and ridematching services.

Who implements TDM?

A range of partners in the Palouse region can implement TDM – from employers to the public sector to a non-profit organization.

Employers play a key role in deploying TDM programming in any city or region because predictable commute trips are the easiest trips to target. Moreover, commute trips are typically the longest trips that people make, and therefore may have the most impact on

reducing SOV travel. Employers reduce vehicle trips by providing employees with incentives, information, and transportation improvements to use a variety of transportation options; allowing employees to commute during off-peak times of day; or even eliminating certain work trips altogether.

There are a limited number employers in Moscow large enough to support an internal TDM program including the University, Walmart, Gritman Medical Center, secondary and elementary schools, and government agencies to name a few. There is an opportunity for these employers and others to be leaders to provide travel options and mobility-related information to the community and for affiliated groups of smaller employers to implement programs

Why should the public and private sector be interested in TDM?

TDM strategies and programs offer substantial benefits to employers and public agencies, alike. For most employers in Moscow and cities where parking is more plentiful, TDM strategies are provided more as employee benefits, although some cost savings can still be realized by the employer. Key employer benefits include:

- **Employee attraction/retention.** Like free parking, many TDM strategies are essentially employee benefits that add to a company's appeal to potential and current employees. Employee benefits can include free or subsidized transit passes, vanpools, or even financial incentives to bike or walk to work. These benefits can also help hiring managers attract a broader range of job candidates, including working parents, students, or individuals without a car who require flexible schedules and commute options.

Bicycle Commuter Act

In 2009, the Internal Revenue Service passed the Bicycle Commuter Act. If employers elect to offer this benefit, employees can receive up to $20 a month for each month they commute primarily by bike. The money can be used to help defray the cost of cycling, for purchase of helmets, bicycle parts, tune-ups, etc.

Source: IRS, http://www.irs.gov/publications/p15b/ar02.html

- **Tax incentives.** Transit, vanpool, or bicycle subsidies can be deducted as a business expense. Pre-tax programs offer savings to employers as well as employees. When funds are removed from paychecks before taxes are applied, employers also save on payroll taxes.

TDM programs in small towns are typically a public sector venture or at least led by the public sector. While private employers often are willing to support TDM efforts to improve access for employees and customers, they usually need assistance from the public sector or TDM-focused non-profits to help realize the benefits of TDM and determine how to implement TDM programs. Key TDM benefits borne on the public sector include:

- Improving the transportation system's efficiency
- Reducing construction costs over time
- Reducing operations and maintenance costs over time
- Reducing transportation costs for residents
- Attracting businesses, students, and university faculty that value locating in communities that are walkable, bikeable, and transit-friendly

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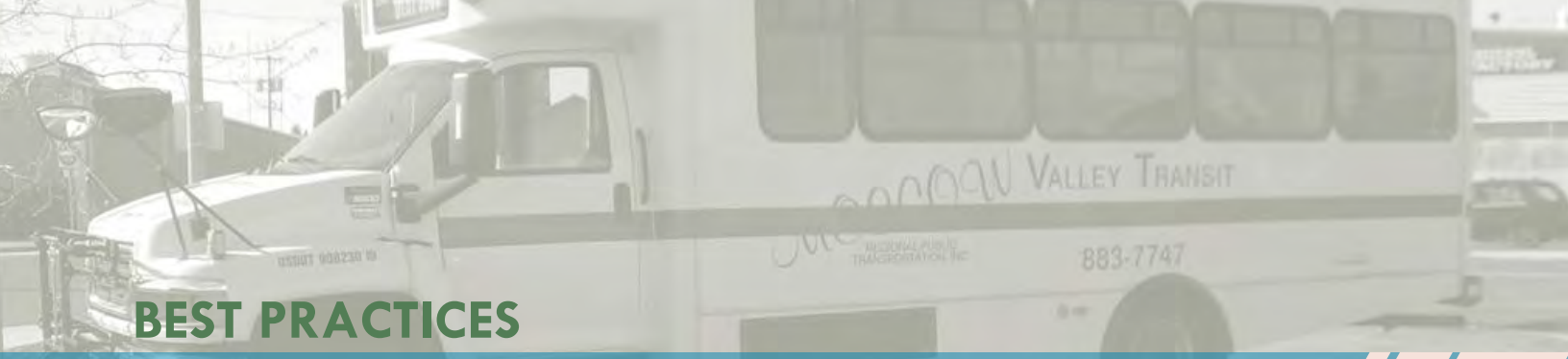

BEST PRACTICES

TRANSIT

WHAT CAN BE DONE TO PROMOTE TRANSIT IN MOSCOW?

Citizens have a broad range of interests and needs when it comes to transit service, but the desires most commonly voiced in transit user and non-user opinion research can be best summed up as:

A set of services that goes where I need to go and operates frequently during the day, on weekends, and into the evening.

A component of *Moscow on the Move* is to help the City and Moscow Valley Transit accomplish this customer vision to retain and attract a broader ridership base. This will ultimately support higher-level city goals related to mitigating future traffic congestion, making streets safe for all users, and creating more vibrant neighborhoods.

What makes a great transit system?

Successful transit systems are defined by high ridership, safe, frequent, and reliable operations, and influence on the development of vital economically successful neighborhoods. A good measure of a successful system, regardless of the size of the city, is when local residents opt to use transit over driving a car. The following section offers four main criteria observed in successful transit systems across the U.S.

Ridership Growth Success Stories

Whatcom Transportation Authority (WTA) in the State of Washington had record ridership growth after introducing their new high frequency Go Line service. According to the FTA, ridership on the WTA grew faster than any other mid-sized U.S. city in 2007 and 2008, when it grew more than 20%, and increased again in 2008 by 32%. This gain was in part due to a significant increase in the number of service hours and the launch of the GO Lines that run every 15 minutes to entice people who may otherwise drive.

Transit service in Boulder, Colorado also experienced dramatic ridership growth. In 1989, Boulder began implementing a Community Transit Network using small, locally designed, and branded buses to provide high frequency, direct local service. Between 1989 and 2002, local and regional transit ridership increased by 500%. Today, there are six bus routes – HOP, SKIP, JUMP, BOUND, DASH, and STAMPEDE – with unique identities shaped with community input.

Source: www.bellinghamherald.com/255/v~print/story/524293.html

Images from Victoria Transportation Policy Institute and Whatcom Transportation Authority

Improve reliability and frequency

Convenience is a major deciding factor for many people when choosing a mode of travel. If transit operates at a high enough frequency with enough capacity, people are

more likely to choose transit over an automobile. Other improvements include:

- Improving service frequency from 30 minutes (like in Moscow) to at least every 15 minutes so that customers don't have to carry a schedule
- Reasonably wide spacing between bus stops to increase operating speeds (passengers don't feel like the bus is stopping every block)
- Transit priority in mixed traffic (e.g. special signalization)

Improve comfort, safety, and convenience

Travelers with other options, such as a car, will only begin to use transit in large numbers when levels of convenience and comfort approach those of driving. In a small community, improving the overall competitiveness of transit requires improvements to service as well as removal of subsidies and incentives that make driving cheap and easy. Moscow has made great strides in improving the passenger experience by purchasing new vehicles with greater capacity, but additional improvements could be made that enhance comfort, safety, and convenience, including:

- Frequent service available throughout the day and evening, intersection priority (where appropriate), and direct routing results in door to door travel time that is competitive with driving
- Convenient transfers between modes and routes
- Transit vehicles that are not consistently overcrowded
- Amenities at transit stops and stations like shelter seating, lighting, information, and bike parking
- Widespread publication of schedules and color-coded matching of buses and lines to make systems more intuitive

Establish transit-supportive policy and design

Effective transit systems often are influenced by external policy conditions that create an urban form that is conducive to transit use. Efforts to improve transit's effectiveness have a mutual task to maintain competitiveness with private automobiles. Managing parking supply and prices strongly influences levels of transit use, cycling and walking. Moscow is taking steps towards providing amenities that support transit, such as developing the citywide Sidewalk Improvement Plan. Some additional strategies that can help make transit more effective include:

- Land use policies that support pedestrian and transit access through increased densities in urban areas
- Complete Street design that provides needed priority for transit and safe pedestrian and bicycle access
- Common rules and guidance on street and site development designs favorable to pedestrian access to transit

Attract riders through marketing

Moscow Valley Transit has deployed fairly basic marketing efforts to residents, students, and visitors. Transit systems need to know the market, tailor services and features to that market, and communicate as directly as possible with that market. Lessons learned in marketing include:

- A single ad campaign will produce no lasting bump in market share; a marketing "portfolio" is more effective
- Continuous messaging to the desired specific market is a necessity to gain, or even maintain, market share
- Knowledgeable drivers – often the first person a new transit customer will turn to for confirmation that they are doing the right thing

System and vehicle branding

Snohomish County, Washington

Many systems have increased ridership and improved the image of transit by branding the system. For example:

- Consistent colors, fonts, and logo
- Vehicle design
- Distinctive stop signage
- Branded marketing materials, such as clothing and accessories
- Well-designed system information and maps, using colors to emphasize frequency
- Developing a user-friendly website interface

For example, Community Transit in Snohomish County, WA has branded its Swift service with a unique, memorable name, a stylized logo, consistent colors, and recognizable signage at all stops.

How can transit serve regional destinations?

Transit can increase accessibility to carless populations by providing regional and intercity service. Improving access to regional transportation hubs, like airports and rail stations, extends the range of accessibility to these groups and the general population. Moscow transit survey respondents clearly value regional routes to Lewiston and Pullman, which were available until recently. Moscow residents, through surveys and interviews, have expressed the need for this service to be reinstated.

How can cities and transit agencies fund transit improvements?

Moscow is limited by legislative barriers to seeking local source funding from utility fees or sales tax. The City of Moscow and its partners – Moscow Valley Transit, the University of Idaho, and large employers – must think creatively about new sustainable funding sources. While transit in Moscow currently requires no fare, some options to extend the current fareless benefit even in a fare system include:

- University pass programs – the University of Colorado at Boulder and Washington State University provide all students with a bus pass in exchange for a student fee. The University of Idaho could institute a student fee to maintain or expand service, including a new route or service to Pullman.
- Residential pass programs – the City of Boulder promotes residential building managers or neighborhoods pooling their resources to purchase transit Eco-Passes for their residents. The City of Moscow could support neighborhoods and student areas in an effort to purchase transit passes in bulk.

The Funding best practices section goes into more detail regarding innovative funding strategies.

Creating a "Transit Experience"

What factors support transit-friendly communities?

Transit-friendly communities focus on creating a complete transit system that:

- Puts the passenger first by creating a safe environment for transit passengers, and making transit easy to use, accessible to persons with disabilities, and comfortable.
- Makes transit a convenient choice of travel by providing connections to a wide range of destinations, facilitating fast, frequent, and reliable service, and linking bus stops to well-connected pedestrian and cycling infrastructure.
- Uses transit to build a resilient community by seamlessly integrating transit with neighborhood design; promoting transit to support energy efficient and sustainable development; and putting money back into local residents' pockets by providing affordable access to local businesses.

Best Practices

Leading small town transit operations are putting passengers first by focusing on the transit experience. Below are examples of transit improvements that promote transit use in cities small and large:

Low-Cost Stop Amenities

Outside of some recent transit shelter enhancements at high boarding locations, stop amenities in Moscow are modest. Areas with little to no stop amenities can be retrofitted with innovative, low cost stop features like this integrated bus stop sign, seat, stop light, and signal beacon that indicates to drivers that a passenger is present in under-lit neighborhoods. This type of feature reduces the number of missed stops and increases passenger confidence and system understanding.

Recognizable Brand

An eye-catching brand that communicates frequent, reliable, and safe travel is an important component of a complete transit system. Branding should be communicated on buses, at bus stops, and all marketing materials.

Pedestrian Access

The pedestrian environment is a critical component of building a complete transit network to ensure the entire transit trip is safe, convenient, and comfortable for all road users. Sidewalk infill, two-stage crossing facilities (pictured), and neighborhood connectivity improvements are a few options to improve transit access.

Bicycle Access

Improving bicycle access to transit supports existing ridership levels and attracts new transit passengers by extending the reach of the transit system. The bicycle network should provide direct and safe access to transit, while bicycle racks on buses and bicycle parking allow passengers to transport and store their bikes while riding transit.

User-Friendly Schedule, Maps

Using a transit system's schedule and map should be easy for people of all abilities. Schedules and maps should be available in multiple forms – posted legibly at bus stops and major transfer points, and available on-line and on mobile devices.

BEST PRACTICES

BICYCLING

WHY PROMOTE BICYCLING?

Bicycling is a low-impact form of transportation that is human-powered, produces minimal noise, produces zero emissions, and requires modest amounts of street space compared with motor vehicles.

Despite common misperceptions that bicycling is a transportation mode most suitable for urban travel, smaller cities in rural environments like Moscow achieve just as many bicycle trips as the national average.[i] Bicycling can be a safe and efficient travel option in small cities like Moscow that have a grid of streets and modest traffic volumes. At no place in Moscow is one farther than two miles from downtown or the University of Idaho. Increasing bicycle mode share can benefit a city and its residents in a number of ways:

Quality of Life: Street design that makes bicycling fun and easy succeeds in strengthening connections between people, reducing vehicle speeds, and linking residents to the places outside their neighborhoods that serve daily needs. Bicycling engages people with the street and each other.

Affordability: Aside from walking, the bicycle is the most cost-effective transportation option available, allowing personal mobility at negligible cost.

Mobility: Bicycling expands personal mobility for people of all ages and socio-economic levels.

Health: Bicycling is fun, functional, and good for people's health.

Economy: Human-powered transportation leaves more money in people's pockets to spend on local goods, unlike spending on gasoline and automobiles which tend to bypass the local economy.

Neighborhood greenways in Portland, Oregon provide well-marked, low-traffic roads for families to bike safely.
Image from Nelson\Nygaard

HOW ARE LEADING CITIES MAKING THEIR STREETS BICYCLE-FRIENDLY?

A bicycle-friendly community is one in which bicycling is a safe and convenient mode of travel for most segments of the population and for many types of trips. This is achieved by building infrastructure (bicycle lanes, paths, and support facilities

like bike parking) and developing policies, planning objectives, outreach, education programs, and enforcement protocol that support cycling.

Bicycle-friendly streets provide safe and efficient routes for cyclists to travel between destinations. There are four basic principles for creating a comfortable bicycling environment that retains and attracts riders.

1. Offer comfortable & convenient bicycle network connections: A complete bicycle network offers bicyclists safe and convenient connections to key destinations, such as schools, employment centers, and commercial areas.

2. Develop easy-to-navigate routes: Bicycle routes that are well-marked and easy to navigate help bicyclists find the safest and most direct route, and provide bicycle awareness to motorists.

Wayfinding is an essential part of a safe and accessible bicycle network. Highly visible signs tell bicyclists where to go and how to get there. Major bicycle corridors, like Clinton Street in Portland, can also be branded to signal bicycle priority to road users.

Image from Nelson\Nygaard and bikeportland.org

3. Provide support and end-of-trip facilities: Bicycle friendly communities provide end-of-trip facilities, such as bike racks on transit, ample bicycle parking, and showers/lockers. Bike parking should be visible, secure, and covered where possible. Although a recent effort to pass an ordinance requiring bicycle parking was unsuccessful, research demonstrates the importance of bicycle parking and end of trip facilities for bicycle use.[ii]

Cities can even develop small-scale bike share systems to make bicycles available to everyone for short trips between major destinations. This could be useful for trips between the University of Idaho and downtown, as well as trips within the University itself.

4. Establish bicycle programs: Communities that encourage cycling as a means of travel and recreation must promote bicycle use and market its cycling amenities, educate citizens how to ride and maintain a bicycle, and enforce the vehicle code for both bicyclists and motorists.

Evaluating the use of bicycle infrastructure and programs over time is also an important tool for Moscow's decision-makers and community members to justify continued investment in the bicycle environment throughout the city.

WHAT IS NEEDED TO ENCOURAGE TIMID RIDERS TO CYCLE MORE OFTEN?

Cities can greatly reduce the fear of interested, but concerned cyclists by providing low stress bikeways and effective programs – off-street paths, better crossing treatments, traffic calming measures, and bicycle skills and promotional programs.

Extending the bike network in Moscow will help improve awareness and negative perceptions of safety. Streetscape and road projects should be designed and evaluated against system-wide transportation goals that include specific bicycle objectives and Complete Streets provisions.

Neighborhood Greenways are ideal routes for timid cyclists. These routes are

low-traffic streets that have been prioritized for cyclists and pedestrians by adding signage and traffic calming measures to reduce vehicular speed and help motorists' awareness of cyclists. Neighborhood greenways are key improvements for fostering a safe and comfortable cycling environment.

Bike Trains encourage children to bike to school by gathering large groups of children to travel together. By coordinating a community of bicyclists riding to the same destination, bike trains not only get children excited about bicycling, but also help parents feel comfortable letting their children ride together.

Bike trains gather large numbers of children to ride to school together. Safety in numbers is a proven mantra for bicycling.

Image from biketrainpdx

Colored Intersection and Crossing Treatments are used to increase awareness of cyclists at conflict points and help cyclists better navigate the system. Colored bike lane treatments provide extra safety measures for cyclists at intersections by providing a green "bike box" to allow cyclists to wait in front of idling cars to ensure they are visible to right turning cars.

Cycle Tracks are exclusive bicycle facilities located parallel to the roadway but physically separated from motor vehicle traffic. Cycle tracks can be bi-directional or one-way facilities and can be located on either one or both sides of a street. Cycle tracks are often buffered from traffic by parking (as shown in the photo), by landscaped planters, or by a curb.

Cycle tracks in downtown Missoula, Montana are highly visible with green pavement treatments at each conflict point—including intersections (top) and driveways (bottom).

Image from Nelson\Nygaard

HOW CAN PEOPLE BE ENCOURAGED TO BICYCLE MORE FREQUENTLY?

Building a strong and lasting bicycling constituency requires a multi-faceted approach that not only provides required infrastructure, but also makes cyclists feel they are part of a broad and growing community. This section outlines successful strategies that Moscow could use to make

bicycling appealing to a broader constituency.

Safety Campaigns can help raise awareness of bicycles and pedestrians. Although cities have limited influence on cyclist and driver behavior, cities can try to increase awareness and education around driver/cyclist safety. In Portland, Oregon, the regional transit authority, TriMet, launched its *See & Be Seen: Light the Bike. See the Bike* campaign to bring greater awareness to the dangers of cycling without proper lighting.

The City of Portland's "See and Be Seen Campaign" encourages greater awareness of the dangers of limited visibility during winter months.

Image from bikeportland.org

On-Street Bicycle Parking, also called bicycle corrals, typically remove two auto parking bays in exchange for 6-12 bicycle racks that can accommodate between 12 and 24 bicycles. Bicycle corrals are often placed at the intersection to provide protection for crossing pedestrians and traffic calming for vehicles. Evidence suggests that on-street bicycle parking is good for business; more patrons can park per square foot and business owners have reported that bicycle parking enhances the streetscape. A 2010 Portland, Oregon study concluded that businesses close to bicycle corrals perceive that their customers are increasingly arriving by bike.[iii]

These are also practical parking solutions for cities like Moscow, that accumulate large amounts of snow in the winter. Corrals can be temporary facilities, which are removed during the winter storm season.

Cities big and small are replacing on-street parking with bicycle parking. Typically, the space taken by two vehicle parking spaces can yield up to 12 bicycle parking spaces, which can expand local business access sixfold.

Image from Nelson\Nygaard

Open Street Events that close the roads to cars can also encourage people to ride more frequently. Great cycling communities have numerous events to encourage existing and new cyclists to take to the streets. These events – referred to by a range of names such as Ciclovia, Sunday Streets, Sunday Parkways, etc. – encourage families to enjoy the streets car-free in the hopes that this will encourage them to bicycle more often after the events and contribute to building a culture of cycling.

Bicycle events that close the road to vehicles allow people of all ages and abilities to comfortably ride in the streets.
Image from Nelson\Nygaard

HOW DO YOU CONVINCE PEOPLE TO CYCLE WITH WINTER COLD AND SUMMER HEAT?

Weather – be it too hot, too cold, too humid, or too rainy – is a frequently cited reason people choose not to bicycle. However, the problem is often not the lack of willingness to cycle in inclement weather, but the condition people end up in after bicycling through rain, snow, or heat. Developing facilities that allow people to store bikes out of the weather and shower and change at workplaces can help overcome these barriers and encourage bicycling in all seasons.

Covered Bicycle Parking provides bicyclists with the added amenity of protecting their bikes from inclement weather under the protection of a bicycle oasis.

End of Trip Facilities, such as showers and lockers, allow commuters to bike in inclement weather and comfortably change into clean work attire with little hassle.

Rider Education and Maintenance Training provides tips on proper clothing attire and bicycle accessories to help prepare everyday cyclists for the weather prior to hitting the road. Explaining the benefits of cold-weather riding could encourage continued use of bicycle facilities. For example, cyclists generally warm up as quickly, if not more quickly than motorists do, while saving the extra time and energy of idling their vehicles.

A covered bike oasis shields bicycles from the elements.
Image from Nelson\Nygaard

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[i] Rails-to-Trails Conservancy (2012). *Active Transportation Beyond Urban Centers*, http://www.railstotrails.org/ourWork/reports/beyondurbancenters.html
[ii] Pucher, Dill, and Handy. (2010). "Infrastructure, programs, and policies to increase bicycling: An international review." Preventive Medicine Journal.
[iii] Drew Meisel, "Bike Corrals: Local Business Impacts, Benefits, and Attitudes," (Portland: Portland State University School of Urban Studies and Planning, 2010).

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BEST PRACTICES

WALKING

WHY PROMOTE WALKING?

Walking is a means of transportation with multiple benefits. From a transportation perspective, walking helps us travel between destinations or even other modes (e.g., from a bike to a bus). As such, walking is part of almost every trip—be it by bike, transit, car, or a walking trip in itself.

In addition to its importance for community mobility, walking can help Moscow meet broader quality of life objectives, such as economic development, improved public health, and community design. To make the pedestrian environment safe and attractive, careful attention must be made to street design, traffic management, encouragement, education, enforcement, and monitoring success. As such, the various strategies – as described in this chapter – that help encourage people to walk can also help meet these quality of life objectives.

WHAT ELEMENTS INCREASE AWARENESS OF PEDESTRIAN-FRIENDLY ZONES?

Studies have shown that when pedestrians and drivers are aware of and attentive to each other's presence, the crash rate declines. Strategies that raise awareness of pedestrians both increase safety and improve the attractiveness of the pedestrian environment. These strategies include:

Special or raised paving at crosswalks help calm traffic and raise awareness that they are in a zone where pedestrians are expected to be crossing.

"Green man" at every signal phase ensures pedestrians may cross on a green phase without using a push button. When a person has to push a button to receive a WALK signal, they are inherently delayed. When the WALK signal (or green man) appears with every green phase, delay decreases.

Leading pedestrian interval gives pedestrians a few second head-start to claim the right-of-way ahead of turning traffic.

Reducing intersection widths improves visual contact between drivers and pedestrians, reduces crossing distances, and ensures safer turning movements by automobiles. Curb extensions and "road diets" are two measures that can reduce crossing widths.

- **Curb extensions** are often placed at the end of on-street parking lanes so that pedestrians standing on the curb can see and be seen by drivers before crossing. These can also be placed mid-block to effectively shorten block lengths.
- **Road diets** reduce the width or number of travel lanes, often by converting a 4-lane street into a 2- or 3-

lane plus bike lane and/or a center turn lane. This reduces crossing distances, vehicle speeds, and the number of travel lanes that pedestrians must encounter to cross the street.

Curb extensions improve the visibility of pedestrians and shorten crossing distances.

Image from Nelson\Nygaard

WHAT PEDESTRIAN ELEMENTS IMPROVE THE WALKING EXPERIENCE?

Beyond issues of basic accommodations, elements that create additional comfort, aesthetics, and amenities contribute to a pleasant pedestrian experience. If the pedestrian experience is unpleasant, people won't walk. This could lead to the weakening of neighborhood shopping districts, the loss of locally-owned businesses, and increased congestion.

Moscow can work to create lively pedestrian environments that promote healthy, dynamic, and enjoyable walking environments. Effective strategies include:

Active sidewalks and transparent building facades can enliven the street. Buildings and streetscapes that activate the environment, such as sidewalk cafes and pocket parks (like Friendship Square) build community and stimulate the desire to reach destinations on foot. Transparent building facades with windows at street level create interest and also open up the pedestrian realm. Land uses that attract pedestrians include coffee shops, grocery stores, and small-scale retail.

Diverse environments attract people on foot. This includes diversity in land use and shop types, architectural styles, landscape designs, and people.

Attractive and distinct sidewalk treatments are unique paving designs and materials that add interest to the walking environment. Defined connections between buildings and the adjacent sidewalk direct foot traffic to entrances and extend the pedestrian realm from the sidewalk to the building.

Plentiful trees provide a tree canopy for shade and shelter and define an "outdoor hallway" to achieve balance between pavement and planted areas. Grass strips, planters, and visible use of rainwater as a resource further reintegrate ecological functions into the streetscape, attracting visitors to the street.

Pedestrian furnishings, such as seating and weather protection, water fountains and trash receptacles, period lighting, and street art and sculptures, are placemaking elements that create usable and attractive places for people to rest and socialize.

Pedestrian furnishings like those found in Friendship Square help to create a successful place.

Image from Nelson\Nygaard

Wayfinding, such as street signs, maps, and unique area treatments help orient pedestrians and create distinct districts. Streets that are inherently easy to navigate

invite travelers by foot and make driver and pedestrian behavior more predictable and therefore safer.

Limited auto-centric land uses, such as parking lots and drive-thrus, that introduce hazards and psychological barriers to people on foot. Driveways across the sidewalk should be removed whenever possible as each driveway introduces a pedestrian conflict.

Formal neighborhood shortcuts and convenient crossings increase pedestrian route options and decrease walking distances in areas with limited pedestrian connections. Many neighborhoods in Moscow have neighborhood trail connections, yet many more connectivity improvements are needed.

Pedestrian refuges, textured paving, and high visibility crossings all contribute to safer crossings.

Image from Nelson\Nygaard

HOW CAN MOSCOW PROVIDE A SAFE WALKING ENVIRONMENT FOR PEOPLE OF ALL AGES AND ABILITIES?

Universal Accessibility

Universally accessible pedestrian design ensures that the transportation network serves people of all abilities, ages, and demographics. Streets that are designed for children, the elderly, and people with mobility impairments serve everyone better. Americans with Disabilities Act (ADA) guidelines and requirements guide appropriate sidewalk, driveway cut design, curb ramp placement at intersections and building entrances. Driveway cuts should be limited, grades leveled, and cross-slopes reduced to make sidewalks safer and more comfortable for those using mobility devices like wheelchairs or canes. Obstacles such as litter, utility poles, and trash cans should be removed to create a clear path for everyone. Visible and consistent placement of signage makes wayfinding systems more navigable and helpful for all people on foot. Pedestrians of all abilities benefit from adequate green signal phases with audible countdown signals to allow ample time to cross. When unique paving materials or raised crosswalks are used to provide a visual and tactile enhancement to the pedestrian environment, care must be given to ensure that any pavement treatments do not hinder movement for those using wheelchairs or canes.

Diverse destinations and walking routes

The majority of Moscow's residents are within a short walk to downtown or other commercial areas. Walkable communities often allow pedestrians to access an array of services and destinations within ¼ or ½ mile. Similarly, pedestrian-oriented communities present a variety of walking routes or options to connect to any one destination. Development patterns with longer blocks and less diverse routes can be retrofit to provide better pedestrian connections between buildings and through cul-de-sacs.

Organized Sidewalk Design

Sidewalk design should consider four distinct zones that together ensure safe and convenient pedestrian travel, maintain

attractive civic spaces, and protect other key street functions.

Curb/Parking Zone provides a physical buffer between the walking/seating areas of the sidewalk and the roadway.

Furniture Zone provides a place for shade trees that give shade and further physical separation between moving vehicles and pedestrians. The furniture zone ideally includes landscaping and trees to add to the appeal of the street.

Pedestrian Zone is the open sidewalk area for pedestrian movement, and should be free of obstacles. Commercial and activity districts tend to feature the widest pedestrian zones, often allowing multiple pedestrians to walk side by side. Preferred sidewalk widths vary by land use context, traffic conditions, and a host of other environmental factors. In a community like Moscow, sidewalks in commercial districts should be no less than 12 ft wide including the furniture zone,. Sidewalks in residential areas should range between 4 and 6 ft, not including landscape buffers and parkways.

Frontage Zone is the area in front of buildings used for tables/chairs or displaying "wares" to entice shoppers.

Elements of the four pedestrian zones help to organize sidewalk space and buffer cars from the pedestrian zone.

Image from Nelson\Nygaard

Safe Routes to School

State Safe Routes to School (SR2S) and federal Safe Routes to School (SRTS) programs have effectively encouraged children to walk and bike to school nationwide.[1] This is no different in Moscow as each elementary school participates in SRTS. These programs are designed to enable and encourage children, including those with disabilities, to walk and bike to school. To do this, those implementing SRTS use the "5E" approach to promoting bicycling and walking:

- **Education:** In the classroom, children learn the safety skills they need to navigate busy streets. Safe Routes to School instructors also provide lessons on health and the environment.
- **Encouragement:** SRTS programs hold events, competitions, and incentives to encourage children and parents to walk and bike to school.
- **Engineering:** Safe infrastructure along and across the road must be in place for children to walk to school.
- **Enforcement:** Schools partner with local police to ensure safe travel throughout the community. Enforcement mechanisms include lower speed zones near schools and other traffic laws.
- **Evaluation:** Program participation and behavior is monitored on a regular basis to track program successes. These include before and after surveys and counts.

The 5E approach aims to increase the number of children biking and walking by facilitating the planning, development, and implementation of projects and activities that will improve safety, and reduce traffic, fuel consumption, and air pollution in the vicinity of schools.

SRTS in Blaine County, Idaho

Hailey Elementary is a neighborhood school with 400 students, most living within walking and bicycling distance to the school. Because of the lack of sidewalks and crosswalks, the school saw less than 15%of its student population walking and bicycling.

With a $312,000 federal Safe Routes to School grant, the City of Hailey constructed sidewalks and pathway connections in and around the school and partnered with the school to implement education and outreach activities to encourage students and parents to bike and walk. Since implementation, walking and biking to school has increased from less than 15% to about 20-30%.

Source: National Center for Safe Routes to School

[1] SRTS is commonly used as the federal Safe Routes to School abbreviation.

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BEST PRACTICES

MEASURING SUCCESS

HOW DO CITIES MEASURE SUCCESS?

Evaluating progress and performance over time creates transparency and accountability that can justify increased and continued multi-modal transportation investment. This section highlights a range of strategies for cities to measure successful delivery of transportation systems, balancing automobile-oriented measures with other measures of transportation and overall community performance.

Performance Indicators

For the past 50 years, cities traditionally employed performance metrics that did not quantify the myriad benefits of a multi-modal transportation system. Although traditional transportation performance metrics measure important automobile traffic indicators such as vehicle travel time and congestion, they do not account for all the benefits and needed outcomes of transportation investment. Cities are starting to use measures that capture the quality of life, economic vitality, and environmental benefits of transportation investments.

The success of an efficient and accessible transportation system that provides for all modes of travel – cars, bicycling, walking, transit, and freight – should be monitored by using a range of indicators. These indicators can include multi-modal corridor level of service (LOS) – which is an alternative means of measuring facility design based on autos, bicycles, pedestrians, and transit users, mode split (i.e. what share of people are driving, biking, walking, taking transit, etc.), economic growth, safety and accessibility, and personal and community health.

Traffic-Related Performance

Until recently, transportation planners used performance metrics that primarily focused on measures that assess traffic conditions, such as roadway level of service (LOS) ratings, volume-to-capacity (V/C) ratios, system-wide vehicle miles traveled, vehicle hours of delay, and average travel time, all of which emphasize motor vehicle traffic speed and delay. LOS and V/C are useful metrics as part of a larger set of measures that also consider person throughput. When considered alone, these indicators are limited in that they focus only on the movement of vehicles and do not consider the movement of people. For example, they count the delay that 30 passengers on a transit vehicle experience the same as the delay to a single-occupant vehicle waiting at the same traffic light.

Multi-Modal Level of Service

Although traditional traffic performance standards are important factors for measuring automobile traffic conditions, they should not be used as a proxy for all road users. Other performance measures can realize the conditions and benefits for transit, pedestrians, and bicyclists as well. A useful supplement to traditional traffic performance measures is implementing a range of multi-modal level of service (MMLOS) metrics, which measure capacity and environmental conditions not only for automobile users, but also pedestrians, transit, and bicycle users along roadways. MMLOS indicators measure performance on a per person basis, using corridor level measures rather than focusing on singular intersections in a system.

Other important metrics that should supplement traditional traffic-related measures include:

- Per person delay – measures delay impacts on a more specific, per user level, rather than by vehicle
- Corridor LOS metrics – measures a range of multi-modal metrics including, motor vehicle and transit travel time between major destinations (e.g. downtown and the University), transit productivity (transit boarding rides per revenue hour), and sidewalk and bikeway availability
- Average person travel time – measures average travel time across all modes weighted by volume

Non-Single Occupant Vehicle Use

Mode split is a calculation of the number of people traveling on a bicycle, on foot, by transit, or in a car. A change in non-single occupant vehicle (SOV) mode split can be an indicator that multi-modal mobility and access investments are achieving a transportation system that supports all road users. For example, a 2012 study of 90 U.S cities found that cities with a greater supply of bike paths and lanes have higher bike commute levels—even after controlling for other factors that may affect cycling levels.[i] Tracking non-SOV mode split over time and before and after major transportation investments can provide communities with important justification to shift transportation investments to be more balanced between modes.

Economic Growth and Transportation Affordability

Economic growth and household spending on transportation are good indicators of a community's accessibility, attractiveness, and health. Retail areas that can be accessed by multiple modes of transportation provide opportunity for a wide range of the population to shop, gather, and socialize and help deliver more customers for small, locally owned businesses. Recent studies have shown that the value of land and level of retail sales per square foot is positively affected by bicycle and pedestrian improvements in mixed-use areas.[ii] Connecting bicycle, pedestrian, and parking management improvements to increases in retail sales is an important metric to track. Other economic measures can include:

- Transportation affordability (do household and transportation costs consume more than 45% of combined household income)?
- Retail sales per square foot of useable retail space
- Property value or change in property value
- Job growth

City of Mountain View, CA

Pedestrian Friendly District Leads to Private Investment

The City of Mountain View, California created a pedestrian-friendly district along previously run-down Castro Street. Since then, $150 million in nearby private investments have brought new commercial and residential development creating a regional retail attraction with restaurants, bookstores, pubs, pedestrians.

Source: Ryan Snyder, The Economic Value of Active Transportation

Safety and Accessibility

Safety and accessibility indicators ensure that a community's transportation dollars are being invested in a way that meets the needs of road users of all abilities (mode of travel, age, disability, etc.). Safety and accessibility measures include:

- Collision rate
- Cycling or pedestrian share of all roadway fatalities and injuries
- Transit access (share of population within a ¼ mile of transit with sidewalk access)
- The number of miles of bike lanes
- The number of universally accessible intersections (i.e. curb ramps, audible crossings and countdown signals, and detectable warnings)
- Share of women bicyclists
- Share of children walking and bicycling to school
- Sidewalk coverage

Health Indicators

Tracking the correlation between public health and transportation can be a powerful tool to (1) encourage people to bike, walk, and take transit; (2) convince policy makers that investing in biking, walking, and transit satisfies a multitude of community goals; and (3) leverage funding from health organizations, such as hospitals, insurance companies, and public health agencies. Health indicators include:

- Residents' level of physical activity (i.e. the number of minutes of physical activity per day)
- The percentage of the population with access to a quality grocery store that provides access to healthy food; this indicator must also be tracked with the quality of the pedestrian environment to ensure that people of all ages and abilities can access grocery stores safely and conveniently
- Indoor and outdoor air quality

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[i] Buehler, Ralph and John Pucher. (2012) "Cycling to work in 90 large American cities: new evidence on the role of bikepaths and lanes." Transportation (39: 409-432).

[ii] The Clean Air Partnership, 2009, "Bike Lanes, On-Street Parking and Business: A study of Bloor Street in Toronto's Annex Neighbourhood," http://www.cleanairpartnership.org/pdf/bike-lanes-parking.pdf

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BEST PRACTICES

FUNDING

Reliable funding is an essential part of any multimodal transportation system. With federal and state transportation funding in flux, it is critical for Moscow to leverage new and innovative funding partners and strategies that can provide long-lasting investment in the city's transportation infrastructure and programs. Cities large and small across the country seek to leverage funding from local, regional, state and federal sources.

While traditional State and Federal transportation funding will continue to be critical to build, operate, and maintain Moscow's transportation system, the City may be wise to diversify its sources including less traditional funding sources. This section covers funding opportunities that could be relevant in Moscow today or in the future.

HEALTH PARTNERSHIPS

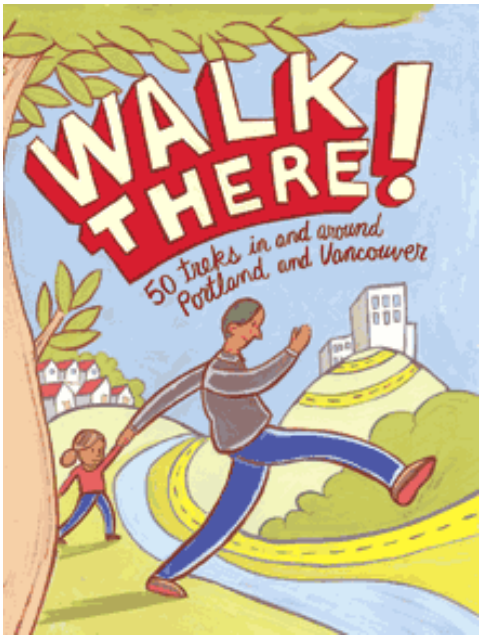
Travel behavior is strongly correlated to a variety of chronic health issues. A myriad of health issues are, in large part, due to community design and its influence on mode choice and activity levels. The research is clear: land use environments, street design, and therefore mode choice impact health. The risk of obesity for people who live in walkable neighborhoods with a mixture of uses is lowered by 35% compared to those in more suburban areas.[i] On the other hand, every additional 30 minutes spent daily in a car correlates to a 3% greater chance of obesity.[ii]

In response to these findings, the health care industry is becoming increasingly interested community design and mobility. Community transportation projects that attract people to active transportation can help meet greater public health goals. As such, health-related organizations may be promising funding partners for community active transportation and access to transit projects. In Portland, OR, health care providers have sponsored major programs like Sunday Parkways and the regional WalkThere book. In a number of U.S. cities, health care and insurance companies have been key funders

Gritman Medical Center

In the heart of downtown Moscow, Gritman Medical Center is an important employment and community center with a mission to provide quality healthcare to the community. In line with its mission, Gritman Medical Center has an opportunity to invest in community infrastructure and programs that help people make mobility choices that improve their health and the health of the community.

of public bike share programs and infrastructure that promotes active transportation.



Metro Portland's Regional Travel Options program produces the regional Walk There! guidebook. Kaiser Permanente supports the program by contributing $13,000 to support walking events and distribute the Walk There! guidebooks for free. In 2009, the guidebook received the Special Achievement Award from the Oregon Chapter of the American Planning Association.

Source: Metro RTO

UNIVERSITY PARTNERSHIPS

Universities are often key partners in providing and funding a range of transportation options for students, faculty, and visitors. Universities are particularly interested in:

- Retaining world-class faculty
- Attracting high caliber students
- Enticing students to remain in the community after graduation

Universities therefore have a vested interest in creating a livable, safe, and accessible community both on- and off- campus. Cities can leverage this commitment to livable community development by partnering with universities to fund and maintain community transportation infrastructure and programs. Many universities have an on-campus travel options department to improve and maintain bicycle and pedestrian infrastructure, provide subsidized transit passes, and offer bicycle rentals and maintenance services to faculty and students.

COMMUNITY-BASED FUNDING

In light of reduced funding from the public sector, communities are finding innovative ways to levy dollars from local community members. "Crowd funding" is a growing solution for funding community projects. This is where the community comes together to raise funds for a particular project or program. For example, funds can be used to build a local neighborhood trail or secure space for a public park.

This format can help fund specific projects, such as improvements to a neighborhood trail, wayfinding to help visitors and residents bike and walk safely throughout the community, or a public open space project. This funding format could also be used to help the community meet grant funding match requirements. Social marketing platforms are being used to both publicize projects and collect donations from the community. For example, Kickstarter is a funding platform in the U.S. that helps fund a range of community projects, including music, film, art, design, and planning. This resource has successfully funded part of CicLAvia in Los Angeles and a large community center in Wales, among others.

Community-based funding platforms are becoming increasingly successful because the community knows exactly what their donations are going toward (instead of a tax, for example, that gets lumped into the general transportation funding pot).[iii]

Communities in Latah County have embarked on community-based funding efforts related to the Latah Trail development and have raised substantial funds. The Latah Trail Foundation or the City could consider utilizing community-based funding tools and platforms to increase fund raising capabilities.

IMPACT FEES

Impact fees are generally defined as one-time assessments used to lessen the impact of new growth and development and to recover the capital costs borne by local governments. Fees may be levied to cover a range of services and infrastructure, including police, fire, street, parks, and stormwater systems. Impact fees are often determined by either the square footage of the new development or the number of dwelling units. This is a key tool used by jurisdictions to make critical improvements like sidewalk construction, bicycle parking installation, and even higher cost improvements like signal installation.

In 1996 the City Commission of Bozeman, Montana voted to establish impact fees to cover the additional fire, water, sewer, and transportation infrastructure and services needed for new development. Impact fees were viewed as the best mechanism to equitably balance cost burdens of new infrastructure and services for the growing community.

Source: Montana Department of Transportation

LOCAL IMPROVEMENT DISTRICT

Local Improvement Districts (LIDs) may be created to finance certain improvements that benefit property owners within an identified district, either in a neighborhood or a business district. Improvements are financed by assessments levied on property owners within the district in relation to the benefits the owners derive from the improvements. LID improvements may be financed with bonds, and there is no statutory requirement for voter approval. Sixty percent (60%) of resident property owners (or 66% of all owners) subject to the assessment must agree to the LID. LID bonds may be issued for up to 30 years, although such bonds are usually issued for 10 to 15 years. LIDs can pay for a range of capital improvements, including sidewalk construction, landscaping, and crosswalks. [iv]

PARKING BENEFIT DISTRICT

A "parking benefit district" can serve as a financing tool to support improvements in downtown areas while also addressing traffic congestion and parking constraints. Within a parking benefit district, public parking spaces (both on and off-street) are charged an hourly rate. Funds collected from parking charges are used for improvements that make the district more attractive, such as sidewalks, landscaping, and other amenities or aesthetic improvements. New parking meter technologies have improved customer convenience (customers can pay remotely by credit card or cell phone), increased pricing flexibility (rates can be changed in real-time based on location, time of day, day of week,

Boulder, Colorado

Boulder uses a district-based approach to help pay for travel options for downtown employees. Tax money from local improvement districts help construct and maintain shared parking structures in certain neighborhoods. The revenue from the parking structures is then used to purchase free transit passes for employees in that district. As of 2011, 60-65% of employees in the downtown district use alternative modes of transportation to get to work.

or level of occupancy), reduced streetscape clutter, and reduced operating costs. Although Moscow does not currently charge for on-street parking, paid parking in the downtown district could provide needed revenue to fund streetscape improvements, sidewalks, and safe crossings to encourage people to shop and visit downtown.

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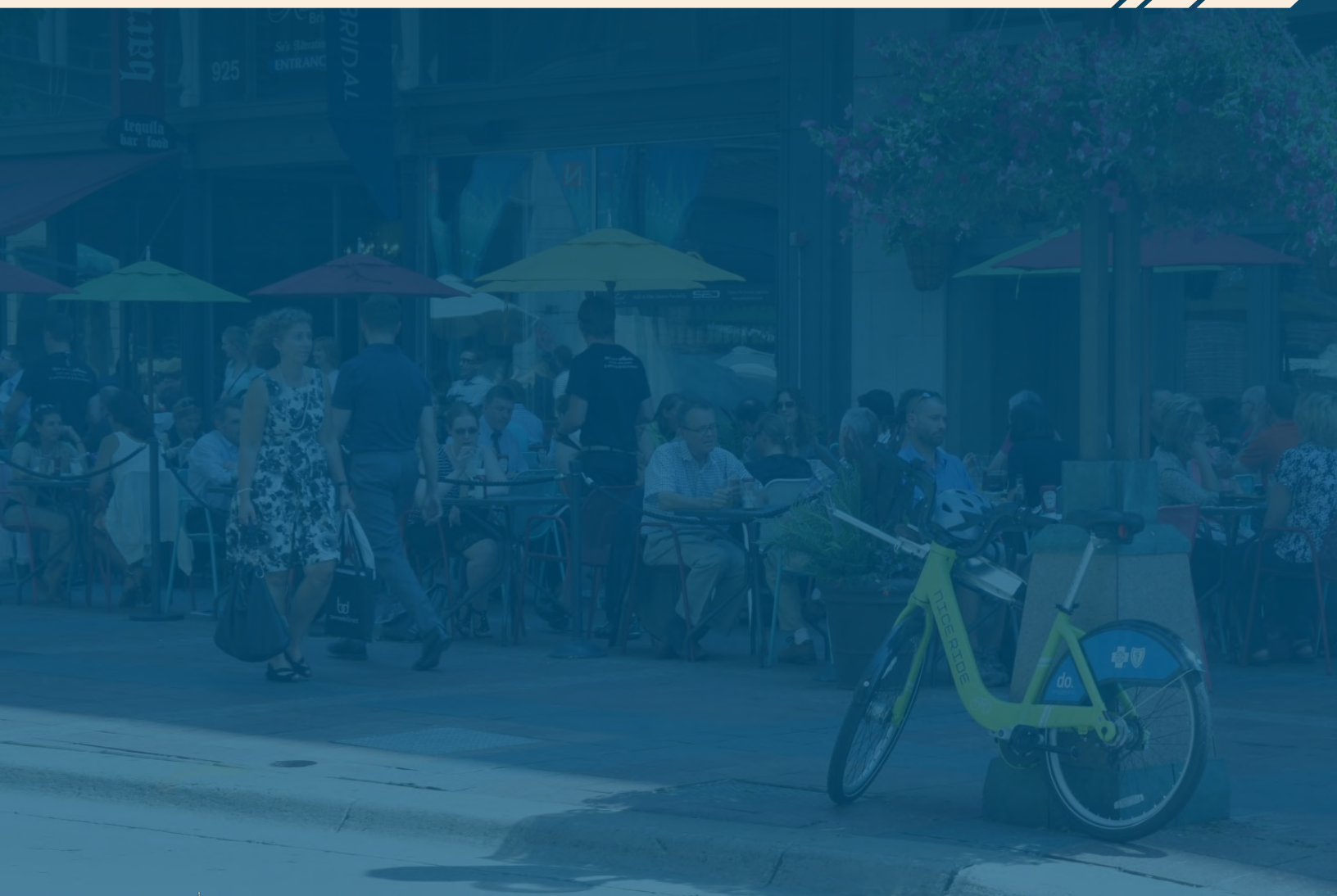
[i] Federal Highway Administration (2012). "Driving, Walking, and Where You Live: Links to Obesity." McCann Consulting. http://knowledge.fhwa.dot.gov/cops/italladdsup.nsf/All+Documents/8D26513DD4635FED85256F6A007BF2EB/$FILE/J%20of%20Preventive%20Medicine%20re%20link%20between%20driving%20and%20obesity.pdf (accessed February 1, 2012).

[ii] Federal Highway Administration (2012). "Driving, Walking, and Where You Live: Links to Obesity." McCann Consulting. http://knowledge.fhwa.dot.gov/cops/italladdsup.nsf/All+Documents/8D26513DD4635FED85256F6A007BF2EB/$FILE/J%20of%20Preventive%20Medicine%20re%20link%20between%20driving%20and%20obesity.pdf (accessed February 1, 2012).

[iii] Note: Funders only pay if the project finds full funding and is implemented.

[iv] Association of Idaho Cities. "A Guide to Public Finance Strategies."

KEY OUTCOMES



This chapter identifies key outcomes for transportation in Moscow that have been voiced by stakeholders, focus groups, and community members. It demonstrates the linkage between transportation investment and opportunities to meet local public health, economic development, senior mobility, ecological health, and placemaking.

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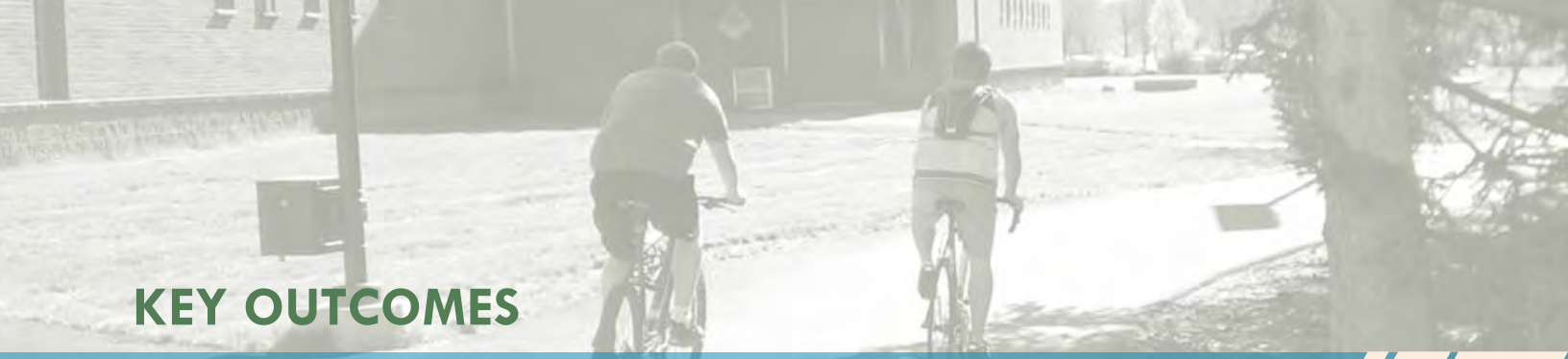


KEY OUTCOMES

HEALTHY & ACTIVE LIVING

The built environment and its impact on levels of physical activity is strongly correlated with a variety of health conditions ranging from obesity, diabetes, heart disease, cancer and respiratory illnesses. Similarly, roadway design and management of vehicular speeds correlate with more significant risks for injury and death for motorists, pedestrians, and cyclists.

Health Indicators

Latah County

Although Latah County is ranked 3rd out of 42 Idaho counties in all health indicators, a sizeable share of residents exhibit unhealthy behavior and incidences of avoidable disease that can stem from community design.

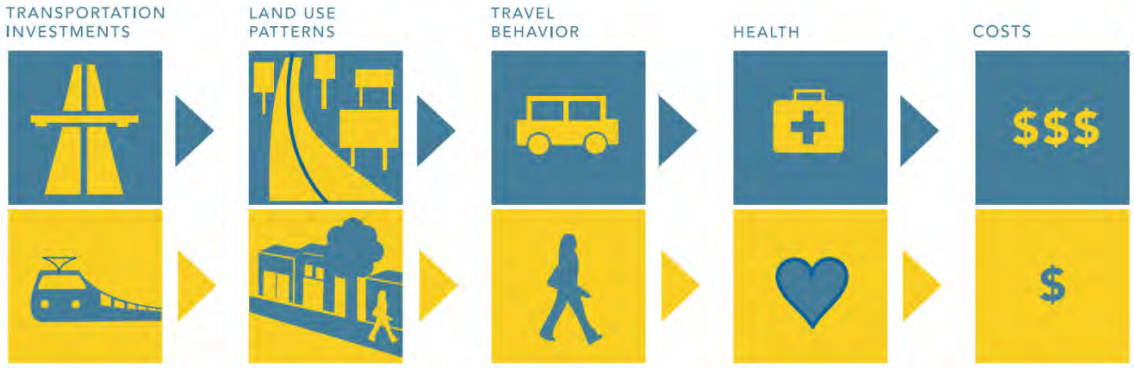
- 26% of adults are obese*
- 17% of adults report no leisure time
- Motor vehicle crash death rate in 2012 is 15 deaths per 100,000 residents, which is higher than the national benchmark of 12

Source: County Health Rankings and Roadmaps

*Obesity is defined as having body mass index (BMI) of 30 or more. BMI is a measure of body fat based on height and weight.

This section describes how conventional auto–oriented development patterns contribute to a decline in human health and how providing a range of transportation choices can help Moscow residents improve their health by using active forms of transportation – such as biking, walking, and taking transit – for transportation and recreation. As illustrated in Figure 1 below, the connection between transportation and health is influenced by the type of transportation investments and land use patterns, which can in turn influence travel behavior and affect the health of residents and the cost of health care to society.

Figure 1 Connection between Transportation and Health



Source: Hidden Health Costs of Transportation, Urban Design 4 Health, Inc. and the American Public Health Association (2010).

Roadway Design

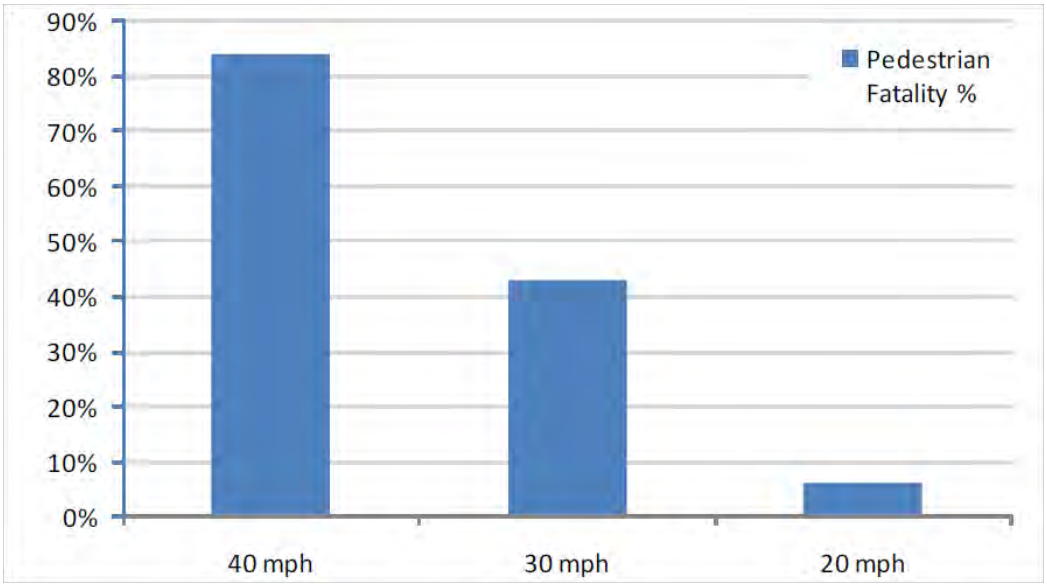
Proximity to arterials that carry large volumes of traffic is a significant deterrent to walking and cycling. Moreover, low-density development patterns designed with limited facilities for walking and cycling are directly related to higher rates of automobile related accidents and pedestrian deaths (see Figure 2 below). Research indicates that for every 1% increase in compact community design (including smaller streets), all mode traffic fatality rates decrease by 1.49%, while pedestrian fatalities decrease by 1.47%.[i]

Community Design and Physical Activity

Roadway design that enables safe and efficient travel for all roadway users as well as multi-modal transportation investments can also encourage people to exercise more frequently for transportation and recreation and therefore stay healthier. A growing body of research links transportation, land use patterns, and poor connectivity to physical activity and related illnesses such as obesity, type 2 diabetes, cancer, stroke, hypertension, cardiovascular disease, and premature mortality.[ii] Studies have found that:

- High rates of obesity are linked to low land use mix, more time per day spent in cars, and shorter distance walked per day[iii]
- People who spend an hour per day in an automobile are 6% more likely to be clinically obese[iv]
- A 1% decrease in automobile use can reduce obesity by 0.4%[v]

Figure 2 Traffic Speed and Probability of Fatality[vi]



Higher automobile speeds increase the likelhood of pedestrian fatality.

Leaf WA, Preusser DF. 1999. Literature review on vehicle travel speeds and pedestrian injuries. National Highway Traffic Safety Administration. Washington DC. US Department of Transportation.

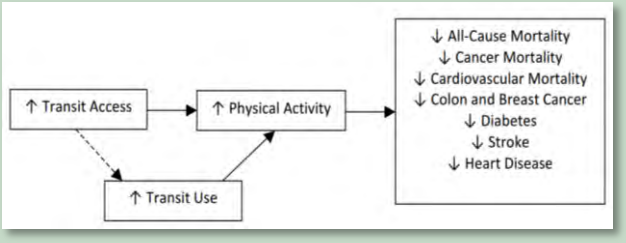
These results highlight the importance of walkable and accessible neighborhoods to mitigating serious health risk.

The American College of Sports Medicine and the American Heart Association recommend that adults aged 18 to 65 engage in moderate physical activity for 30 minutes five days each week or more vigorous activity for 20 minutes three days each week.[vii] Moscow can continue building facilities to encourage people to meet these weekly physical fitness recommendations. Physical activity and active transportation in Moscow can be further promoted by extending the trail network, building out the Paradise Pathway concept (see the *Bicycling in Moscow* section for more information), and establishing safer connections to the trail network and the local park spaces.

Safe bicycling facilities help parents feel comfortable encouraging their children to ride their bikes.
Image from Chris Metka

Health Impact Analysis

Case Study in Oregon



In 2009, Oregon Health & Sciences University and Upstream Public Health conducted a health impact assessment (HIA) on a potential statewide VMT reduction strategy. The HIA was designed to show how future policies would impact the health of Oregonians. The study targeted four strategies that would significantly improve air quality, increase levels of physical activity and reduce car collision injuries and fatalities for all roadway users in communities like Moscow, including:

- Increasing densities in neighborhoods
- Requiring highly connected, mixed use environments in new developments
- Improving pedestrian infrastructure in neighborhoods
- Expanding the coverage of public transportation

The HIA found "pathways" connecting each health risk mitigation strategy with a change in health. For example, by increasing transit access, transit use would increase along with the physical activity exerted to arrive at a bus stop. In return, diabetes, stroke, heart disease, various cancers and mortality would decrease. HIAs are an effective method to test how potential policies and development might exacerbate or alleviate health risk.

Source: Upstream Public Health and Oregon Health & Sciences University, 2009

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[i] Ewing, Reid, Richard A. Schieber, Charles V. Zegeer (2003). "Urban Sprawl as a Risk Factor for Motor Vehicle Occupant and Pedestrian Fatalities". American Journal of Public Health, Vol. 93, No. 9, pp. 1541-1545.
[ii] Ewing, Reid, Tom Schmid, Richard Killingsworth, Amy Zlot, and Stephen Raudenbush (2003). "Relationship between Urban Sprawl and Physical Activity, Obesity, and Morbidity". American Journal of Health Promotion, Vol. 18, No. 1, pp. 47-57. http://www.smartgrowth.umd.edu/research/pdf/EwingSchmidKillingsworthEtAl_SprawlObesity_DateNA.pdf

[iii] Frank, Lawrence D., Martin Andersen, Thomas Schmidt (2004). "Obesity Relationships Community Design, Physical Activity, and Time Spentin Cars." American Journal of Preventative Medicine, 27 (2), pp. 87-96. http://www.act-trans.ubc.ca/smartraq/files/FRANK-AJPM-04-obesity.pdf.
[iv] Samimi, Amir, *Abolfazl Mohammadiana and Seyedali Madanizadeh (2009)*. "Effects of transportation and built environment on general health and obesity." Transportation Research Part D: Transport and Environment, 14 (1), pp. 67-71.
[v] Ibid.
[vi] Leaf, W. and Preusser, D. (1999) Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups, NHTSA.
[vii] Physical activity and public health: updated recommendations for adults, 2007. Available at http://ncbi.nlm.nih.gov/pubmed/17762377

KEY OUTCOMES

SENIOR MOBILITY

BUILDING CITIES THAT ENABLE ACTIVE SENIOR LIVING

With a median age of 24 and a large contingent of University students, the City of Moscow is generally a youthful population. However, 7% of the population is currently over the age of 65, and over 15% of the population will be over age 65 in 20 years.[i] The baby boomer population in Moscow, like the rest of the United States, is reaching retirement. The ability for the senior population to maintain access to goods, services, and social opportunities is critical and must be a high priority to keep seniors engaged in the community and healthy.

As baby boomers age, the City of Moscow can expect increased use of mobility devices like motorized scooters. To build upon the work of the Mobility Task Force, the City must consider the needs of those using mobility devices when developing and retrofitting new pedestrian facilities.

Image from Nelson\Nygaard

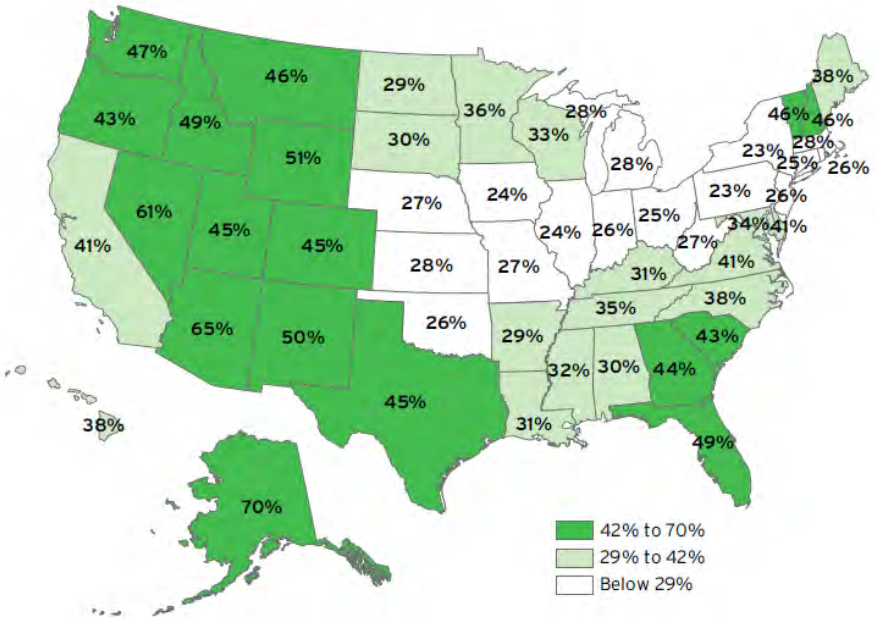
What are the national trends?

Seniors are at great risk for rapidly declining health and social isolation once they lose the ability to travel on their own. In the U.S., about 20% of seniors today do not drive. Half of all non-drivers age 65 or older—four million Americans—stay at home on a given day because they do not have access to convenient transportation options.[ii] As shown in Figure 1 on the next page, the projected growth in the 65+ population in Idaho is among the highest in the country – 49% between 2010 and 2020. As the City of Moscow plans for its next 30 years of transportation investment, careful consideration will be needed to keep existing and future seniors engaged, active, and safe.

Where do seniors want to live?

Although senior housing and neighborhood preference varies vastly in communities across the U.S., recent studies have shown that the social and economic needs of "boomer seniors" will likely differ sharply from the past. Boomers are less likely to live in a traditional family than their parents: with a higher percentage of non-family residence among both men and women and fewer married couples.[iii]

Figure 1 Projected Growth in 65+ Population between 2010-2020 by State



The 65+ population in the state of Idaho is expected to grow by 49% between 2010 -2020, among one of the highest rates in the country.

Source:Brookings Institute "Getting Current: Recent Trends in Metroplitan America."

A 2010 AARP survey found that nearly 90 percent of seniors want to "age in place" – seniors want to live in their homes and stay in their community as long as possible. The degree to which this can happen relies in large part on community design and access to travel options.[iv] Daily goods and services must be within a convenient and safe walking or transit trip. Compact neighborhoods with safe sidewalks and intersections that provide well-timed crossing signals are critical.

Common issues that limit senior mobility

Given the large-scale nature by which Moscow and surrounding Latah County communities are aging, it is critical to evaluate the impact of the built environment on senior mobility.

Strip Development & Senior Safety[v]

Strip commercial development characterized by big box retail and large surface parking lots—similar to the development patterns between SH8 and A Street in Moscow—is associated with higher risks of traffic-related injuries and deaths among people 75 and older.

Palouse Mall along Pullman Road in Moscow

Image from Flickr user Dan B May

Common issues exhibited in Moscow and other smaller cities that limit senior mobility include transit access, limited access to travel information, insufficient sidewalks, physical barriers, and unsafe intersection crossings. By addressing these issues, cities in turn improve mobility for all citizens.

- **Living on a fixed income.** Seniors tend to live on a fixed income – either on social security, Medicaid, or a pension or retirement fund. At a certain point, many seniors can no longer drive and hiring a driver or depending on family for transportation is often infeasible. As such, providing a range of affordable transportation options for seniors is important.
- **Transit access.** In some small town and rural communities where transit resources are limited, fixed route transit coverage is unable to accommodate elderly housing located on the town periphery, such as the Good Samaritan – Fairview Village. Cities are now reconsidering how they deliver transit services in order to serve the most transit-dependent of populations. In Moscow, the highest concentration of seniors is located at the Good Samaritan Village on North Eisenhower Street northeast of downtown roughly ½-mile from the closest transit route. A second concentration of seniors is located at the Kindred Nursing and Rehabilitation Center on Styner Avenue, which is located directly on Moscow Valley Transit's East Route.
- **Marketing for general population and complementary ADA paratransit services.** Local and county-wide organizations are beginning to coordinate regional transportation services and create information clearinghouses that educate seniors about mobility options.
- **Sidewalk availability and design.** To help aging adults safely walk for exercise and errands, cities are improving sidewalk infrastructure to ensure sidewalks are in good condition for canes, walkers, and wheelchairs, and curb ramps are in place at driveway cutouts and intersections. In addition, cities are providing more street furniture like benches, drinking fountains, and pedestrian-scale lighting to provide respite and comfort for seniors. Well-maintained sidewalk infrastructure helps encourage seniors to walk and feel safe doing so.
- **Physical barriers.** Barriers like neighborhoods with long block faces, disconnected street grids, and areas with steep grades limit seniors' ability to walk or roll to neighborhood or medical destinations.
- **Intersection conditions.** Cities are retiming signal WALK phases at intersections to provide adequate time for seniors and people with disabilities to cross. Most signals are timed for pedestrians walking at 4 feet per second, which is insufficient for older pedestrians. Traffic signals that allow pedestrians to get a 3-6 second head start before motor vehicle traffic lights turn green - called leading pedestrian intervals – also help pedestrians feel safe while crossing intersections by increasing their visibility in areas with high turn volumes.
- **Existing community transportation resources for seniors.** Most communities have a variety of existing transportation options for seniors. The Older American's Act provides funding for nutrition (meals on wheels and congregate meals), and social/recreational outings. The Federal Transit Administration provides capital

funding for vehicles for seniors and people with disabilities. The local Area Agency on Aging may provide volunteer drivers through programs such as the Retired Senior Volunteer Program (RSVP) and Senior Companion. Seniors who are unable to used fixed-route transit services are also eligible for ADA paratransit service.

- **Coordination of human-service transportation programs.** Coordination of community transportation services is a growing need in communities. Demand for these services is increasing, brought on by demographic and economic shifts in our society including the retirement of baby boomers and the Great Recession, while at the same time funding for services is being cut. Because communities have a diverse spectrum of services for seniors and people with disabilities, it is critical that local agencies work together to leverage the available resources for providing access and mobility.

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[i] 2010 Census Summary File 2 Moscow City, Idaho.
[ii] AARP and the Walkable and Livable Communities Initiative. (2011) From Inspiration to Action: Implementing Projects to Support Active Living.
[iii] Brookings Institute (2006). "America's Regional Demographics in the '00s Decade: The role of seniors, boomers, and new minorities."
[iv] AARP. (2011). "Aging in Place: A State Survey of Livability Policies and Practices."
[v] Dumbaugh, Eric, Yi Zhang and Wenhao Li (2012). Community Design and the Incidence of Crashes Involving Pedestrians and Motorists Aged 75 and Older. University Transportation Center for Mobility, Texas Transportation Institute.

KEY OUTCOMES

ECONOMIC DEVELOPMENT

MAKING A RESILIENT ECONOMY

The economic viability of a community is dependent upon the efficient movement of people, products, and goods throughout the community. An effective transportation system is essential for Moscow to continue to grow and thrive economically. Moscow's economic competitiveness relies on access to a broader regional and global market as well as its attractiveness as a place to live and do business.

What are Moscow's economic development goals and objectives?

According to Moscow's Economic Development Strategy Plan, the city's economic development objectives are to provide a high quality of life for residents, achieve environmental sustainability, preserve small-town community character, support strong Universities and cultural amenities, and create economic security. The Moscow 2009 Comprehensive Plan envisions a strong and diverse economy by building upon existing assets, providing business and employment opportunities for City residents, and taking steps to create an environment that offers greater potential for upward mobility.

Moscow on the Move's guiding principles support these objectives through increasing mobility and access, supporting downtown and University public spaces, enhancing economic resilience, increasing quality of life through land use and design, improving safety, promoting active and healthy living, and improving environmental quality.

What role does a multi-modal transportation system have in strengthening the local economy?

Accessibility plays a key role in the local economy. Accessibility includes regional connections outside of the community (typically for passenger vehicles, freight, or public transit) and local connections within the community (for pedestrians, cyclists, passenger vehicles, or public transit).

A sound multi-modal transportation system is a foundation for the local and regional economy, providing access to:

- The University, which encourages the development of an educated workforce
- Employment opportunities
- Retail, recreation, and entertainment, contributing to a more attractive educational and business environment

- Medical care, including preventive care trips
- Agricultural and industrial businesses that rely on movement of goods to prosper

Strengthening downtown and the city's other commercial centers will need to be supported by a range of convenient options for access. Promoting non-auto transportation options, improving parking efficiency, reducing long-term parking in prime retail-serving on-street parking spaces, and lowering auto speeds by improving road conditions can improve access to businesses. Studies have found that transit users, pedestrians and bicyclists support businesses more than drivers by going to stores in commercial areas more often and spending more money.[i]

Movement of Goods

To compete successfully in today's globalized economy, communities must ensure that roads allow for the efficient movement of goods. The efficient movement of goods has economic and environmental benefits:

- Economic benefit: lower prices and higher productivity
- Environmental: improved efficiency in supply chains based on investments in transportation and trade infrastructure

Access to freeways and airports is among the first criteria businesses look at when locating in a community. Managing accessing in and out of a community ensures that truck routes are safe, efficient, and convenient without putting an unnecessary burden on residential areas and main streets. The Moscow Comprehensive Plan identifies the movement of goods as a key priority for building an economically viable region.

Complete Streets

Complete Streets can support economic development efforts because they provide accessible, safe, and efficient connections between key destinations such as residences, schools, parks, public transportation, workplaces, and retail. This approach recognizes the importance of tying neighboring commercial, residential, and activity centers throughout the community. Research shows that Complete Streets can bolster the economy through increased property values[ii] and job growth[iii]. Street designs that promote multi-modal transportation options improve conditions for existing businesses and help to revitalize neighborhoods and attract new development.

Complete Streets support businesses by improving retail access for motorists, transit users, pedestrians, and bicyclists.

Image from Nelson\Nygaard

What are the major employers and industries in Moscow today?

With respect to the overall number of jobs in the community, Moscow's top five industries are state and local government (including the University of Idaho), retail, food and lodging, health care and social assistance, and professional and technical services, which together accounted for a total of 14,006 jobs in 2008.[iv]

Figure 1 Retail revenue leakage in Moscow

Image from Moscow Economic Development Strategy Plan

The top five employers in Moscow include Washington State University, University of Idaho, Gritman Medical Center, the Moscow School District, and Wal-Mart.

Retail

Retail is an important employment and revenue source for Moscow. Moscow serves as a regional retail hub for smaller cities in the region, like Troy, Dreary, Potlatch, and Genesee, bringing in revenue from outside the city.[v] A retail-supportive multi-modal transportation system is one that provides convenient parking, pedestrian, bicycling, and transit access to important commercial locations like downtown, the Eastside Marketplace, and strip development along SH8 and US95.

In 2007, Moscow retailers generated $305.5 million in sales and less than $5 million, or 1.6%, of the City's purchasing power leaked out to other places (see Figure 1). Moscow's retail revenue leakage is relatively low; as a peer comparison, Ellensburg, WA lost 5.1% of retail revenue in 2003.[1] The loss in purchasing power that Moscow does experience is mainly due to residents leaving for work and making purchases elsewhere during the day; a problem that could be addressed by an improved jobs/housing balance. Balancing where people live and work also increases retail access, reduces short auto trips that contribute to peak period traffic issues, and improves transit productivity. As discussed in many sections of the Transportation Fact Book, housing and employment location preferences of younger generations and the elderly are trending toward central and more walkable places, which increase access to retail. Placemaking and downtown access efforts are important transportation strategies that support retail.

Transportation improvements to support retail also take into consideration movement of goods to important retail centers.

Tourism

Tourism is currently an important economic driver in Moscow and an area to focus on for future economic growth. According the Moscow's Economic Development Strategy Plan, tourism has a $60 million annual impact on the local economy. Current tourist draws in Moscow include cultural and sporting events at the University, arts attractions and festivals, and outdoor recreation opportunities.

Moscow has an opportunity to leverage the City's natural beauty, current and future trail network, and proximity to Moscow Mountain—a mountain biking destination—to grow the outdoor recreation tourism industry.

[1] Property Counselors, (2005) "Kittitas County Regional Retail Market Analysis"

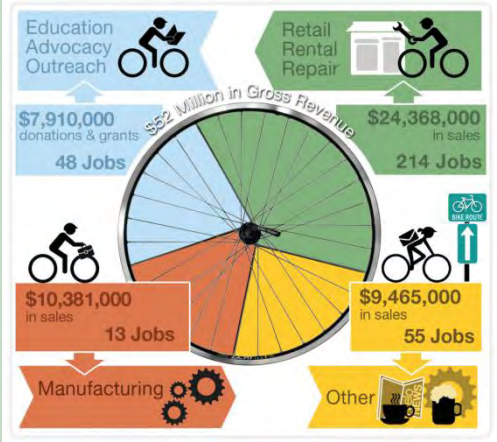
Bike Tourism

Boulder's bike industry creates jobs

A recent survey by Community Cycles in Boulder found that the bike industry impact on the local economy is significant, generating $52 million in sales and 330 full time jobs. Statewide data from 2000 shows the retail impact of the bike industry on Colorado is $200 million.

Businesses like bike-related retail, rental and repair shops, manufacturing, and education and advocacy groups are responsible for this impact. However, the benefit extends past the bike industry to revenue generated through tourism and cycling events. Tourists visiting Boulder for biking events or to use mountain biking trails contribute to the local economy through retail, restaurants, and hotels, as well as adding to the local bike industry through bike-related retail and rental and repair shops.

Source: Boulder Community Cycles Local Bike Business Survey (2011)



What growth areas have been identified?

The 2009 Comprehensive Plan identified a number of potential growth areas in Moscow, including retail, tourism, health care, higher education, biological and social sciences, arts, and engineering. A number of local initiatives – described below – have been established to deliberately grow these industries. Strong coordination between the City, the University, and the private sector will be needed to ensure the transportation needs of these growing industries are met.

What local initiatives support economic growth?

A number of initiatives and organizations in the City of Moscow have been identified to help guide the economic growth of the region, including the University of Idaho, the Palouse Knowledge Corridor, the Business Technology Incubator, and two urban renewal districts.

University of Idaho

The University of Idaho comprises a significant portion of Moscow's employment base. The University provides nearly 40% of the city's jobs. More than 10,000 students live in Moscow while attending school, making up a large portion of the city's consumer base. Additionally, this population can be courted to stay in Moscow post-graduation if they are provided a diversity of jobs and an active community environment supported by well-connected and multi-modal transportation system. This is a key objective of *Moscow on the Move*.

Palouse Knowledge Corridor

Moscow and the larger region are making positive steps to leverage current economic assets to attract businesses and residents. The Palouse Knowledge Corridor (PKC) is a cluster of knowledge-based industries in the Latah County-Whitman County region focused on the development of University talent and technologies in the areas of high-tech and research at the University of Idaho and Washington State University. The intent of the PKC is to develop a strong, nationally competitive research sector in electronics, biotech, environmental services, advanced materials, and information services that will attract, recruit, and retain first-rate faculty and students.

Key to Moscow's economic success is the retention of UI faculty and graduating students. The success of the PKC will help build a sustainable consumer base in Moscow by providing employment opportunities.

Urban renewal districts

Moscow has two urban renewal districts: the Alturas Technology Park and the Legacy Crossing district. The Alturas Technology Park is located southwest of SH8 and Mountain View Road and is a business park oriented to technology sector companies. This office location supports businesses that develop out of the BTI or want to locate near the University of Idaho and Washington State University to tap into their knowledge and talent. Supporting the technology sector is an effective economic development strategy. Safe and direct multi-modal connections to the Technology Park along key access corridors like Paradise Path, Troy Road, Blaine Street, White Avenue, Styner Avenue, and Mountain View Road can expand commuting options and attract businesses to locate in Moscow by contributing to the City's existing high quality of life.

The Legacy Crossing urban renewal district is a key strategy for strengthening Moscow's economy. Located between downtown and the University, this site presents a significant opportunity to connect these two activity centers and support the city's core commercial areas. Successful development of the district will not only create a direct retail and residential access from the University and physically extend downtown's commercial district to the south, but it will also create some level of permeability through Legacy Crossing to better connect the University to downtown. Student and faculty access to downtown is currently constrained by Pullman Road and the decommissioned rail track along Paradise Creek. Developing attractive streetscapes with targeted placemaking efforts and a diversity of land uses within Legacy Crossing could support retail activity—a direct stimulus to the local economy. Streets can be used for more than just mobility; they can also be turned into great public spaces that foster active community use. Coordination between the City, the Urban Renewal Agency, the University, and Moscow Valley Transit will be necessary to ensure Legacy Crossing is designed as a place where people want to live, work and shop.

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[i] *Macdonald, Elizabeth; Sanders, Rebecca; Anderson, Alia. "Performance Measures for Complete, Green Streets: A Proposal for Urban Arterials in California." University of California Transportation Center. 2010*

[ii] *Richard Campbell and Margaret Wittgens, 2004, "The Business Case for Active Transportation: the economic benefits of walking and cycling" (Go for Green: the Active Living and Environment Program), 32.*

[iii] *National Complete Streets Coalition, Local Government Commission. "It's A Safe Decision: Complete Streets in California." February 2012.*

[iv] *City of Moscow. (2009) Comprehensive Plan: Economic Development*

[v] *City of Moscow. (2008) Economic Development Strategy Plan*

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KEY OUTCOMES

ENVIRONMENT, ECOLOGY, AND PLACE

WHAT ARE MOSCOW'S ENVIRONMENTAL GOALS AND OBJECTIVES?

Moscow's core community values affirmed in the city's 2009 Comprehensive Plan can be supported by the development of a multi-modal transportation system with livable and walkable street design. These goals include:

- Protect and conserve natural resources of the area in a manner that **balances their ecologic, economic, and aesthetic potentials** to preserve natural features and ecosystems
- **Protect and enhance regional waterways** and sensitive riparian areas to serve their natural functions
- **Conserve and protect the groundwater** of the region's aquifers
- Protect and **expand the City's urban forest**
- **Direct land uses** to meet current and future community desires and needs while conserving natural resources and protecting agricultural lands from scattered development through efficient and orderly development

These goals align with *Moscow on the Move's* transportation principles in that they seek to improve the quality of life for current and future residents and preserve the local environment.

How can transportation benefit Moscow's environment and public realm?

The choices the City makes when redesigning its transportation network will impact the health of the natural environment in and around Moscow. Effective street design and policies that shift travel away from private vehicles can reduce air and water pollution, support local habitats, promote healthy lifestyles, and support the local economy.

Incorporating open space and landscaping in public space and trail design can do more than create pleasant places. There are natural processes that healthy trees, soils, and water systems provide, including retaining stormwater in root systems; filtering pollutants out of air and water; replenishing healthy soils with nutrients; and supporting species diversity and a healthy food chain. Public spaces designed to protect these natural systems can also be beautiful and inviting community assets that encourage people to walk, bike, enjoy, and participate in the neighborhood around them.

Multi-modal transportation systems can also contribute to public health by reducing air polluting emissions and encouraging active lifestyles. The number of vehicle miles

traveled is directly related to presence of pollutants that can induce asthma and other health problems. When people walk and bike more, they increase their levels of exercise and reduce their chances of obesity and related illnesses. See the *Healthy & Active Living* transportation plan outcomes section for more information on how transportation can create healthier cities. Creating the conditions for these changes requires the development of inviting, safe public spaces and the facilities and policies that make use of non-auto modes safe and attractive. Cities that have focused investment in placemaking—an approach to designing and managing great public spaces that capitalizes on a local community's assets, inspiration, and potential, ultimately creating good public spaces increase use of non-auto modes and decrease transportation emissions.

Green Streets

Green Street design seeks to incorporate the street into larger "green" infrastructure efforts and adopts a watershed approach to improving the region's water quality. A key component of this approach involves the design of innovative stormwater treatments within the street right-of-way that minimize the amount of water that travels directly into the stormwater pipe system and blend with the aesthetics of the community. This approach also uses street tree coverage to intercept stormwater and improve air quality.

The Green Streets approach complements the development of multi-modal and Complete Streets. Both involve rethinking the way that streets function to incorporate a variety of uses, promote connectivity, and require more integrated decision-making across City departments. Green Streets facilities and treatment elements can include:

What is Placemaking?

Placemaking is an approach to designing and programming great public spaces by capitalizing on local assets and community vision—a process that ultimately creates well-designed and well-used public spaces and multi-modal thoroughfares.

Key outcomes of placemaking include:

- Enhancing access and expanding linkages to the places people want to go
- Preserving local environmental, economic, and community health
- Creating sociable places and storefronts
- Expanding the number of uses and programmed activities along and on streets
- Improving comfort and the image of public spaces

Pedestrianizing downtown has had a major impact on how people access, socialize, and shop downtown. Friendship Square, one of Moscow's great places, is achieving these outcomes. By restricting access to motorized traffic, patrons are afforded a space to rest, meet, play, stroll, converse, and learn.

Image from Nelson\Nygaard

- **Bioswales with native plants:** A bioswale is a natural or constructed open depression or wide, shallow ditch that contains stormwater runoff from heavy rains. Native plants filter out pollutants. Bioswales are sometimes also called rain gardens, which protrude from the original street edge as curb extensions.
- **Filter strips:** Filter strips are gently sloped grassy areas that treat small volumes of stormwater runoff using vegetation to remove sediment. Filter strips are an effective method of bio-

remediation that protects the quality of groundwater and controls runoff.

- **Vegetated planter or filter box:** These are rectangular facilities between the street curb and sidewalk that use curb cuts to allow street and sidewalk runoff to enter. Excess runoff exits via a second curb cut and flows to another filter box further down the street.
- **Reduction of impervious surfaces:** Impervious surfaces keep stormwater on the surface instead of letting it soak into the ground to recharge groundwater supplies. Using permeable pavements to reduce impervious surfaces can help protect Moscow's aquifers.
- **Street trees:** Trees provide many benefits to people and the environment, such as providing shade, conserving energy and water, creating an attractive landscape, and reducing excessive speeding. Urban forests can support sustainable stormwater management because a tree's leaves, stems, and branches intercept rain water and contribute to absorption.
- **Runoff irrigated plantings:** Street vegetation that utilizes stormwater runoff to meet irrigation needs helps reduce the quantity of runoff and slows runoff.

Improving Water Quality & Quantity

Water quantity and quality are very important considerations in Moscow, since the city receives all of its water from groundwater sources: the Wanapum and Grande Ronde Aquifer Systems.

Filtering stormwater through urban rain garden systems helps deliver water back down through sediment layers to the aquifers located in the basalt rock. This process not only serves to capture toxics in the soil and plants, but also slows and eliminates the scouring power of storms that create erosion and allows more water to evaporate and infiltrate naturally, which is part of the natural water cycle.

Bioswales, rainwater gardens, and other Green Street treatments capture stormwater runoff to reduce stormwater volume and filter pollutants. They also offer opportunities to beautify streetscapes and even integrate into broader traffic calming strategies.

Image from Nelson\Nygaard

Rain garden systems can take many physical forms, but all have the capability to allow fluctuating water levels within the facilities. They can be designed to allow infiltration of water back into the ground or when soil conditions are not appropriate for infiltration, they can be designed to provide valuable storage and filtering capability.

Improving Air Quality

In addition to emitting greenhouse gases, gas and diesel-powered private vehicle travel emits other harmful pollutants like nitrogen dioxide, sulfur dioxide, and particulate matter. While the amount of vehicle travel has increased over time, air pollution standards for light vehicles and trucks have become more stringent, reducing the amount of emissions from transportation.

Strategies for further reducing transportation impacts on air quality include:

- **Transportation demand management (TDM):** Walking and bicycling offer emission-free mobility. Policies that reduce the overall number of vehicle miles traveled or car trips taken by encouraging a shift to walking bicycling and transit can reduce emissions and improve air quality. See the *Transportation Demand Management* best practices section to learn more about effective TDM strategies.
- **Traffic flow measures:** Signal timing improvements can reduce emissions through more efficient traffic flow.
- **Low-emission vehicle technology:** Many jurisdictions are improving their fleets with low-emission vehicles and technologies, including hybrid and electric buses, low-emission fuels, and other technologies that improve fuel economy. For example, TriMet, the transit agency for Portland, OR, retrofitted older buses with high-tech filters that drastically reduce exhaust emissions, improved the efficiency of vehicle cooling systems, and use a cleaner burning fuel that is blended with biodiesel. Chittenden County Transportation Authority in Burlington, VT purchased new low-emission buses that reduce particulate emissions by 97% and carbon monoxide emissions by 75%.

Non-point source pollution such as tail pipe emissions and leaking oil, grease, and toxic chemicals directly impact local air quality and watershed health.

Image from Flickr user Ugly Hugo

U.S. Mayor's Climate Protection Agreement

City of Moscow

In 2007, the Mayor of Moscow signed the U.S. Mayor's Climate Protection Agreement –a pledge made by cities across the country to reduce GHG emissions by 7% below 1990 levels by the year 2012. As of 2009, transportation accounted for 24% of the Moscow community's emissions.

Source: City of Moscow "Greenhouse Gas & Energy Efficiency Report, July 2010."

MOSCOW ON THE MOVE

ACTIVE TRANSPORTATION TOOLKIT

March 2014

CITY OF MOSCOW 1887 IDAHO

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In association with DKS Associates and Alta Planning + Design

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1 INTRODUCTION

This toolkit is intended to assist the City of Moscow in the selection and design of bicycle facilities. The following chapters pull together best practices by facility type from public agencies and municipalities nationwide. Within the design chapters, treatments are covered within a single sheet tabular format relaying important design information and discussion, example photos, schematics (if applicable), and existing summary guidance from current or upcoming draft standards. Existing standards are referenced throughout and should be the first source of information when seeking to implement any of the treatments featured here.

Guiding Principles

The following are guiding principles for these bicycle design guidelines:

- The walking and bicycling environment should be safe. All bicycling and walking routes should be physically safe and perceived as safe by all users. Safe means minimal conflicts with external factors, such as noise, vehicular traffic and protruding architectural elements. Safe also means routes are clear and well-marked with appropriate pavement markings and directional signage.
- Pedestrian and bicycle network improvements should be economical. Pedestrian and bicycle improvements should achieve the maximum benefit for their cost, including initial cost and maintenance cost, as well as a reduced reliance on more expensive modes of transportation. Where possible, improvements in the right-of-way should stimulate, reinforce and connect with adjacent private improvements.
- The pedestrian and bicycle network should connect to places people want to go. The pedestrian and bicycle network should provide continuous direct routes and convenient connections between destinations such as homes, schools, shopping areas, public services, recreational opportunities and transit.
- The walking and bicycling environment should be clear and easy to use. Sidewalks, shared-use paths and crossings should allow all people to easily find a direct route to a destination with minimal delays, regardless of whether these persons have mobility, sensory, or cognitive disability impairments.
- The walking and bicycling environment should be attractive and enhance community livability. Good design should integrate with and support the development of complementary uses and should encourage preservation and construction of art, landscaping and other items that add value to communities. These components might include open spaces such as plazas, courtyards and squares, and amenities like street furniture, banners, art, plantings and special paving. These along with historical elements and cultural references, should promote a sense of place. Public activities should be encouraged and the municipal code should permit commercial activities such as dining, vending and advertising when they do not interfere with safety and accessibility.

2 PEDESTRIAN FACILITY TOOLKIT

DESIGN NEEDS OF PEDESTRIANS

Pedestrians have a variety of characteristics and the transportation network should accommodate a variety of needs, abilities, and possible impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception. Children have low eye height and walk at slower speeds than adults. They also perceive the environment differently at various stages of their cognitive development. Older adults walk more slowly and may require assistive devices for walking stability, sight, and hearing. The table below summarizes common pedestrian characteristics for various age groups.

The MUTCD recommends a normal walking speed of three and a half feet per second when calculating the pedestrian clearance interval at traffic signals. The walking speed can drop to three feet per second for areas with older populations and persons with mobility impairments. While the type and degree of mobility impairment varies greatly across the population, the transportation system should accommodate these users to the greatest reasonable extent.

Pedestrian Characteristics by Age

Age	Characteristics
0-4	Learning to walk
	Requires constant adult supervision
	Developing peripheral vision and depth perception
5-8	Increasing independence, but still requires supervision
	Poor depth perception
9-13	Susceptible to "dart out" intersection dash
	Poor judgment
	Sense of invulnerability
14-18	Improved awareness of traffic environment
	Poor judgment
19-40	Active, fully aware of traffic environment
41-65	Slowing of reflexes
65+	Difficulty crossing street
	Vision loss
	Difficulty hearing vehicles approaching from behind

Source: AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (July 2004), Exhibit 2-1.

The table below summarizes common physical and cognitive impairments, how they affect personal mobility, and recommendations for improved pedestrian-friendly design.

Disabled Pedestrian Design Considerations

Impairment	Effect on Mobility	Design Solution
Wheelchair and Scooter Users	Difficulty propelling over uneven or soft surfaces.	Firm, stable surfaces and structures, including ramps or beveled edges.
	Cross-slopes cause wheelchairs to veer downhill.	Cross-slopes of less than two percent.
	Require wider path of travel.	Sufficient width and maneuvering space.
Walking Aid Users	Difficulty negotiating steep grades and cross slopes; decreased stability.	Smooth, non-slipperly travel surface.
	Slower walking speed and reduced endurance; reduced ability to react.	Longer pedestrian signal cycles, shorter crossing distances, median refuges, and street furniture.
Hearing Impairment	Less able to detect oncoming hazards at locations with limited sight lines (e.g. driveways, angled intersections, channelized right turn lanes) and complex intersections.	Longer pedestrian signal cycles, clear sight distances, highly visible pedestrian signals and markings.
Vision Impairment	Limited perception of path ahead and obstacles; reliance on memory; reliance on non-visual indicators (e.g. sound and texture).	Accessible text (larger print and raised text), accessible pedestrian signals (APS), guide strips and detectable warning surfaces, safety barriers, and lighting.
Cognitive Impairment	Varies greatly. Can affect ability to perceive, recognize, understand, interpret, and respond to information.	Signs with pictures, universal symbols, and colors, rather than text.

SIDEWALKS

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel that is separated from vehicle traffic. Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped planting strip area. Sidewalks are a common application in both urban and suburban environments. Attributes of well-designed sidewalks include the following:

Accessibility: A network of sidewalks should be accessible to all users.

Adequate width: Two people should be able to walk side-by-side and pass a third comfortably. Different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should accommodate the high volume of walkers.

Safety: Design features of the sidewalk should allow pedestrians to have a sense of security and predictability. Sidewalk users should not feel they are at risk due to the presence of adjacent traffic.

Continuity: Walking routes should be obvious and should not require pedestrians to travel out of their way unnecessarily.

Landscaping: Plantings and street trees should contribute to the overall psychological and visual comfort of sidewalk users, and be designed in a manner that contributes to the safety of people.

Drainage: Sidewalks should be well graded to minimize standing water.

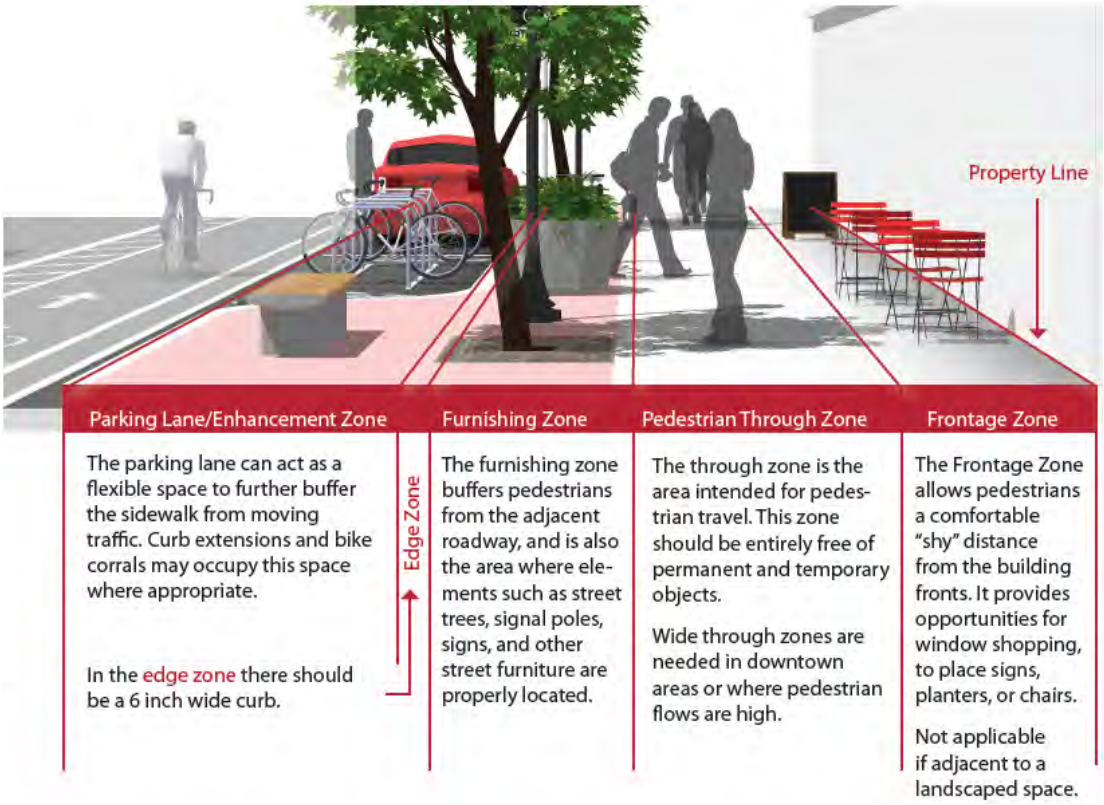
Social space: There should be places for standing, visiting, and sitting. The sidewalk area should be a place where adults and children can safely participate in public life.

Quality of place: Sidewalks should contribute to the character of neighborhoods and business districts.

ZONES IN THE SIDEWALK CORRIDOR

Description

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel separated from vehicle traffic. A variety of considerations are important in sidewalk design. Providing adequate and accessible facilities can lead to increased numbers of people walking, improved safety, and the creation of social space.



Discussion

Sidewalks should be more than areas to travel; they should provide places for people to interact. There should be places for standing, visiting, and sitting. Sidewalks should contribute to the character of neighborhoods and business districts, strengthen their identity, and be an area where adults and children can safely participate in public life.

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped space. Colored, patterned, or stamped concrete can add distinctive visual appeal.

Additional References and Guides

- USDOJ. (2010). ADA Standards for Accessible Design.
- United States Access Board. (2007). Public Rights-of-Way Accessibility
- Guidelines (PROWAG).
- AASHTO. (2004). Guide for the Planning, Design, and Operation of
- Pedestrian Facilities.

SIDEWALK WIDTHS

Description

The width and design of sidewalks will vary depending on street context, functional classification, and pedestrian demand. Below are preferred widths of each sidewalk zone according to general street type. Standardizing sidewalk guidelines for different areas of the city, dependent on the above listed factors, ensures a minimum level of quality for all sidewalks.

Street Classification	Parking Lane/ Enhancement Zone	Furnishing Zone	Pedestrian Through Zone	Frontage Zone	Total
Local Streets	Varies	2 - 5 feet	4 - 6 feet	N/A	6 - 11 feet
Commercial Areas	Varies	4 - 6 feet	6 - 12 feet	2.5 - 10 feet	11 - 28 feet
Arterials and Collectors	Varies	2 - 6 feet	4 - 8 feet	2.5 - 5 feet	8 -19 feet

Areas that have significant accumulations of snow during the winter may prefer a wider furnishing zone for snow storage.

Six feet enables two pedestrians (including wheelchair users) to walk side-by-side, or to pass each other comfortably

Discussion

It is important to provide adequate width along a sidewalk corridor. Two people should be able to walk side-by-side and pass a third comfortably. In areas of high demand, sidewalks should contain adequate width to accommodate the high volumes and different walking speeds of pedestrians. The Americans with Disabilities Act requires a 4 foot clear width in the pedestrian zone plus 5 foot passing areas every 200 feet.

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped boulevard. Surfaces must be firm, stable, and slip resistant. Colored, patterned, or stamped concrete can add distinctive visual appeal. Sidewalks should have a wide enough clear zone for easier winter maintenance and snow removal.

Additional References and Guides

- USDOJ. (2010). ADA Standards for Accessible Design.
- United States Access Board. (2007). Public Rights-of-Way Accessibility
- Guidelines (PROWAG).
- AASHTO. (2004). Guide for the Planning, Design, and Operation of
- Pedestrian Facilities.

PEDESTRIANS AT INTERSECTIONS

Attributes of pedestrian-friendly intersection design include:

- Clear Space: Corners should be clear of obstructions. They should also have enough room for curb ramps, for transit stops where appropriate, and for street conversations where pedestrians might congregate.
- Visibility: It is critical that pedestrians on the corner have a good view of vehicle travel lanes and that motorists in the travel lanes can easily see waiting pedestrians.
- Legibility: Symbols, markings, and signs used at corners should clearly indicate what actions the pedestrian should take.
- Accessibility: All corner features, such as curb ramps, landings, call buttons, signs, symbols, markings, and textures, should meet accessibility standards and follow universal design principles.
- Separation from Traffic: Corner design and construction should be effective in discouraging turning vehicles from driving over the pedestrian area. Crossing distances should be minimized.
- Lighting: Adequate lighting is an important aspect of visibility, legibility, and accessibility.

These attributes will vary with context but should be considered in all design processes. For example, suburban and rural intersections may have limited or no signing. However, legibility regarding appropriate pedestrian movements should still be taken into account during design.

MARKED CROSSWALKS

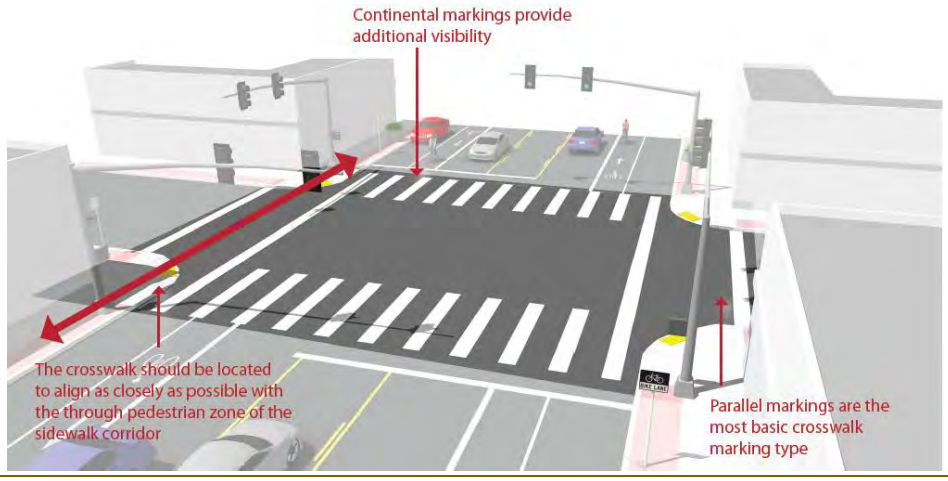
Description

A marked crosswalk signals to motorists that they must stop for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily make crossings safer especially on multi-lane roadways. At mid-block locations, crosswalks can be marked where there is a demand for crossing and there are no nearby marked crosswalks.

Guidance

At signalized intersections, all crosswalks should be marked. At un-signalized intersections, crosswalks may be marked under the following conditions:

- At a complex intersection, to orient pedestrians in finding their way across.
- At an offset intersection, to show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At an intersection within a school zone on a walking route.



Discussion

Continental crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including: school crossings, across arterial streets for pedestrian-only signals, at mid-block crosswalks, and at intersections where there is expected high pedestrian use and the crossing is not controlled by signals or stop signs.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. Thermoplastic markings offer increased durability than conventional paint. Continually exploring the options for various striping methods is encouraged to reduce the striping needs after winter maintenance.

Additional References and Guides

- FHWA. (2009). Manual on Uniform Traffic Control Devices. (3B.18)
- AASHTO. (2004). Guide for the Planning, Design, and Operation of
- Pedestrian Facilities.
- FHWA. (2005). Safety Effects of Marked vs. Unmarked Crosswalks at
- Uncontrolled Locations.
- FHWA. (2010). Crosswalk Marking Field Visibility Study.

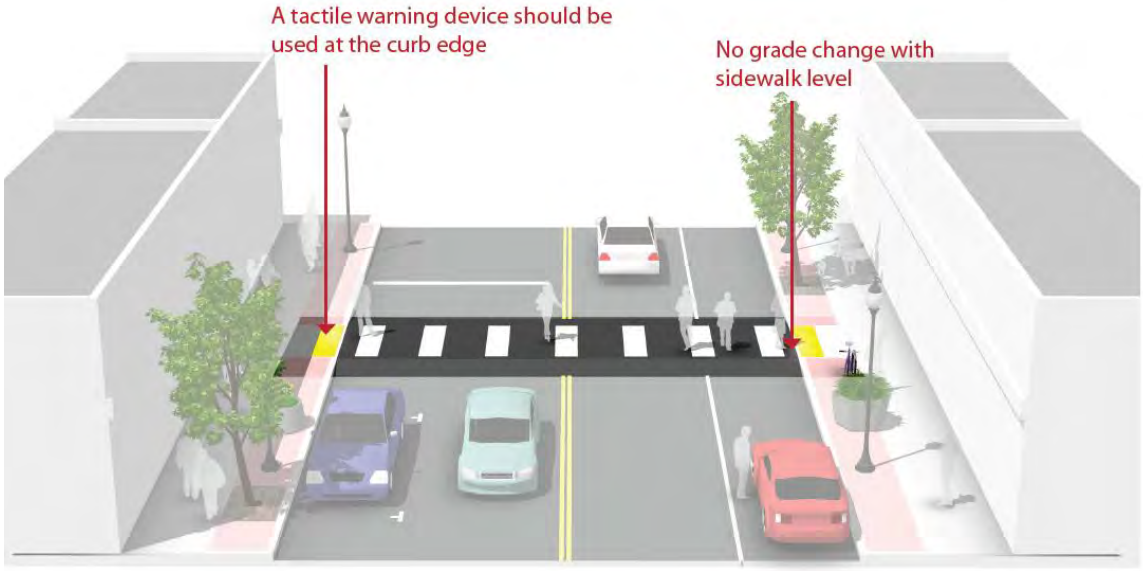
RAISED CROSSWALKS

Description

A raised crosswalk or intersection can eliminate grade changes from the pedestrian path and give pedestrians greater prominence as they cross the street. Raised crosswalks should be used only in very limited cases where a special emphasis on pedestrians is desired; review on case-by-case basis.

Guidance

- Use detectable warnings at the curb edges to alert vision-impaired pedestrians that they are entering the roadway
- Approaches to the raised crosswalk may be designed to be similar to speed humps.
- Raised crosswalks can also be used as a traffic calming treatment.



Discussion

Like a speed hump, raised crosswalks have a traffic slowing effect which may be unsuitable on emergency response routes.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. A raised crosswalk will require additional effort during winter maintenance as snow plow blades will need to be raised to go over the crosswalk.

Additional References and Guides

- FHWA. (2009). Manual on Uniform Traffic Control Devices. (3B.18)
- AASHTO. (2004). Guide for the Planning, Design, and Operation of
- Pedestrian Facilities.
- USDOJ. (2010). ADA Standards for Accessible Design.

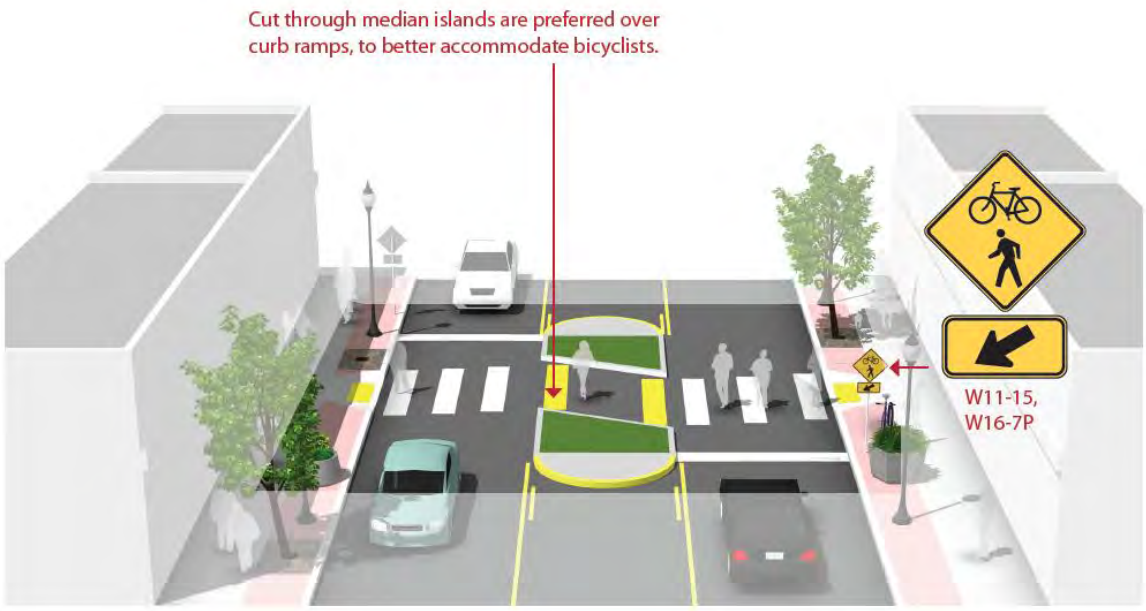
MEDIAN REFUGE ISLAND

Description

Median refuge islands are located at the mid-point of a marked crossing and help improve pedestrian safety by allowing pedestrians to cross one direction of traffic at a time. Refuge islands minimize pedestrian exposure by shortening crossing distance and increasing the number of available gaps for crossing.

Guidance

- Can be applied on any roadway with a left turn center lane or median that is at least 6' wide.
- Appropriate at signalized or unsignalized crosswalks
- The refuge island must be accessible, preferably with an at-grade passage through the island rather than ramps and landings.
- The island should be at least 6' wide between travel lanes (to accommodate bikes with trailers and wheelchair users) and at least 20' long.
- On streets with speeds higher than 25 mph there should also be double centerline marking, reflectors, and "KEEP RIGHT" signage.



Discussion

If a refuge island is landscaped, the landscaping should not compromise the visibility of pedestrians crossing in the crosswalk. Shrubs and ground plantings should be no higher than 1 ft 6 in.

Materials and Maintenance

Refuge islands may collect road debris and may require somewhat frequent maintenance. Refuge islands should be visible to snow plow crews and should be kept free of snow berms that block access.

Additional References and Guides

- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- AASHTO. (2004). Guide for the Planning, Design, and Operation of
- Pedestrian Facilities.
- NACTO. (2012). Urban Bikeway Design Guide.

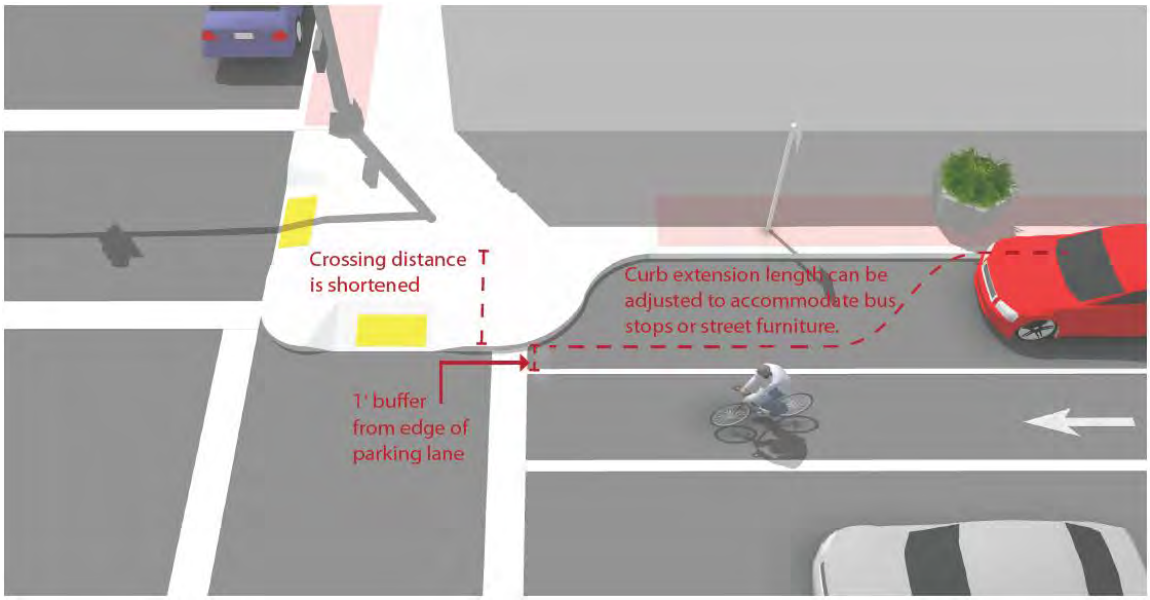
CURB EXTENSIONS

Description

Curb extensions minimize pedestrian exposure during crossing by shortening crossing distance and giving pedestrians a better chance to see and be seen before committing to crossing. They are appropriate for any crosswalk where it is desirable to shorten the crossing distance and there is a parking lane adjacent to the curb.

Guidance

- In most cases, the curb extensions should be designed to transition between the extended curb and the running curb in the shortest practicable distance.
- For purposes of efficient street sweeping, the minimum radius for the reverse curves of the transition is 10 feet and the two radii should be balanced to be nearly equal.
- Curb extensions should terminate one foot short of the parking lane to maximize bicyclist safety.



Discussion

If there is no parking lane, adding curb extensions may be a problem for bicycle travel and truck or bus turning movements.

Materials and Maintenance

Planted curb extensions may be designed as a bioswale, a vegetated system for stormwater management.

Additional References and Guides

- AASHTO. (2004). Guide for the Planning, Design, and Operation of
- Pedestrian Facilities.
- AASHTO. (2004). A Policy on Geometric Design of Highways and
- Streets.

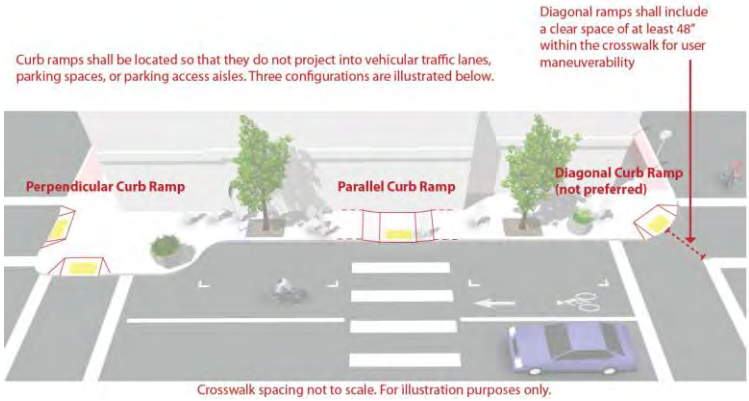
ADA COMPLIANT CURB RAMP

Description

Curb ramps are the design elements that allow all users to make the transition from the street to the sidewalk. There are a number of factors to be considered in the design and placement of curb ramps at corners. Properly designed curb ramps ensure that the sidewalk is accessible from the roadway. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access. Although diagonal curb ramps might save money, they create potential safety and mobility problems for pedestrians, including reduced maneuverability and increased interaction with turning vehicles, particularly in areas with high traffic volumes.

Guidance

- The landing at the top of a ramp shall be at least 4 feet long and at least the same width as the ramp itself.
- The ramp shall slope no more than 1:12 , with a maximum cross slope of 2.0%.
- If the ramp runs directly into a crosswalk, the landing at the bottom will be in the roadway.
- If the ramp lands on a dropped landing within the sidewalk or corner area where someone in a wheelchair may have to change direction, the landing must be a minimum of 5'-0" long and at least as wide as the ramp, although a width of 5'-0" is preferred.



Crosswalk spacing not to scale. For illustration purposes only.

Discussion

The edge of an ADA compliant curb ramp may be marked with a tactile warning device (also known as truncated domes) to alert people with visual impairments to changes in the pedestrian environment. Contrast between the raised tactile device and the surrounding infrastructure is important so that the change is readily evident. These devices are most effective when adjacent to smooth pavement so the difference is easily detected. The devices should provide color contrast so partially sighted people can see them.

Materials and Maintenance

It is critical that the interface between a curb ramp and the street be maintained adequately. Asphalt street sections can develop potholes at the foot of the ramp, which can catch the front wheels of a wheelchair.

Additional References and Guides

- United States Access Board. (2002). Accessibility Guidelines for
- Buildings and Facilities.
- United States Access Board. (2007). Public Rights-of-Way Accessibility
- Guidelines (PROWAG).
- USDOJ. (2010). ADA Standards for Accessible Design.

CROSSING BEACONS AND SIGNALS

Crossing beacons and signals facilitate crossings of roadways for pedestrians and bicyclists. Beacons make crossing intersections safer by clarifying when to enter an intersection and by alerting motorists to the presence of pedestrians and bicyclists.

Flashing amber warning beacons can be utilized at unsignalized intersection crossings. Push buttons, signage, and pavement markings may be used to highlight these facilities for pedestrians, bicyclists and motorists.

Determining which type of signal or beacon to use for a particular intersection depends on a variety of factors. These include speed limits, traffic volumes, and the anticipated levels of pedestrian and bicycle crossing traffic.

An intersection with crossing beacons may reduce stress and delays for crossing users, and discourage illegal and unsafe crossing maneuvers.

PEDESTRIANS AT SIGNALIZED CROSSINGS

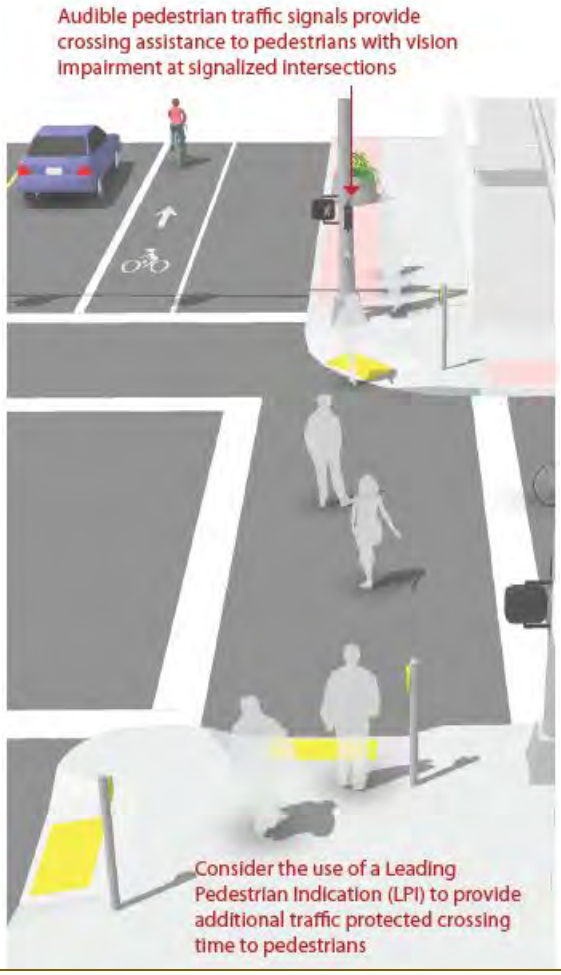
Description

Pedestrian Signal Head

Pedestrian signal indicators demonstrate to pedestrians when to cross at a signalized crosswalk. All traffic signals should be equipped with pedestrian signal indications except where pedestrian crossing is prohibited by signage. Countdown pedestrian signals are particularly valuable for pedestrians, as they indicate whether a pedestrian has time to cross the street before the signal phase ends. Countdown signals should be used at all signalized intersections.

Signal Timing

Providing adequate pedestrian crossing time is a critical element of the walking environment at signalized intersections. The MUTCD recommends traffic signal timing to assume a pedestrian walking speed of 4' per second, meaning that the length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street. At crossings where older pedestrians or pedestrians with disabilities are expected, crossing speeds as low as 3' per second may be assumed. Special pedestrian phases can be used to provide greater visibility or more crossing time for pedestrians at certain intersections. In busy pedestrian areas such as downtowns, the pedestrian signal indication should be built into each signal phase, eliminating the requirement for a pedestrian to actuate the signal by pushing a button.



Discussion

When push buttons are used, they should be located so that someone in a wheelchair can reach the button from a level area of the sidewalk without deviating significantly from the natural line of travel into the crosswalk, and marked (for example, with arrows) so that it is clear which signal is affected. In areas with very heavy pedestrian traffic, consider an all-pedestrian signal phase to give pedestrians free passage in the intersection when all motor vehicle traffic movements are stopped.

Materials and Maintenance

It is important to repair or replace traffic control equipment before it fails. Consider semi-annual inspections of controller and signal equipment, intersection hardware, and loop detectors.

Additional References and Guides

- United States Access Board. (2007). Public Rights-of-Way Accessibility
- Guidelines (PROWAG).
- AASHTO. (2004). Guide for the Planning, Design, and Operation of
- Pedestrian Facilities.

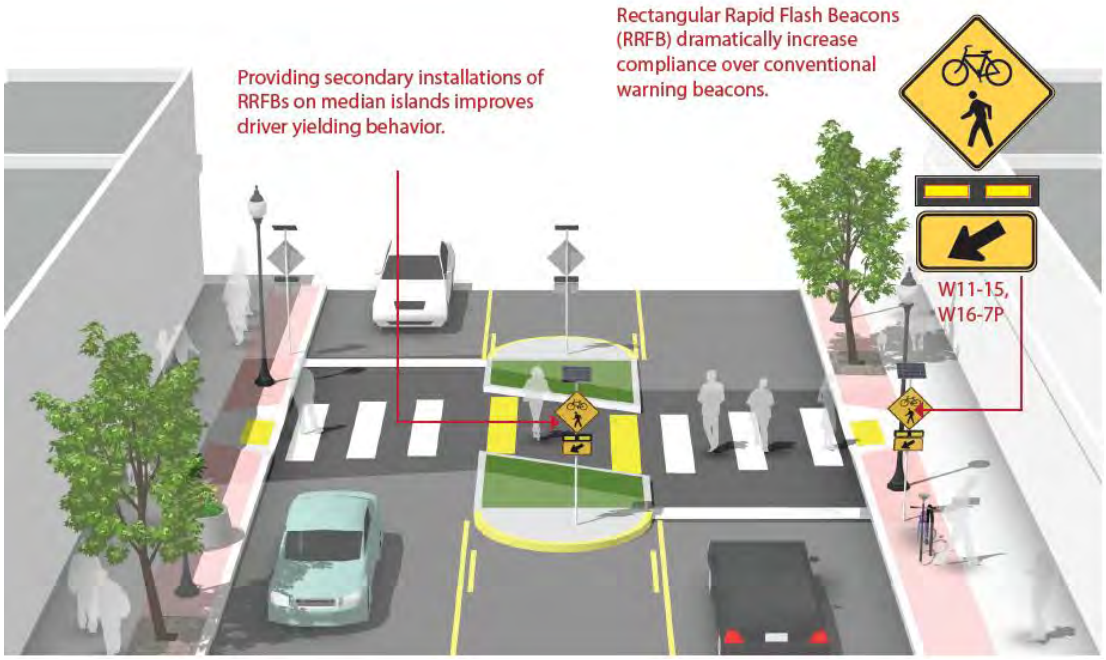
ACTIVE WARNING BEACONS

Description

Active warning beacons are user actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi-lane or high volume roadways. Types of active warning beacons include conventional circular yellow flashing beacons, in-roadway warning lights, or Rectangular Rapid Flash Beacons (RRFB).

Guidance

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic signals.
- Warning beacons shall initiate operation based on pedestrian or bicyclist actuation and shall cease operation at a predetermined time after actuation or, with passive detection, after the pedestrian or bicyclist clears the crosswalk.



Discussion

Rectangular rapid flash beacons have the most increased compliance of all the warning beacon enhancement options. A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88 percent. Additional studies over long term installations show little to no decrease in yielding behavior over time.

Materials and Maintenance

Depending on power supply, maintenance can be minimal. If solar power is used, RRFBs should run for years without issue.

Additional References and Guides

- NACTO. (2012). Urban Bikeway Design Guide.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- FHWA. (2008). MUTCD - Interim Approval for Optional Use of
- Rectangular Rapid Flashing Beacons (IA-11)

NEIGHBORHOOD GREENWAYS

Neighborhood greenways are low-volume, low-speed streets modified to enhance ease of use and comfort level for pedestrians by using treatments such as:

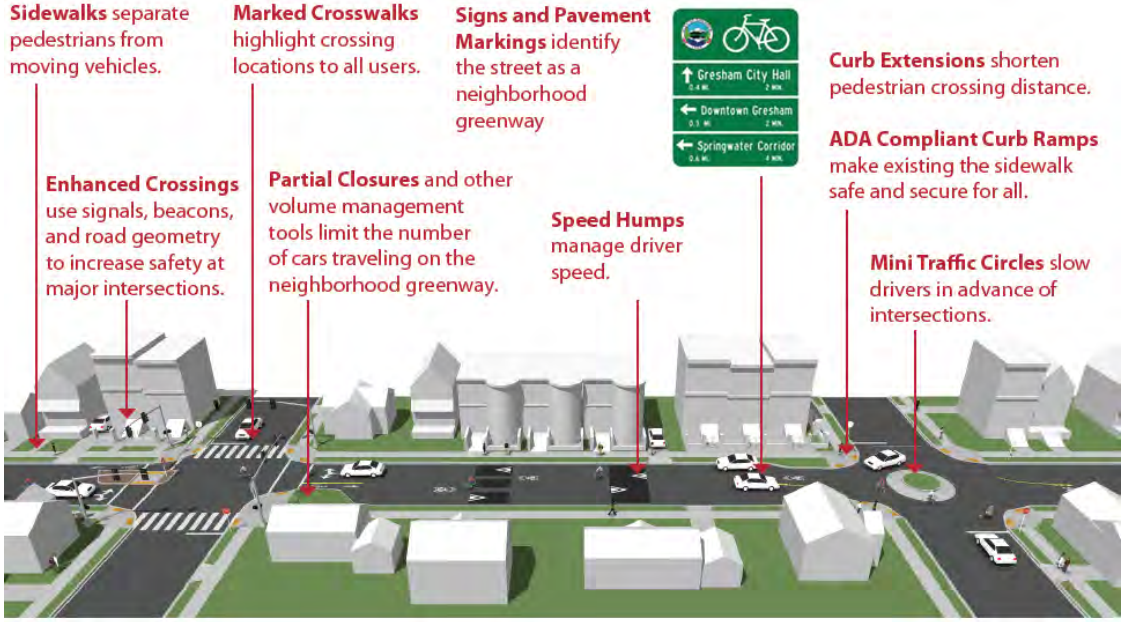
- Sidewalks or trails,
- Traffic calming and/or traffic reduction,
- and intersection modifications (including marked crosswalks and crossing beacons and signals).

These treatments allow through movements of pedestrians while discouraging similar through-trips by non-local motorized traffic. Jurisdictions throughout the country use a wide variety of strategies to determine where specific treatments are applied.

NEIGHBORHOOD GREENWAYS

Guidance

- Signs and pavement markings are the minimum treatments necessary to designate a street as a neighborhood greenway.
- Neighborhood greenways should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.
- Implement volume control treatments based on the context of the neighborhood greenway, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.
- Intersection crossings should be designed to enhance safety and minimize delay for bicyclists.



Discussion

Neighborhood greenway retrofits to local streets are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists and pedestrians, these intersections can become major barriers along the neighborhood greenway and compromise safety.

Traffic calming can deter motorists from driving on a street. Anticipate and monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Materials and Maintenance

Vegetation should be regularly trimmed to maintain visibility and attractiveness.

Additional References and Guides

- Alta Planning + Design and IBPI. (2009). Bicycle Boulevard Planning
- and Design Handbook.
- BikeSafe. (No Date). Bicycle countermeasure selection system.
- Ewing, Reid. (1999). Traffic Calming: State of the Practice.
- Ewing, Reid and Brown, Steven. (2009). U.S. Traffic Calming Manual.

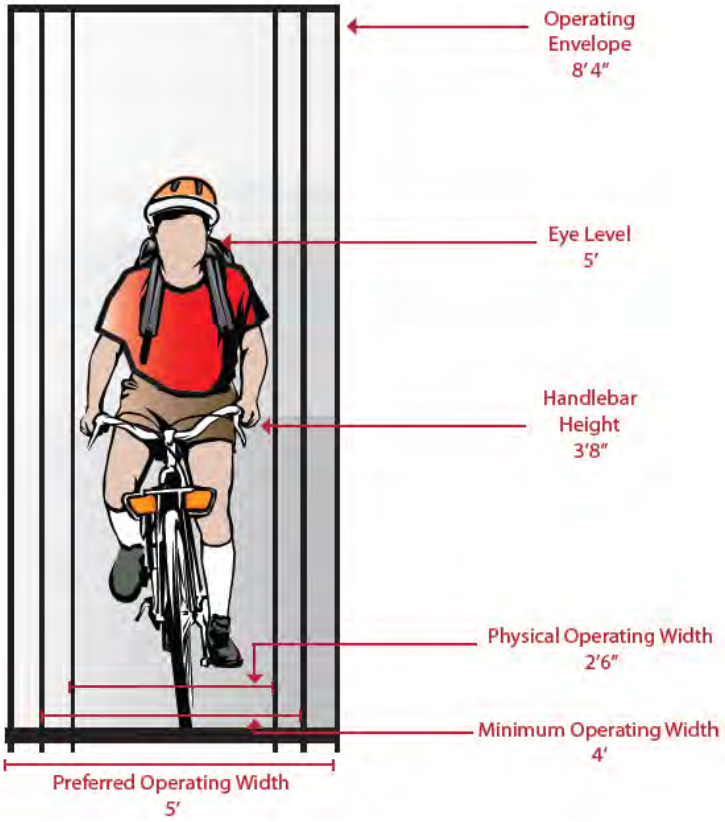
3 BICYCLE FACILITY TOOLKIT

DESIGN NEEDS OF BICYCLISTS

The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

Bicycle as Design Vehicle

Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway (and facility open to bicyclists) should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions. The adjacent figure illustrates the operating space and physical dimensions of a typical adult bicyclist, which are the basis for typical facility design. Bicyclists require clear space to operate within a facility. This is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, although four feet may be minimally acceptable.



Standard Bicycle Rider Dimensions
Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition

In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories.

BICYCLE FACILITY SELECTION GUIDELINES

Facility Selection Guidelines

There are no 'hard and fast' rules for determining the most appropriate type of bicycle facility for a particular location – roadway speeds, volumes, right-of-way width, presence of parking, adjacent land uses, and expected bicycle user types are all critical elements of this decision. Studies find that the most significant factors influencing bicycle use are motor vehicle traffic volumes and speeds. Additionally, most bicyclists prefer facilities separated from motor vehicle traffic or located on local roads with low motor vehicle traffic speeds and volumes. Because off-street pathways are physically separated from the roadway, they are perceived as safe and attractive routes for bicyclists who prefer to avoid motor vehicle traffic. Consistent use of treatments and application of bikeway facilities allow users to anticipate whether they would feel comfortable riding on a particular facility, and plan their trips accordingly. This section provides guidance on various factors that affect the type of facilities that should be provided.

Facility Classification

Consistent with bicycle facility classifications throughout the nation, these Bicycle Facility Design Guidelines identify the following classes of facilities by degree of separation from motor vehicle traffic. It should be noted that unless otherwise posted, all roadways are open to bicycles.

Shared Roadways are bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. The most basic type of bikeway is a signed shared roadway. This facility provides continuity with other bicycle facilities (usually bike lanes), or designates preferred routes through high-demand corridors.

Shared Roadways may also be designated by pavement markings, signage and other treatments including directional signage, traffic diverters, chicanes, chokers and /or other traffic calming devices to reduce vehicle speeds or volumes. Such treatments often are associated with **Neighborhood Greenways**.

Separated Bikeways, such as bike lanes, use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists.

Cycle Tracks are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.

Shared Use Paths are facilities separated from roadways for use by bicyclists and pedestrians.

SHARED ROADWAYS

On shared roadways, bicyclists and motor vehicles use the same roadway space. These facilities are typically used on roads with low speeds and traffic volumes, however they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver may have to cross into an adjacent travel lane to pass a bicyclist when the travel lane is narrow. Shared roadways employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, chicanes, chokers, and/or other traffic calming devices to reduce vehicle speeds or volumes.

Neighborhood Greenways

Neighborhood greenways are a special class of shared roadways designed for a broad spectrum of bicyclists. They are low-volume local streets where motorists and bicyclists share the same travel lane. Treatments for neighborhood greenways are selected as necessary to create appropriate automobile volumes and speeds, and to provide safe crossing opportunities of busy streets.

SIGNED SHARED ROADWAY

Description

Signed Shared Roadways are facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes, however can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver may have to cross into an adjacent travel lane to pass a bicyclist when the travel lane is narrow.

Guidance

Lane width varies depending on roadway configuration. Bicycle Route signage (D11-1) should be applied at intervals frequent enough to keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists. Commonly, this includes placement at:

- Beginning or end of Bicycle Route.
- At major changes in direction or at intersections with other bicycle routes. • At intervals along bicycle routes not to exceed ½ mile.

Discussion

Signed Shared Roadways serve either to provide continuity with other bicycle facilities (usually bike lanes) or to designate preferred routes through high-demand corridors. This configuration differs from a Neighborhood Greenway due to a lack of traffic calming, wayfinding, pavement markings and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs, and will need periodic replacement due to wear.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.

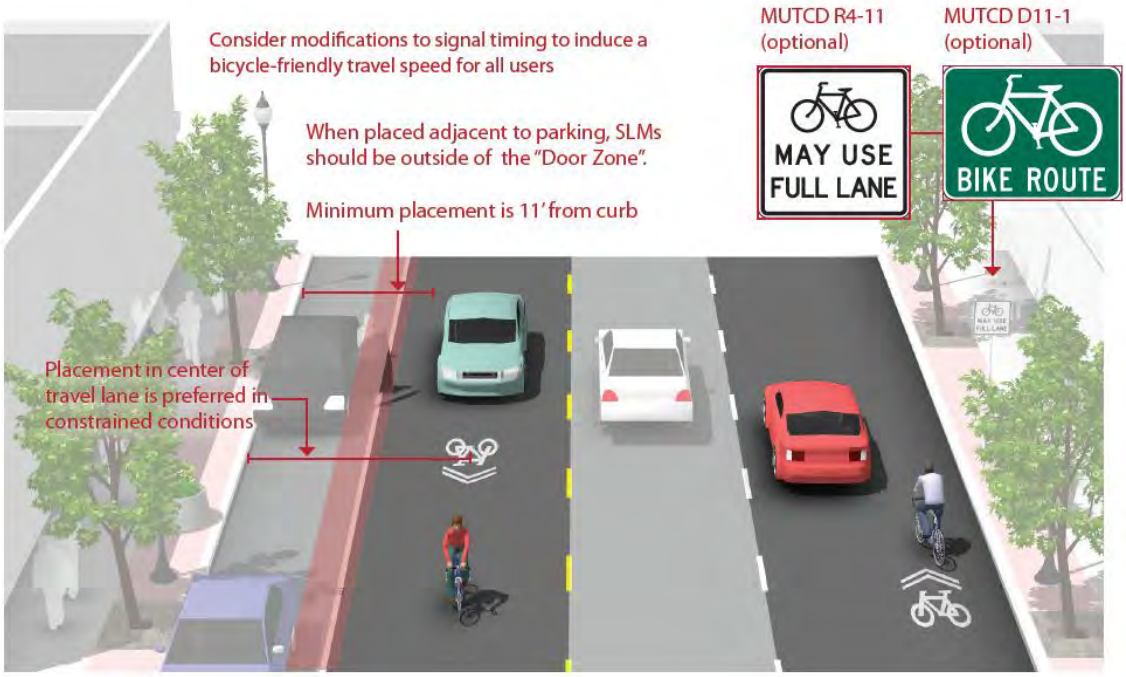
MARKED SHARED ROADWAY

Description

A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane. In constrained conditions, the SLMs are placed in the middle of the lane to discourage unsafe passing by motor vehicles. On a wide outside lane, the SLMs can be used to promote bicycle travel to the right of motor vehicles. In all conditions, SLMs should be placed outside of the door zone of parked cars.

Guidance

- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel. Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.



Discussion

Bike Lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated Bike Lanes, or to designate Bicycle Detection at signalized intersections. This configuration differs from a Neighborhood Greenway due to a lack of traffic calming, wayfinding, and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Materials and Maintenance

Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment. The type of application (paint or thermoplastic) will impact the long-term viability of the marking through winter maintenance.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.

NEIGHBORHOOD GREENWAYS

Neighborhood greenways are low-volume, low-speed streets modified to enhance bicyclist travel by using treatments such as:

- Signage,
- Pavement markings,
- Traffic calming and/or traffic reduction, and
- Intersection modifications.

These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic. Jurisdictions throughout the country use a wide variety of strategies to determine where specific treatments are applied. While no federal guidelines exist, several best practices have emerged for the development of neighborhood greenways.

At a minimum, neighborhood greenways should include distinctive pavement markings and wayfinding signs. They can also use combinations of traffic calming, traffic diversion, and intersection treatments to improve the bicycling environment. The appropriate level of treatment to apply is dependent on roadway conditions, particularly motor vehicle speeds and volumes. Traffic conditions on neighborhood greenways should be monitored to provide guidance on when and where treatments should be implemented. When motor vehicle speeds and volumes or bicyclist delay exceed the preferred limits, additional treatments should be considered for the neighborhood greenway.

ROUTE SELECTION

Description

Neighborhood greenways should be developed on streets that improve connectivity to key destinations and provide a direct route for bicyclists. Local streets with existing traffic calming, traffic diversions, or signalized crossings of major streets are good candidates, as they tend to be existing bicycle routes and have low motor vehicle speeds and volumes. Other streets where residents have expressed a desire for traffic calming are also good options. Neighborhood greenways parallel to commercial streets improve access for "interested but concerned" bicyclists and complement bike lanes on major roadways.

Guidance

- Streets are signed at 25 mph or less to improve the bicycling environment and decrease the risk and severity of crashes.
- Traffic volumes are limited to 3,000 vehicles per day (ideally less than 1,500) to minimize passing events and potential conflicts with motor vehicles.
- Use of streets that parallel major streets can discourage non-local motor vehicle traffic without significantly impacting motorists.
- Use of streets where a relatively continuous route for bicyclists exists and/or where treatments can provide wayfinding and improve crossing opportunities at offset intersections.
- Use of streets where bicyclists have right-of-way at intersections or where right-of-way is possible to assign to bicyclists.
- Use of routes where the topography is fairly level or flat to appeal to the largest possible user group

In Portland, OR, the bicycle network includes a high density of neighborhood greenways parallel to streets with bike lanes.

- MULTI-USE PATH Closed to motor vehicles
- MULTI-USE PATH (unpaved)
- BIKE BOULEVARDS / NEIGHBORHOOD GREEN STREETS pavement markings & directional signs to guide cyclists
- SHARED ROADWAY on lower traffic street
- BIKE LANE or wide shoulder, usually on higher traffic streets
- SHARED ROADWAY WITH WIDER OUTSIDE LANE on moderate and higher traffic street

Discussion

Neighborhood greenways should form a continuous network of streets or off-street facilities that accommodate bicyclists who are less willing to ride on streets with motorized traffic. Most neighborhood greenways are located on residential streets. Vertical traffic calming can minimize impacts to large vehicles and parking.

Materials and Maintenance

Repaving, street sweeping and other maintenance should occur with higher frequency than on other local streets.

Additional References and Guides

- Alta Planning + Design and IBPI. (2009). Bicycle Boulevard Planning and Design Handbook.
- City of Berkeley. (2000). Bicycle Boulevard Design Tools and Guidelines.
- City of Emeryville. (2011). Bicycle Boulevard Treatments.

BASIC TREATMENTS

Description

Signs and pavement markings are the minimum treatments necessary to designate a street as a neighborhood greenway. Together, they visibly designate a roadway to both bicyclists and motorists. Signs, and in some cases pavement markings, provide wayfinding to help bicyclists remain on the designated route.

Guidance

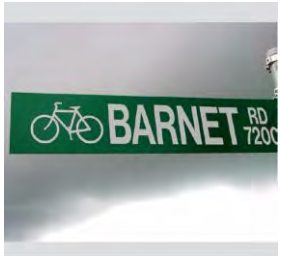
- Pavement Markings

  Place symbols every 250-800 feet along a linear corridor, as well as after every intersection. On narrow streets where a motor vehicle cannot pass a bicyclist within one lane of traffic, place stencils in the center of the travel lane. See Marked Shared Roadway guidance for additional information on the use of shared lane markings.



- Signs

  See Bikeway Signing for guidance on developing bicycle wayfinding signage. Some cities have developed unique logos or colors for wayfinding signs that help brand their neighborhood greenways. Be consistent in content, design, and intent; colors reserved by the Manual on Uniform Traffic Devices (MUTCD) for regulatory and warning road signs are not recommended. Signs can include information about intersecting bikeways and distance/time information to key destinations.



Discussion

Wayfinding signs displaying destinations, distances, and "riding time" can dispel common misperceptions about time and distance while increasing users' comfort and accessibility to the neighborhood greenway network. Neighborhood greenways frequently include offset intersections or 'jog' onto another street. Signs and pavement markings can help bicyclists remain on the route. In addition, fewer businesses or services are located along local streets, and signs inform bicyclists of the direction to key destinations, including commercial districts, transit hubs, schools and universities, and other bikeways.

Materials and Maintenance

Pavement markings should be repainted and signs replaced as needed. Wayfinding signs should be regularly updated with new major destinations and bikeways.

Additional References and Guides

- City of Oakland (2009). Design Guidelines for Bicycle Wayfinding Signage
- NACTO. (2012). Urban Bikeway Design Guide.

VERTICAL TRAFFIC CALMING

Description

Motor vehicle speeds affect the frequency at which automobiles pass bicyclists as well as the severity of crashes that can occur. Maintaining motor vehicle speeds closer to those of bicyclists' greatly improves bicyclists' comfort on a street. Slower vehicular speeds also improve motorists' ability to see and react to bicyclists and minimize conflicts at driveways and other turning locations. Vertical speed control measures are composed of slight rises in the pavement, on which motorists and bicyclists must reduce speed to cross.

Guidance

- Neighborhood greenways should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.
- Speed humps are raised areas usually placed in a series across both travel lanes. Speed humps can be challenging for bicyclists, gaps can be provided in the center or by the curb for bicyclists and to improve drainage. Speed humps can also be offset to accommodate emergency vehicles.
- Speed tables are longer than speed humps and flat-topped. Raised crosswalks are speed tables that are marked and signed for a pedestrian crossing.
- For all vertical traffic calming, slopes should not exceed 1:10 or be less steep than 1:25. Tapers should be no greater than 1:6 to reduce the risk of bicyclists losing their balance. The vertical lip should be no more than a 1/4" high.

Discussion

Emergency vehicle response times should be considered where vertical deflection is used. Because emergency vehicles have a wider wheel base than passenger cars, speed lumps/cushions allow them to pass unimpeded while slowing most other traffic. Traffic calming can also deter motorists from driving on a street. Monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Materials and Maintenance

Traffic calming should be designed to minimize impacts to snowplows. Vegetation should be regularly trimmed to maintain visibility and attractiveness. During the winter months, proper identification of speed hump location allows snowplow blade to be lifted when clearing speed humps. The snow clearing time on streets with speed humps may therefore be slightly increased. In addition, speed humps made of rubber can be designed and installed to be removable during the winter months, maximizing the lifetime of the speed hump while reducing the cost over time.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- Ewing, Reid. (1999). Traffic Calming: State of the Practice.
- Ewing, Reid and Brown, Steven. (2009). U.S. Traffic Calming Manual.
- http://www.trafficlogix.com/en/productsservices/speedhumps

HORIZONTAL TRAFFIC CALMING

Description

Horizontal traffic calming devices cause drivers to slow down by constricting the roadway space or by requiring careful maneuvering. Such measures may reduce the design speed of a street, and can be used in conjunction with reduced speed limits to reinforce the expectation of lowered speeds.

Guidance

- Maintain a minimum clear width of 20 feet (or 28 feet with parking on both sides), with a constricted length of at least 20 feet in the direction of travel.
- Chicanes are a series of raised or delineated curb extensions, edge islands, or parking bays on alternating sides of a street forming an "S"-shaped curb, which reduce vehicle speeds by requiring motorists to shift laterally through narrowed travel lanes.
- Pinchponts are curb extensions placed on both sides of the street, narrowing the travel lane and encouraging all road users to slow down. When placed at intersections, pinchpoints are known as chokers or neckdowns. They reduce curb radii and further lower motor vehicle speeds.
- Traffic circles are raised or delineated islands placed at intersections that reduce vehicle speeds by narrowing turning radii and the travel lane. Traffic circles can also include a paved apron to accommodate the turning radii of larger vehicles like fire trucks or school buses.

Discussion

Horizontal speed control measures should not infringe on bicycle space. Where possible, provide a bicycle route outside of the element so bicyclists can avoid having to merge into traffic at a narrow pinch point. This technique can also improve drainage flow and reduce construction and maintenance costs. Traffic calming can also deter motorists from driving on a street. Monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Materials and Maintenance

Traffic calming should be designed to minimize impacts to snowplows. Vegetation should be regularly trimmed to maintain visibility and attractiveness.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- Ewing, Reid. (1999). Traffic Calming: State of the Practice.
- Ewing, Reid and Brown, Steven. (2009). U.S. Traffic Calming Manual.

TRAFFIC DIVERSION

Description

Motor vehicle traffic volumes affect the operation of a neighborhood greenway. Higher vehicle volumes reduce bicyclists' comfort and can result in more conflicts. Implement volume control treatments based on the context of the neighborhood greenway, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day, above which the route should be striped as a bike lane or considered a signed shared roadway.

Guidance

- Traffic diversion treatments reduce motor vehicle volumes by completely or partially restricting through traffic on a neighborhood greenway. Partial closures allow full bicycle passage while restricting vehicle access to one way traffic at that point.
- Diagonal diverters require all motor vehicle traffic to turn.
- Median diverters (see Major Intersection Treatments) restrict through motor vehicle movements while providing a refuge for bicyclists to cross in two stages.
- Street closures create a "T" that blocks motor vehicles from continuing on a neighborhood greenway, while bicycle travel can continue unimpeded. Full closures can accommodate emergency vehicles with the use of mountable curbs (maximum of six inches high).

Discussion

Neighborhood greenways on streets with volumes higher than 3,000 vehicles per day are not recommended, although a segment of a neighborhood greenway may accommodate more traffic for a short distance if necessary to complete the corridor. Providing additional separation with a Bike Lane, Cycle Track or other treatment is recommended where traffic calming or diversion cannot reduce volumes below this threshold.

Materials and Maintenance

Depending on the diverter type, these treatments can be challenging to keep clear of snow and debris. Vegetation should be regularly trimmed to maintain visibility and attractiveness.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- Ewing, Reid. (1999). Traffic Calming: State of the Practice.
- Ewing, Reid and Brown, Steven. (2009). U.S. Traffic Calming Manual.
- Oregon Department of Transportation. (1998). Right-In Right-Out Channelization.

MINOR INTERSECTION TREATMENTS

Description

Treatments at minor roadway intersections are designed to improve the visibility of a neighborhood greenway, raise awareness of motorists on the cross-street that they are likely to encounter bicyclists, and enhance safety for all road users.

Guidance

- On the neighborhood greenway, the majority of intersections with minor roadways should stop control cross traffic to minimize bicyclist delay. This will maximize bicycling efficiency.
- Traffic circles are a type of Horizontal Traffic Calming that can be used at minor street intersections. Traffic circles reduce conflict potential and severity while providing traffic calming to the corridor.
- If a stop sign is present on the neighborhood greenway, a second stop bar for bicyclists can be placed closer to the centerline of the cross street than the motorists' stop bar to increase the visibility of bicyclists waiting to cross the street.
- Curb extensions can be used to move bicyclists closer to the centerline to improve visibility and encourage motorists to let them cross.

Discussion

Neighborhood greenways should have fewer stops or delays than other local streets. If several stop signs are turned along a corridor, speeds should be monitored and traffic-calming treatments used to reduce excessive vehicle speeds on the neighborhood greenway.

Materials and Maintenance

Vegetation in traffic circles and curb extensions should be regularly trimmed to maintain visibility and attractiveness. Repaint bicycle stop bars as needed. The use of neighborhood traffic circles must consider the needs and turning radius of any snow plows and winter maintenance vehicles used.

Additional References and Guides

- City of Berkeley. (2000). Bicycle Boulevard Design Tools and Guidelines.
- City of London Transport for London. Advanced stop lines (ASLS) background and research studies.
- Transportation Research Board. (2006). Improving Pedestrian Safety at Unsignalized Crossings. NCHRP Report # 562.

MAJOR INTERSECTION TREATMENTS

Description

The quality of treatments at major street crossings can significantly affect a bicyclist's choice to use a neighborhood greenway, as opposed to another road that provides a crossing treatment.

Guidance

- Bike boxes increase bicyclist visibility to motorists and reduce the danger of right "hooks" by providing a space for bicyclists to wait at signalized intersections.
- Median islands provided at uncontrolled intersections of neighborhood greenways and major streets allow bicyclists to cross one direction of traffic at a time as gaps in traffic occur.
- Hybrid Beacons, active warning beacons and bicycle signals can facilitate bicyclists crossing a busy street on which cross-traffic does not stop.
- Select treatments based on engineering judgment; see National Cooperative Highway Research Program (NCHRP) Report # 562 Improving Pedestrian Safety at Unsignalized Crossings (2006) for guidance on appropriate use of crossing treatments. Treatments are designed to improve visibility and encourage motorists to stop for pedestrians; with engineering judgment many of the same treatments are appropriate for use along neighborhood greenways.

Discussion

Neighborhood greenway retrofits to local streets are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists, these intersections can become major barriers along the neighborhood greenway and compromise safety.

Materials and Maintenance

Maintain signs, markings, and other treatments and replace as needed. Monitor intersections for bicyclist delay to determine if additional treatments are warranted.

Additional References and Guides

- Transportation Research Board. (2006). Improving Pedestrian Safety at Unsignalized Crossings. NCHRP Report # 562.
- Federal Highway Administration. (2004). Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations. FHWARD- 04-100
- NACTO. (2012). Urban Bikeway Design Guide.

OFFSET INTERSECTION TREATMENTS

Description

Offset intersections can be challenging for bicyclists who are required to briefly travel along the busier cross street in order to continue along the neighborhood greenway.

Guidance

- Appropriate treatments depend on volume of traffic including turning volumes, traffic speeds and the type of bicyclist using the crossing.
- Contraflow Bike Lanes allow bicyclists to travel against the flow of traffic on a one-way street and can improve neighborhood greenway connectivity.
- Bicycle left-turn lanes can be painted where a neighborhood greenway is offset to the right on a street that has sufficient traffic gaps. Bicyclists cross one direction of traffic and wait in a protected space for a gap in the other direction. The bike turn pockets should be at least 4 feet wide, with a total of 11 feet for both turn pockets and center striping.
- Short Bike Lanes on the cross street assist with accessing a neighborhood greenway that jogs to the left. Crossing treatments should be provided on both sides to minimize wrong-way riding.
- A Cycle Track can be provided on one side of a busy street. Bicyclists enter the cycle track from the neighborhood greenway to reach the connecting segment of the neighborhood greenway. This maneuver may be signalized on one side.

Discussion

Because neighborhood greenways are located on local streets, the route is often discontinuous. Wayfinding and pavement markings assist bicyclists with remaining on the route.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Facilities should be cleared of snow through routine snow removal operations.

Additional References and Guides

- Hendrix, Michael. (2007). Responding to the Challenges of Bicycle Crossings at Offset Intersections. Third Urban Street Symposium.
- NACTO. (2012). Urban Bikeway Design Guide.

SEPARATED BIKEWAYS

Designated exclusively for bicycle travel, separated bikeways are segregated from vehicle travel lanes by striping, and can include pavement stencils and other treatments. Separated bikeways are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation. Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.
- Reducing the incidence of wrong way riding.
- Reminding motorists that bicyclists have a right to the road.

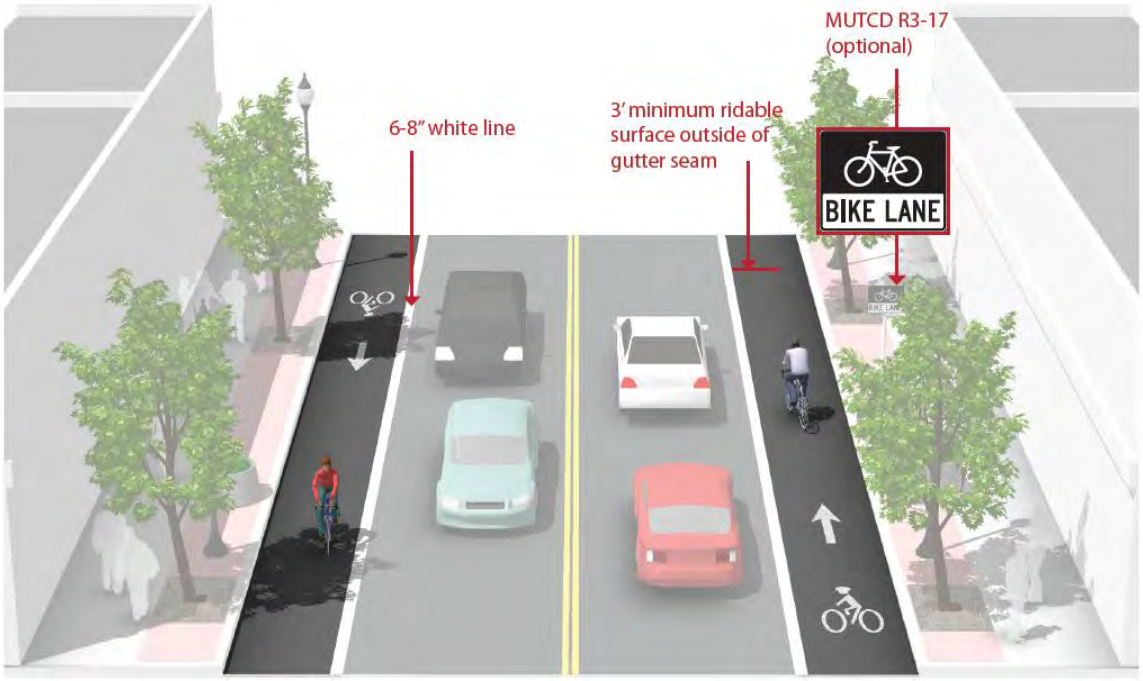
BIKE LANE WITHOUT ON-STREET PARKING

Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is typically located on the right side of the street, between the adjacent travel lane and curb, and is used in the same direction as motor vehicle traffic. A bike lane width of 7 feet makes it possible for bicyclists to ride side-by-side or pass each other without leaving the bike lane, thereby increasing the capacity of the lane.

Guidance

- 4 foot minimum when no curb and gutter is present.
- 5 foot minimum when adjacent to curb and gutter or 3 feet more than the gutter pan width if the gutter pan is wider than 2 feet.
- 7 foot maximum width for use adjacent to arterials with high travel speeds. Greater widths may encourage motor vehicle use of bike lane. See buffered bicycle lanes when a wider facility is desired.



Discussion

Wider bicycle lanes are desirable in certain situations such as on higher speed arterials (45 mph+) where use of a wider bicycle lane would increase separation between passing vehicles and bicyclists. Appropriate signing and stenciling is important with wide bicycle lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane. Consider Buffered Bicycle Lanes when further separation is desired.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.

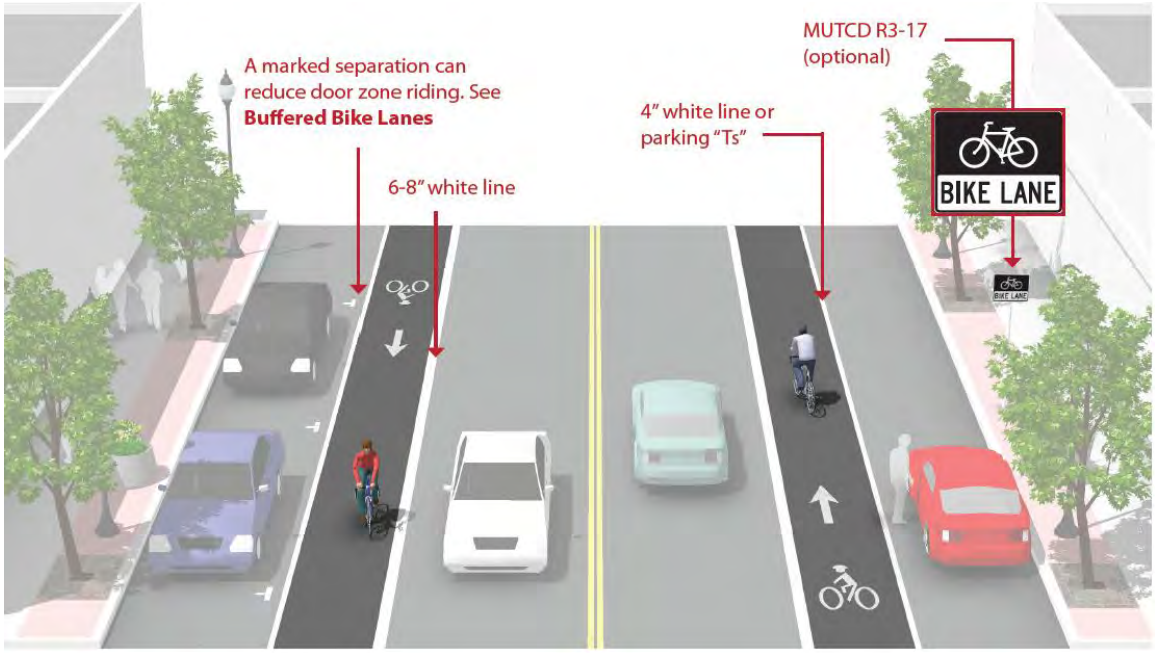
BIKE LANE ADJACENT TO ON-STREET PARALLEL PARKING

Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane. Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.

Guidance

- 12 foot minimum from curb face to edge of 6-8" bike lane striping.
- 14.5 foot preferred from curb face to edge of 6-8" bike lane striping.
- 7 foot maximum for marked width of bike lane. Greater widths may encourage vehicle loading in bike lane. See buffered bicycle lanes when a wider facility is desired.



Discussion

Bike lanes adjacent to on-street parallel parking require special treatment in order to avoid crashes caused by an open vehicle door. The bike lane should have sufficient width to allow bicyclists to stay out of the door zone while not encroaching into the adjacent vehicular lane. Parking stall markings, such as parking "Ts" and double white lines create a parking side buffer that encourages bicyclists to ride farther away from the door zone.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.

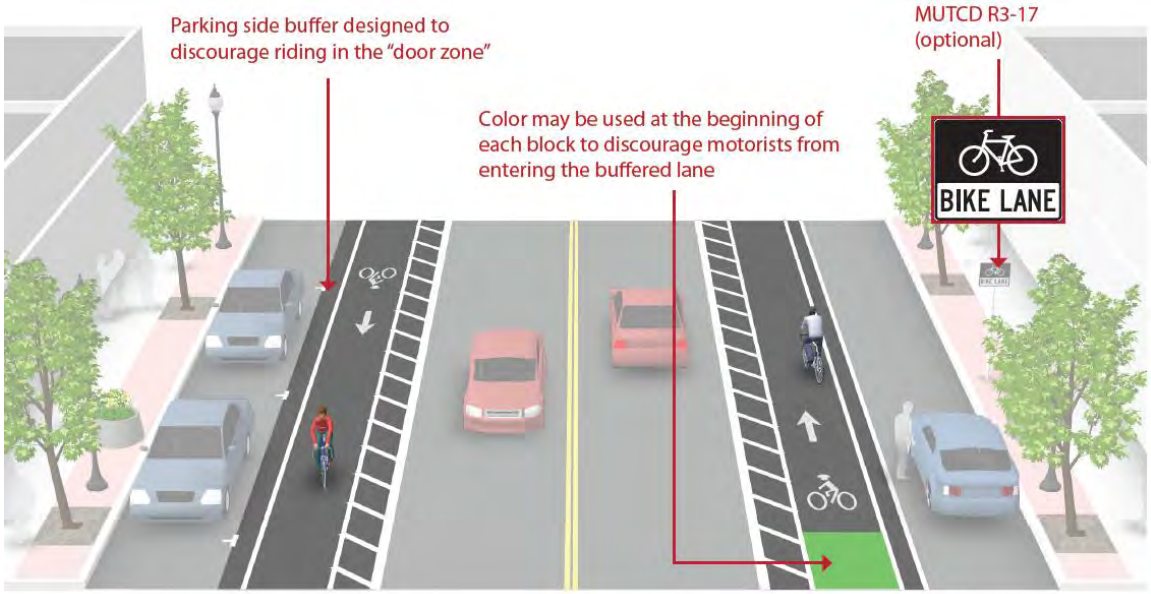
BUFFERED BIKE LANE

Description

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes are allowed as per MUTCD guidelines for buffered preferential lanes (section 3D-01). Buffered bike lanes are designed to increase the space between the bike lane and the travel lane or parked cars. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic.

Guidance

- Where bicyclist volumes are high or where bicyclist speed differentials are significant, the desired bicycle travel area width is 7 feet.
- Buffers should be at least 2 feet wide. If 3 feet or wider, mark with diagonal or chevron hatching. For clarity at driveways or minor street crossings, consider a dotted line for the inside buffer boundary where cars are expected to cross.



Discussion

Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection. Commonly configured as a buffer between the bicycle lane and motor vehicle travel lane, a parking side buffer may also be provided to help bicyclists avoid the 'door zone' of parked cars.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices. (3D-01)
- NACTO. (2012). Urban Bikeway Design Guide.

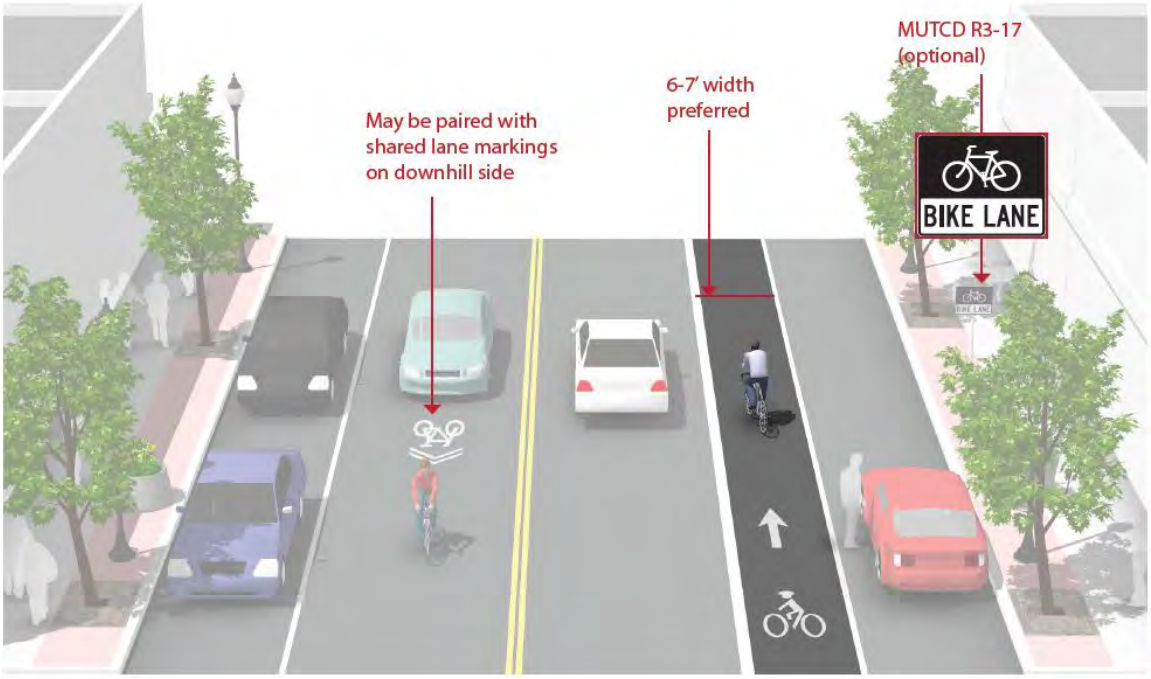
UPHILL BICYCLE CLIMBING LANE

Description

Uphill bike lanes (also known as "climbing lanes") enable motorists to safely pass slower-speed bicyclists, thereby improving conditions for both travel modes. They also provide a dedicated lane for bicyclists where the speed differential between the bicyclist and the adjacent motorist is greater than 10 miles per hour.

Guidance

- Uphill bike lanes should be 5-7 feet wide (wider lanes are preferred because extra maneuvering room on steep grades can benefit bicyclists).
- Can be combined with Shared Lane Markings for downhill bicyclists who can more closely match prevailing traffic speeds.



Discussion

This treatment is typically found on retrofit projects as newly constructed roads should provide adequate space for bicycle lanes in both directions of travel. Accommodating an uphill bicycle lane often includes removing on-street parking (if necessary), delineating on-street parking (if provided), narrowing travel lanes and/or shifting the centerline if necessary.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Additional References and Guides

- NACTO. (2012). Urban Bikeway Design Guide.
- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.

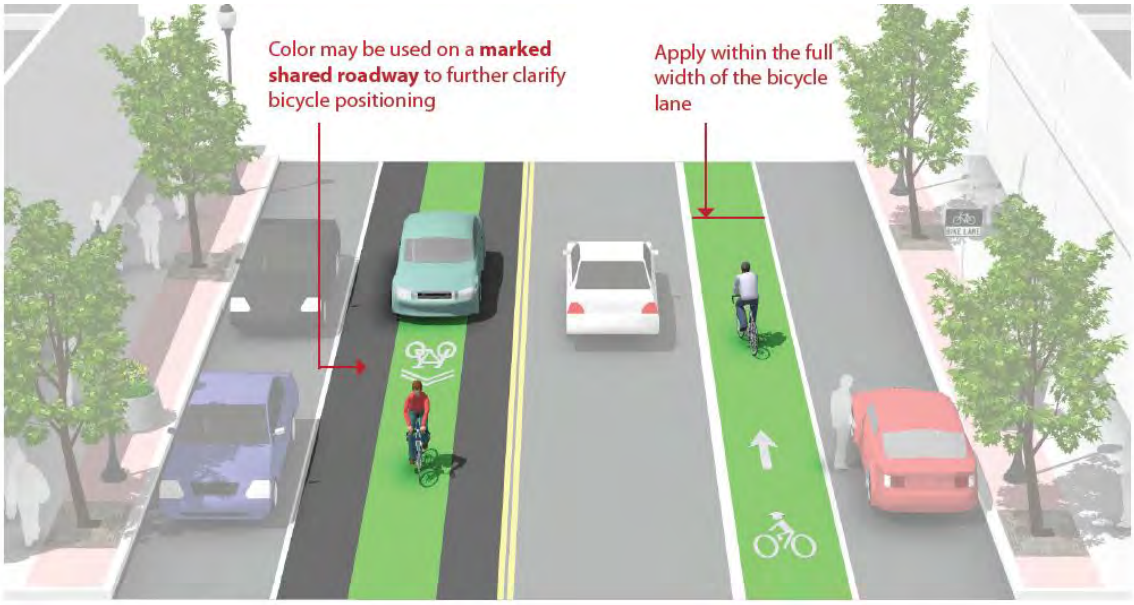
COLORED BIKE LANES

Description

Colored pavement within a bicycle lane increases the visibility of the bicycle facility. Use of color is appropriate for use in areas with pressure for illegal parking, frequent encroachment of motor vehicles, clarify conflict areas, and along enhanced facilities such as contra-flow bicycle lanes and cycle tracks. Color has also been used in conjunction with shared lane markings to create a "lane within a lane" to further clarify proper bicyclist positioning on shared roadway streets. When applied along full corridors, driveway and intersection areas should be identified though the absence of color, or the use of an alternate marking pattern to identify potential conflict areas.

Guidance

- The color green has been given interim approval by the Federal Highways Administration in March of 2011. See interim approval IA-14 for specific color standards. The colored surface should be skid resistant and retroreflective.



Discussion

Colored pavement is also used to identify potential areas of conflict, and reinforces priority to bicyclists in these conflict areas.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Additional References and Guides

- FHWA. (2011). Interim Approval (IA-14) has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10
- NACTO. (2012). Urban Bikeway Design Guide.

INTERSECTIONS / CROSSINGS

Intersections are junctions at which different modes of transportation meet and facilities overlap. An intersection facilitates the interchange between bicyclists, motorists, pedestrians and other modes in order to advance traffic flow in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting clear right-of-way and facilitating eye contact and awareness with other modes. Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.

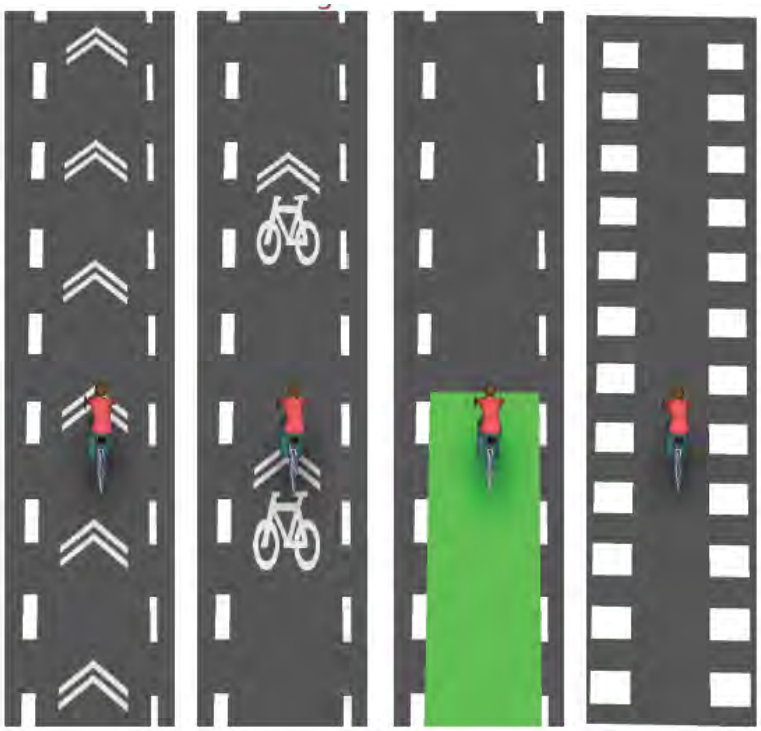
INTERSECTION CROSSING MARKINGS

Description

Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.

Guidance

- See MUTCD Section 3B.08: "dotted line extensions"
- Crossing striping shall be at least six inches wide when adjacent to motor vehicle travel lanes. Dotted lines should be two-foot lines spaced two to six feet apart.
- Chevrons, shared lane markings, or colored bike lanes in conflict areas may be used to increase visibility within conflict areas or across entire intersections. Elephant's Feet markings are common in Europe and Canada.



Discussion

Additional markings such as chevrons, shared lane markings, or colored bike lanes in conflict areas are strategies currently in use in the United States and Canada. Cities considering the implementation of markings through intersections should standardize future designs to avoid confusion.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices. (3A.06)
- NACTO. (2012). Urban Bikeway Design Guide.

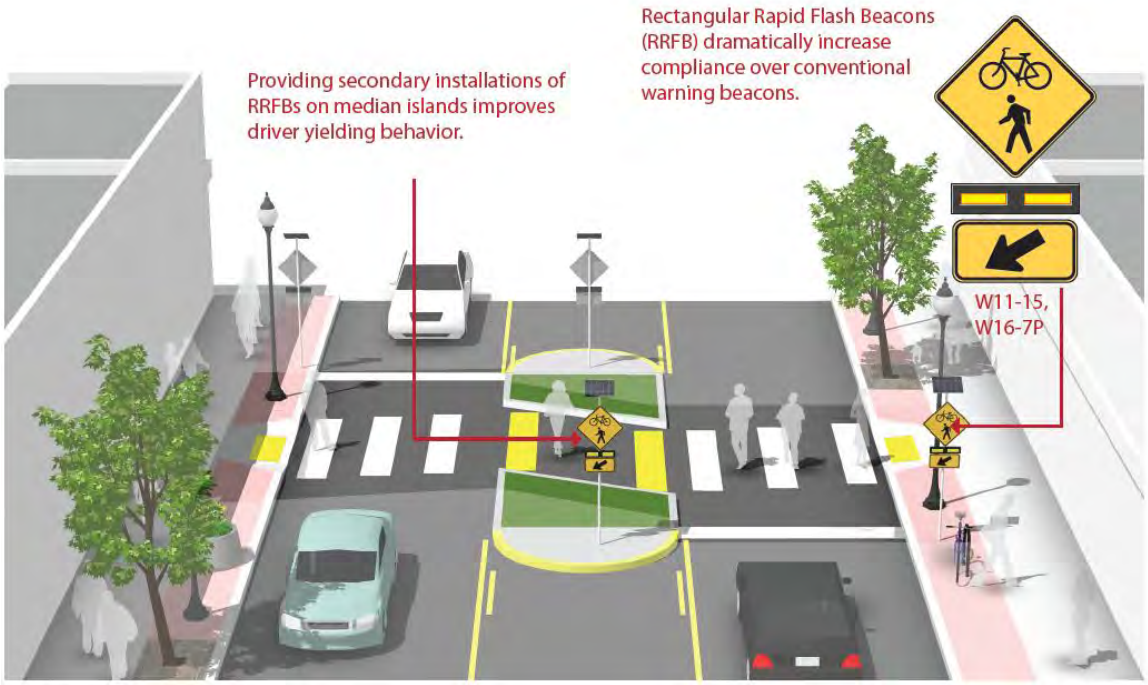
ACTIVE WARNING BEACONS

Description

Active warning beacons are user actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi-lane or high volume roadways. Types of active warning beacons include conventional circular yellow flashing beacons, in-roadway warning lights, or Rectangular Rapid Flash Beacons (RRFB).

Guidance

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic signals.
- Warning beacons shall initiate operation based on pedestrian or bicyclist actuation and shall cease operation at a predetermined time after actuation or, with passive detection, after the pedestrian or bicyclist clears the crosswalk.



Discussion

Rectangular rapid flash beacons have the most increased compliance of all the warning beacon enhancement options. A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88 percent. Additional studies over long term installations show little to no decrease in yielding behavior over time.

Materials and Maintenance

Depending on power supply, maintenance can be minimal. If solar power is used, RRFBs should run for years without issue.

Additional References and Guides

- NACTO. (2012). Urban Bikeway Design Guide.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- FHWA. (2008). MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11)

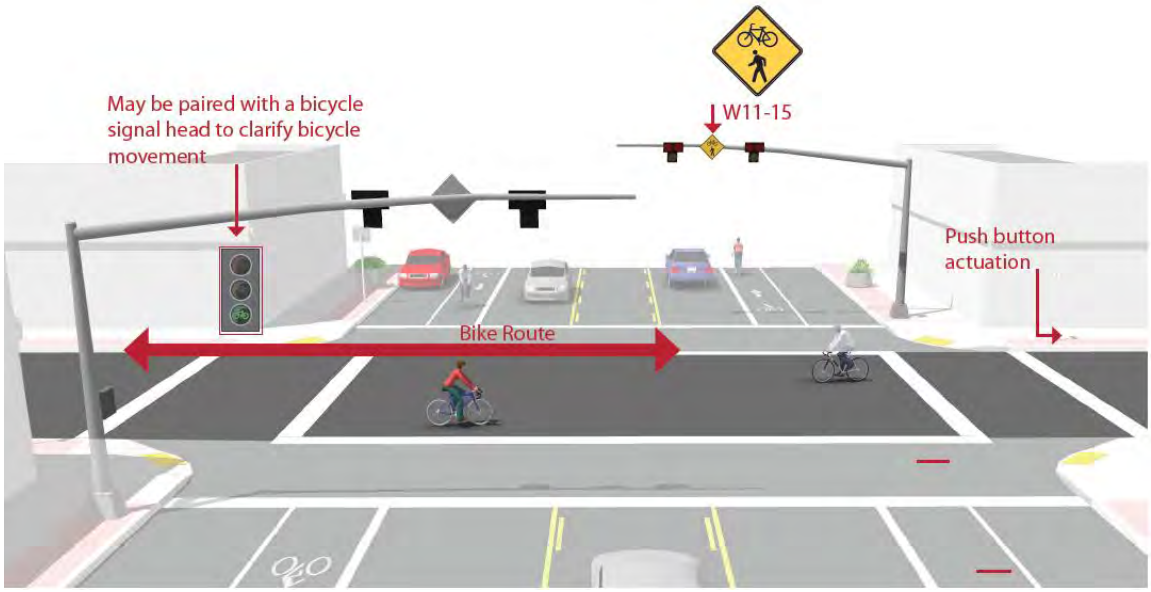
HYBRID BEACON FOR BICYCLE ROUTE CROSSING

Description

A hybrid beacon, previously known as a High-intensity Activated CrosswalK (HAWK), consists of a signal-head with two red lenses over a single yellow lens on the major street, and pedestrian and/or bicycle signal heads for the minor street. There are no signal indications for motor vehicles on the minor street approaches. Hybrid beacons are used to improve non-motorized crossings of major streets in locations where side-street volumes do not support installation of a conventional traffic signal (or where there are concerns that a conventional signal will encourage additional motor vehicle traffic on the minor street). Hybrid beacons may also be used at mid-block crossing locations.

Guidance

- Hybrid beacons may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable user crossing.
- If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.



Discussion

The hybrid beacon can significantly improve the operation of a bicycle route, particularly along neighborhood greenway corridors. Because of the low traffic volumes on these facilities, intersections with major roadways are often unsignalized, creating difficult and potentially unsafe crossing conditions for bicyclists. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety.

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

Additional References and Guides

- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.

BIKEWAY SIGNING

The ability to navigate through a city is informed by landmarks, natural features and other visual cues. Signs throughout the city should indicate to bicyclists:

- Direction of travel
- Location of destinations
- Travel time/distance to those destinations

These signs will increase users' comfort and accessibility to the bicycle systems. Signage can serve both wayfinding and safety purposes including:

- Helping to familiarize users with the bicycle network
- Helping users identify the best routes to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a "barrier to entry" for people who are not frequent bicyclists (e.g., "interested but concerned" bicyclists)

A community-wide bicycle wayfinding signage plan would identify:

- Sign locations
- Sign type – what information should be included and design features
- Destinations to be highlighted on each sign – key destinations for bicyclists
- Approximate distance and travel time to each destination

Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution. Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes. Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists rather than per vehicle signage standards.

WAYFINDING SIGN PLACEMENT

Description

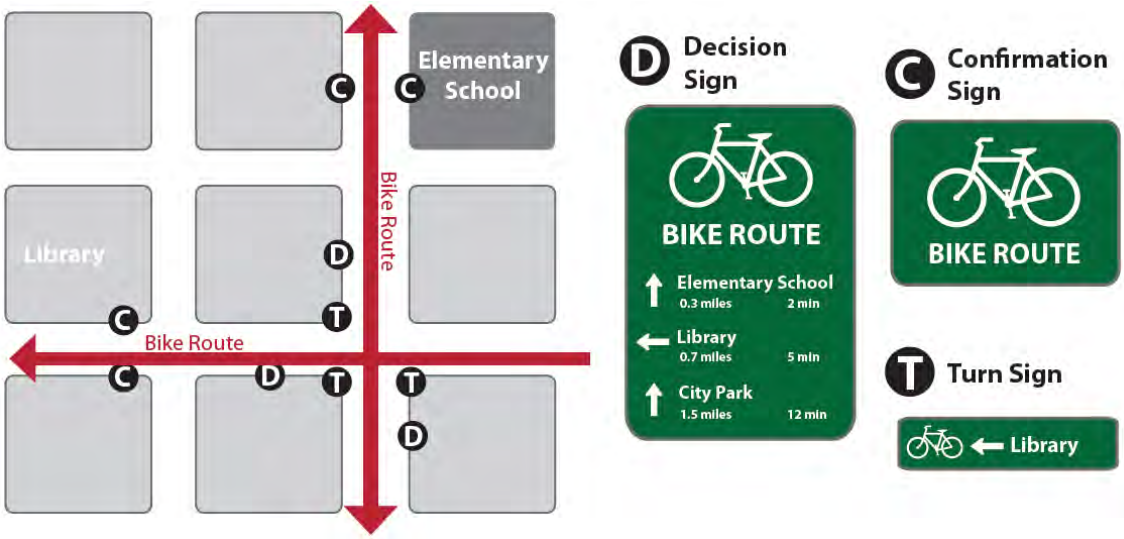
- Confirmation Signs

  Every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g., within 150 ft of a turn or decision sign). Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.
- Turn Signs

  Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.

Guidance

- Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes. Decisions Signs Near-side of intersections in advance of a junction with another bicycle route. Along a route to indicate a nearby destination.



Discussion

It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to five miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations (such as a park) may be included on signage up to one mile away.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.

RETROFITTING EXISTING STREETS TO ADD BIKEWAYS

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths. As a result, much of the guidance provided in this section focuses on effectively reallocating existing street width through striping modifications to accommodate dedicated bike lanes. Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.

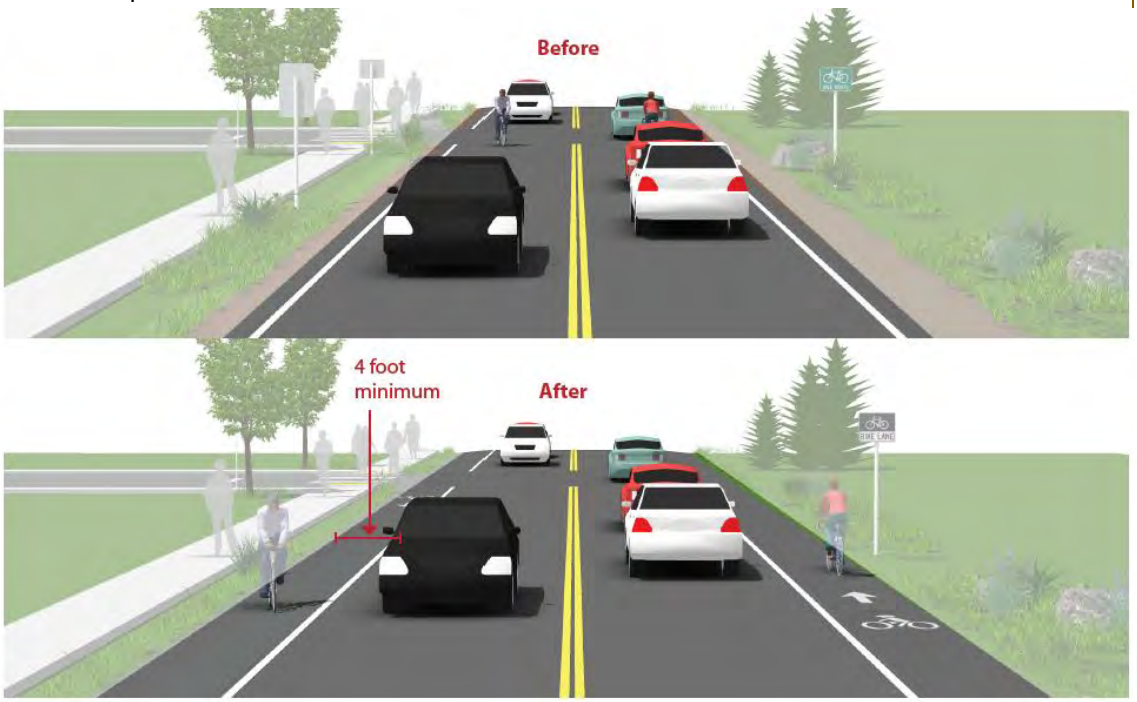
ROADWAY WIDENING

Description

Bike lanes can be accommodated on streets with excess right-of-way through shoulder widening. Although roadway widening incurs higher expenses compared with re-striping projects, bike lanes can be added to streets currently lacking curbs, gutters and sidewalks without the high costs of major infrastructure reconstruction.

Guidance

- Guidance on bicycle lanes applies to this treatment.
- 4 foot minimum width when no curb and gutter is present.
- 6 foot width preferred.



Discussion

Roadway widening is most appropriate on roads lacking curbs, gutters and sidewalks. If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.

Materials and Maintenance

The extended bicycle area should not contain any rough joints where bicyclists ride. Saw or grind a clean cut at the edge of the travel lane, or feather with a fine mix in a non-ridable area of the roadway.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.

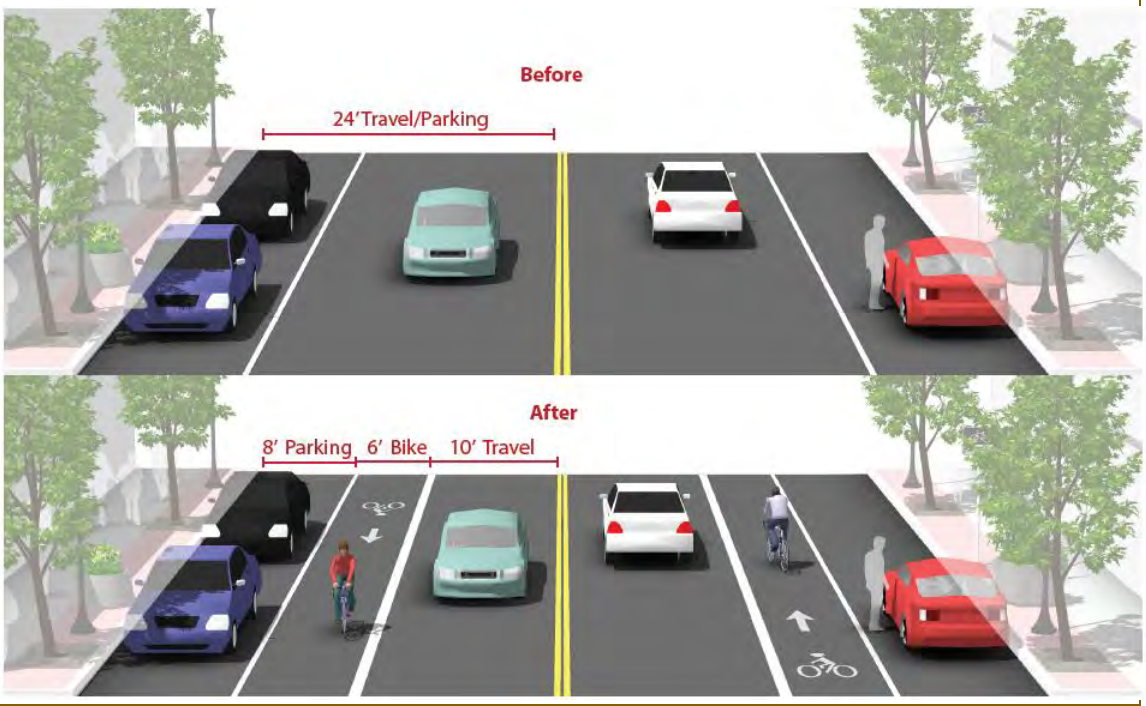
LANE NARROWING

Description

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.

Guidance

- Vehicle lane width: • Before: 10-15 feet • After: 10-11 feet
- Bicycle lane width: • Guidance on Bicycle Lanes applies to this treatment.



Discussion

Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bike lanes. AASHTO supports reduced width lanes in A Policy on Geometric Design of Highways and Streets: "On interrupted-flow operation conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages."

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

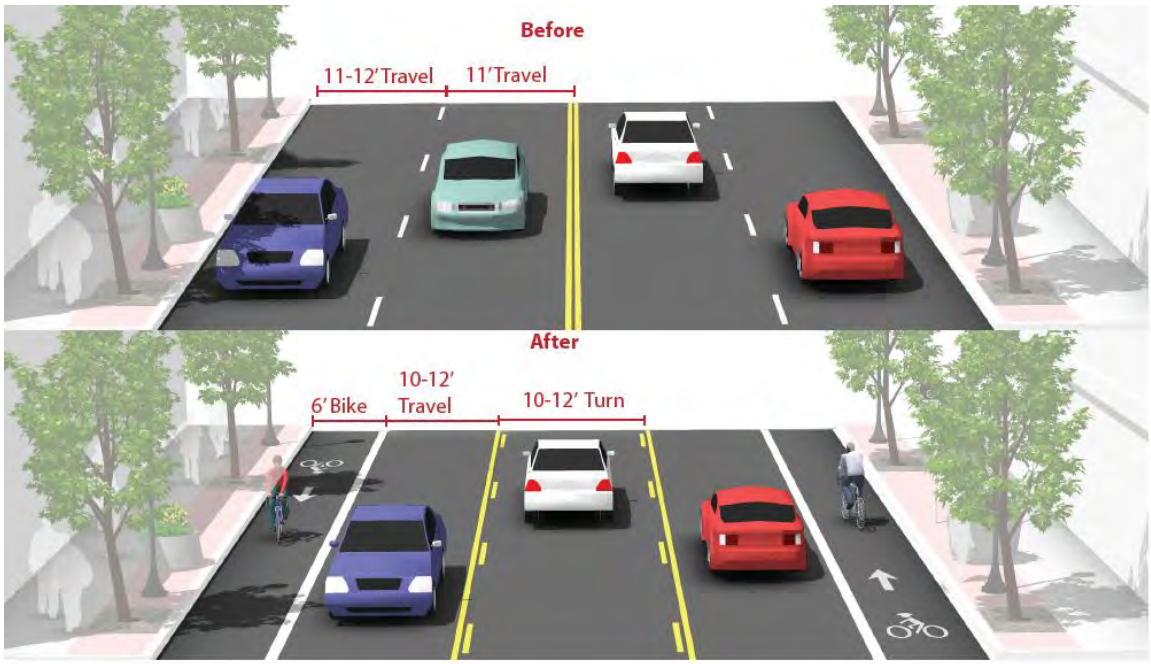
LANE RECONFIGURATION

Description

The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects.

Guidance

- Vehicle lane width: Width depends on project. No narrowing may be needed if a lane is removed.
- Bicycle lane width: • Guidance on Bicycle Lanes / Buffered Bicycle Lanes applies to this treatment.



Discussion

Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2010). Evaluation of Lane Reduction "Road Diet" Measures on Crashes. Publication Number: FHWA-HRT-10-053

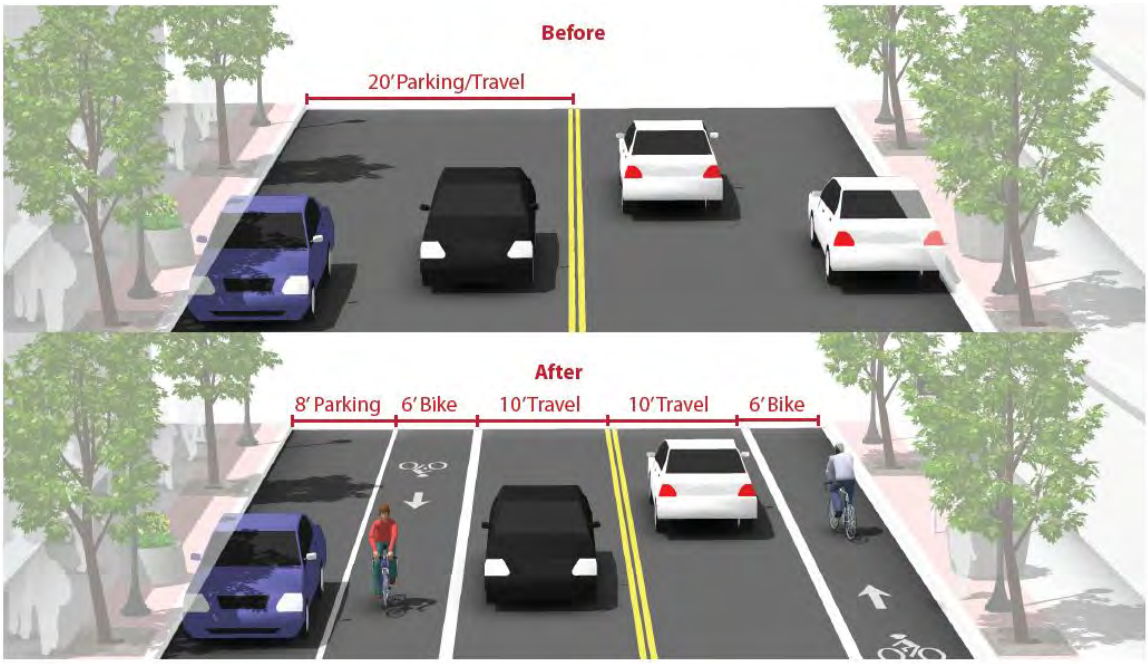
PARKING REDUCTION

Description

Bike lanes can replace one or more on-street parking lanes on streets where excess parking exists and/or the importance of bike lanes outweighs parking needs. Such a location may include difficult or challenging terrain, or where sight lines for passing by the motorist are limited by the presence of a hill. Eliminating or reducing on-street parking also improves sight distance for bicyclists in bike lanes and for motorists on approaching side streets and driveways.

Guidance

- Vehicle lane width depends on project. No travel lane narrowing may be required depending on the width of the parking lanes.
- Bicycle lane width: Guidance on Bicycle Lanes applies to this treatment.



Discussion

It is advisable to conduct outreach to the affected businesses and residents prior to removing or reducing on-street parking to install bike lanes. A parking study can be performed to gauge parking demand and evaluate impacts to people with disabilities. In instances where removal of a small amount of parking (i.e., one or two blocks) is required to implement a desired bike route, a study may not be required.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement

Additional References and Guides

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

MOSCOW ON THE MOVE

COMMUNITY OUTREACH SUMMARY REPORT

City of Moscow

JULY 2014

NELSON NYGAARD

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COMMUNITY OUTREACH SUMMARY

This report summarizes the feedback received during the two community open houses and one 2-day workshop held on April 25, 2012, April 1, 2014, and October 9/10, 2012, respectively. The intent of these open houses and drop-in workshops was to gather the community's feedback on transportation-related best practices and proposed projects, policies, and programs. These outreach efforts helped project planners understand community priorities.

Throughout the process, outreach events were widely advertized on social media (Facebook, Twitter) blog posts, radio, newspaper, University of Idaho email blasts, print media display in downtown Moscow and City buildings, and through the City's *Moscow on the Move* website.

The following summarizes the outcomes of each open house/workshop and the social media campaign.

OPEN HOUSE #1: BEST PRACTICES

Moscow on the Move's initial public open house was attended by 80-90 community members of all ages. Various informative display stations were set up to highlight the plan's purpose and process as well as best practices in multimodal transportation seen in similar university towns. Community members also made their mark on the Plan by participating in various interactive mapping exercises designed to allow people to locate transportation-related issues and opportunities throughout the city. Mapping exercise facilitators made it clear that all ideas were welcome, which helped spur thought-provoking discussion.

During the open house, community members were able to provide input by: (1) filling out comment cards; (2) Mark up maps to identify issues and opportunities by mode; (3) talk with project planners (planners would take noted during discussions); and (4) accessing project social media resources for commenting via QR codes.

DROP-IN COMMUNITY WORKSHOP: INITIAL CONCEPTS

Held over two days in October 2012, this drop-in workshop was well-attended with 90-100 community members participating. Community members were able to provide input by: (1) filling out comment cards that listed the community members' three top priorities for transportation improvements and other comments; (2) Providing an interactive map that where participants to pinpoint specific improvements around city; (3) giving the opportunity for participants to design their ideal Third Street Bridge connection, if they believe a new connection was necessary; and (4) providing comments on preliminary near-term transit service design options.

Workshop Mapping Exercise

During the two-day workshop, participants were also able to document their transportation concerns and ideas by marking their comments directly on a map with a numbered sticky dots (unique IDs). Workshop participants:

- Placed a numbered sticker on the map where they thought an improvement or change is needed;
- Wrote down the numbered code on a project identification sheet; and
- Specified the precise improvements needed (e.g., Develop an enhanced bicycle and pedestrian crossing at Styner and Troy Highway).

The comments from the mapping exercise were in line with those received on the comment cards. Bike and pedestrian issues were the most noted, including a bike/ped bridge or path specifically at Troy Highway, and the need to restore transit between Pullman and Moscow.

Figure 1 Mapping Exercise Transportation Improvement Comments

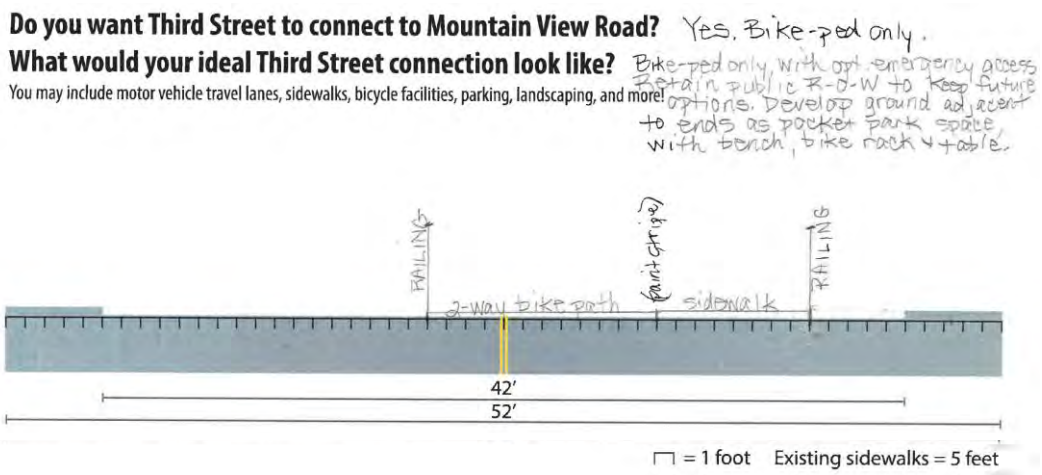
Transportation Improvement	Count
Create a pedestrian/bike only bridge or path	9
Bike/pedestrian underpass for Troy Highway	6
Need transit between Pullman WA and Moscow	6
Traffic control needed - light, stop sign, police presence, etc.	4
Bike lane, sidewalks on this street	3
Look for opportunities to extend Paradise Path across SH 8 to the west side of Moscow; use underpass	3
Complete sidewalks, speed an issue	3
Traffic control needed - light, roundabout, or police presence	3

Transportation Improvement	Count
To Main Street - bicycle lanes. this is the only place where bikes can go east and avoid the hill. Heavy traffic and narrow roads	2
Wider bike lanes	2
General city comment: get as much lane space for cyclists as possible	2
Safer crossing needed for bike/ped, left turn conflict	2
Improve Lieuallen and SH 8 crossing for peds and bikes	2
Crosswalk needed over SH 8 and Styner. Signal improvements as well. Ped island?	2
In general, more bike parking needed downtown	2
No sidewalk on bridge. Intersection allows for high speed turn. Tighten intersection	2
Sidewalks and pedestrian crossings needed	2
Bridge for all modes (including autos) desired	2
Traffic control - stoplight or stop sign - needed	2
Curvy section dangerous. Sight line issue. lower speed limit for vehicles. Lights for ped crossing	2
Hayes between 3rd and F - manage speeds	2

Third Street bridge connection design ideas

If workshop participants communicated the need to develop a Third Street bridge connection across Paradise Creek, they were provided a blank cross section. Participants were asked to draw what their ideal Third Street connection would look like and whether or not it would be a pedestrian and bike only or Complete Street connection.

Five Third Street bridge connection designs were received from participants. All respondents preferred that the Third Street Bridge Connection be for bikes and pedestrians only. Below is a cross section example produced by a participant.



Initial Response to the Draft Transit Strategy

A comment board was provided at the Community Workshop to gather initial feedback on the Draft Transit Strategy. The board provided two options for potential transit service in Moscow. Option 1 provides minor changes to the existing transit service coverage and maintains 30 minute frequency; Option 2 expands coverage considerably in the city, but reduces frequency to 60 minutes. Figure 2 summarizes the comments received on each Option.

Figure 2 List of Comments on Draft Transit Strategy

Option 1 Comments	Option 2 Comments	Other Comments
▪ Frequency makes bus service easy to plan for without consulting a schedule ▪ Split route every other day or 3 hours ▪ I like that this option maintains 30 minute service – it is more productive	▪ I like that this route is fixed ▪ I would frequent businesses in West Moscow more often ▪ This option is preferred, but bus service should be extended ½ hour to 1 hour in evening to increase ridership	▪ Increased hours and Saturday service are critical ▪ Schedule should be coordinated with UI class schedule ▪ Need bus service to Lewiston ▪ Bus route to Pullman is the winning idea ▪ Need to survey residents in the suburbs to see if leaving the car at home is even an option ▪ Find a way to use health and welfare services to service older citizens ▪ Need evening and weekend service ▪ Need evening and weekend service

Summary of roadway, bicycle, and pedestrian connectivity opportunities

A summary of roadway, bicycle, and pedestrian connectivity opportunities, based on feedback during the two-day workshop, is provided in Figure 3 and 4 below. In Figure 3, the red arrows indicate needed pathway expansion, the blue arrows indicate needed on-road bikeways or gap closures, and the orange arrows represent enhanced crossing needs across major arterials. In summary, pathways are primarily needed between the A Street connection, Highway 95, and the University. Opportunities to expand the on-road bikeway network were identified throughout the city, however the need for east-west connections was most prevalent. Bicyclists and pedestrians face crossing barriers throughout the city; the majority of needed improvements are noted on Highway 95 and Mountain View Road.

In Figure 4, blue arrows indicate participants' most immediate needs for street connectivity and blue circles denote the most immediate needs to alleviate district or corridor-wide congestion. The latter is focused around congestion within and leading into downtown—particularly in south downtown—as well as congestion along Troy Highway west of Mountain View Road.

Figure 3 Workshop Findings: Bicycle and Pedestrian Trends

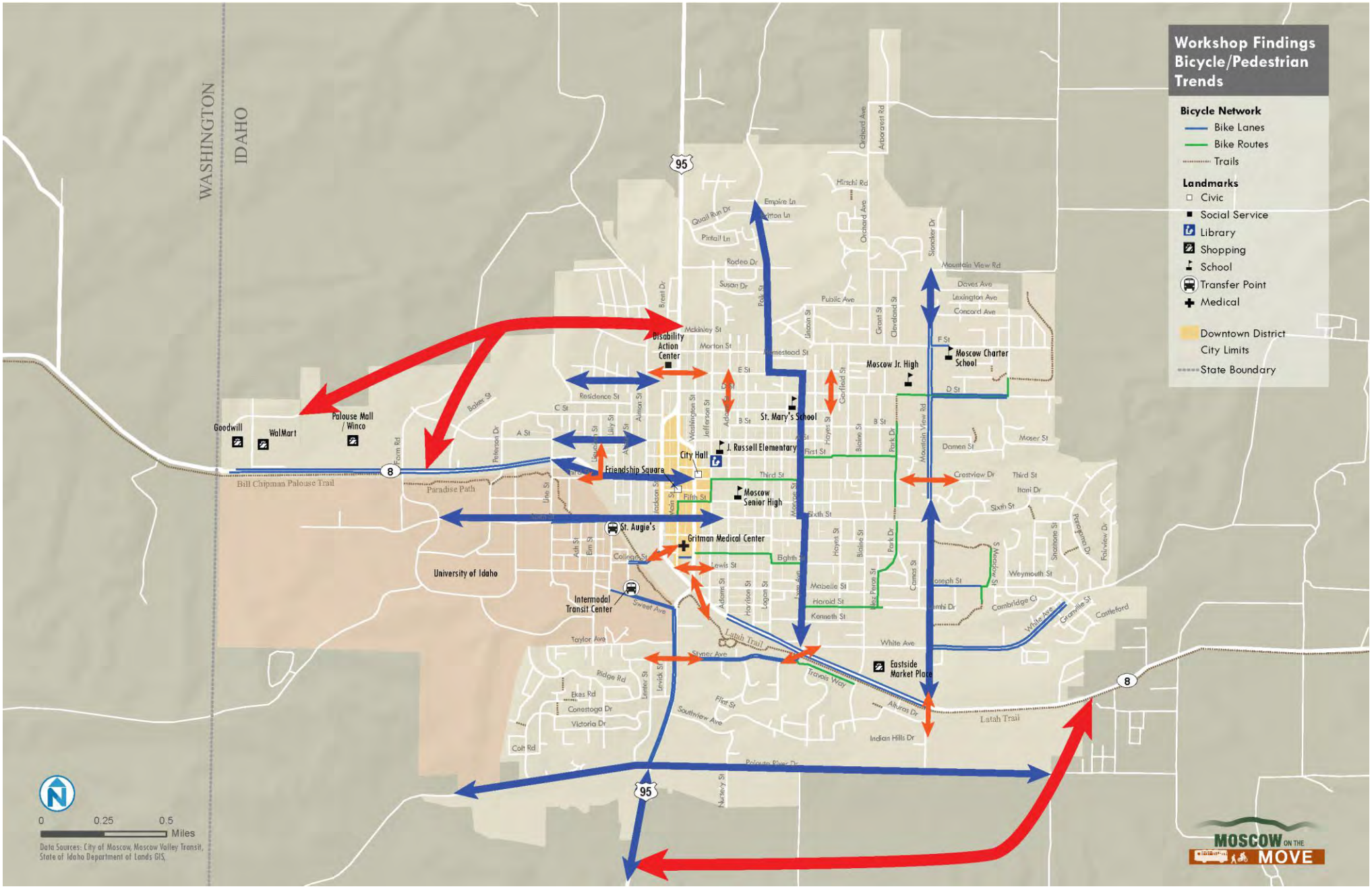
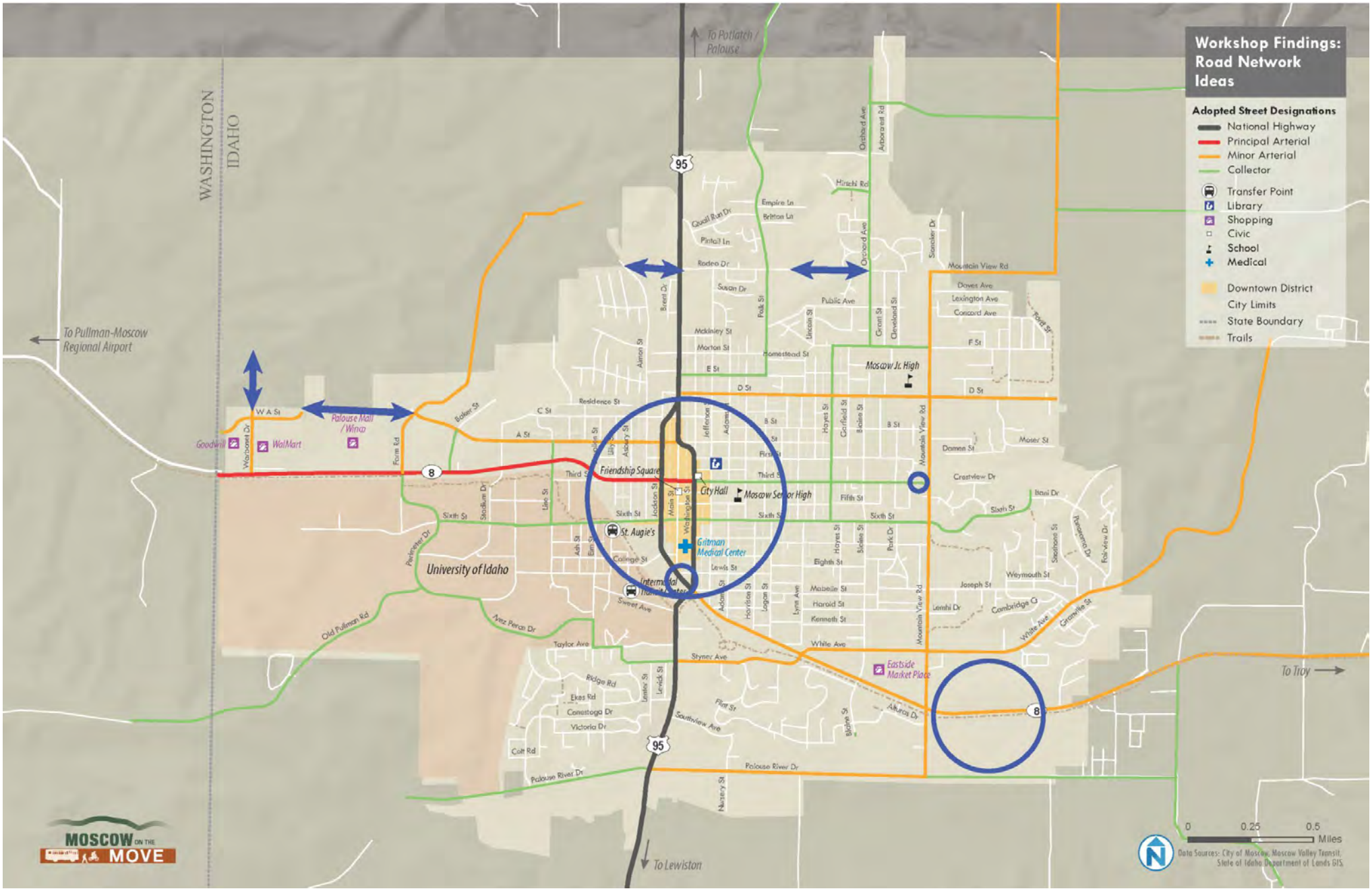


Figure 4 Workshop Findings: Roadway Network Ideas



OPEN HOUSE #2: DRAFT PLAN RESPONSE

On April 1, 2014, the City held its final opportunity for public input before *Moscow on the Move* went before City Council for adoption. Roughly 40 community members participated in the open house, which informed participants of planned transportation investments and near-term priorities identified through the extensive public input process. Participants were provided a final opportunity to influence the projects, policies, and programs recommended in *Moscow on the Move*.

The majority of participants voiced their opinions on sticky notes (pasted on boards) and on comment cards. Open house participants generally preferred the pedestrian and bicycle only bridge (Alternative #1) over a multimodal bridge (Alternative #2).

Figure 5 List of Comments on Various Boards

3rd Street Bridge	Transit	Miscellaneous Comments
▪ Paradise Task Force supports Pedestrian Bridge on 3rd Street ▪ I support alternative #1 on the 3rd Street Bridge (only). Too many cars and trucks already on 3rd Street. Third is the only route flat enough for bikes. ▪ Alternative 2 is much needed. ▪ Alternative 1 seems to help more in general if there can only be one choice. ▪ Third Street already carries too much traffic for what is really a residential road. Either ped/bike bridge or multimodal ONLY if it will not increase traffic on Third. ▪ Alt #1. We should go ahead with a ped/bike bridge at Mountain View and 3rd. We could put one in now that would parallel a future motor vehicle bridge. (Which I am not actually in favor of.) ▪ We need Alternative #1. ▪ Strongly favor Alt #1 for bike/ped only connectivity. Third Street is lined with vulnerable users, (grade school, largest City park, high school, community center with senior programs and hall for disabilities. At City Hall on Washington Street there is gridlock that doesn't need more cars. ▪ Alternative #1 Please keep Moscow bikeable, walkable. Don't need more automobile routes, as it is, you can drive anywhere in Moscow in 10	▪ Bus shelter on Ash Street- Great idea. It is a long hike from West end of Campus to St. Augustine's. ▪ Covered artful bus shelters paired with local service are great! ▪ Yes, more bus routes. ▪ Love the bus! North and South routes would be nice but great as is. ▪ Yes, bus to Pullman. ▪ Bus to Pullman. ▪ Bus to Pullman. ▪ Bus to Pullman. ▪ Are loops the most efficient? Difficult to coordinate other amenities if isn't around stops. ▪ Northwest Trailways offers service to Pullman to Moscow. Not a commute route but does operate seven days a week, 2x daily. ▪ "A" Street connection would improve efficiency, long term. ▪ Mabelle Street bus stop would be even better by connecting the sidewalk up Mabelle from Blaine to Hayes. Also, the City should fully remove snow from this bus stop. ▪ Bring back bus service to/from Pullman. ▪ We need more buses. ▪ SMART needs to be a bigger and	▪ Yes to a roundabout with pedestrian crossing at Mountain View and 6th. ▪ Left Lane from #1 to 6th Street should be left turn only! (Refers to left turns originating from the South Couplet on Washington) ▪ Also for one block have solid line for those turning north from Troy Highway onto 95N. ▪ Anticipate needs of urban forests

3rd Street Bridge	Transit	Miscellaneous Comments
minutes. **Summary:** ▪ 8 of 9 comments were supportive of Alternative #1	more appreciated service in the City- Highlight! ▪ Identify funding sources for expanding bus service including interstate. **Summary:** ▪ Bus service to Pullman – 6 of 16 comments ▪ Improved service or amenities – 10 of 16 comments	

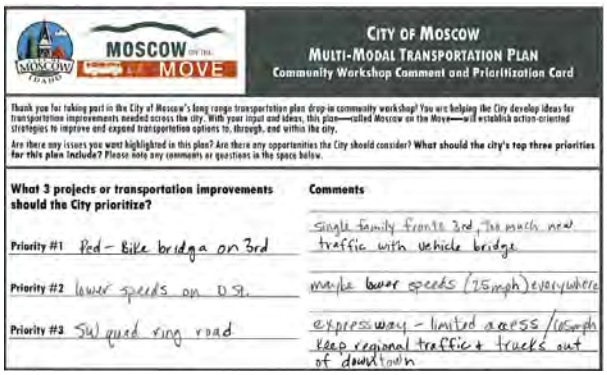
Note: Comments have not been edited.

Open house participants also made comments on comment cards. Comment cards were meant as a way for participants to communicate the three proposed projects or transportation improvement that were most interesting. The following bullet list summarizes these comments:

- Third Street Bridge Alternative #1 (2 total)
- Third Street Bridge Alternative #2 (2 total)
- Roundabout at 6th and Mountain View (6 total)
- Reinstate bus service to Pullman (2 total)
- General improvements to transit (1 total)
- Improvements to the bicycle network (8 total)
- Construct a pedestrian and bicycle underpass at Styner and Troy Road (3 total)
- Lane reallocation on Washington and Jackson—including buffered bike lanes (2 total)

OPEN HOUSE/WORKSHOP COMMENT CARDS

Comment cards were available for community members to fill out during the Community Workshop. Comment cards included a section for participants to list their top three priority transportation improvement projects for the City to focus on, in addition to a general comment section. Sidewalk infill, bus service to Pullman, and bike lanes represented the top priorities listed by participants (see Figure 6). Increased transit service and safe and accessible pedestrian infrastructure (including signalization, curb ramps, and well-marked crossings) were also notable.


MOSCOW ON THE MOVE

CITY OF MOSCOW
MULTI-MODAL TRANSPORTATION PLAN
Community Workshop Comment and Prioritization Card

Thank you for taking part in the City of Moscow's long range transportation plan drop-in community workshop! You are helping the City develop ideas for transportation improvements needed across the city. With your input and ideas, this plan—called Moscow on the Move—will establish action-oriented strategies to improve and expand transportation options to, through, and within the city.

Are there any issues you want highlighted in this plan? Are there any opportunities the City should consider? What should the city's top three priorities for this plan include? Please note any comments or questions in the space below.

What 3 projects or transportation improvements should the City prioritize?	Comments
Priority #1 Ped – Bike bridge on 3rd	Single family from 3rd, too much new traffic with vehicle bridge
Priority #2 lower speeds on D St.	maybe lower speeds (25mph) everywhere
Priority #3 SW quad ring road	expressway – limited access / 60mph keep regional traffic + trucks out of downtown

Figure 6 Participants' Top 5 #1 Transit Improvement Priorities

Priority Transportation Improvement Category	Top Five #1 Priorities
Build sidewalks	4

Priority Transportation Improvement Category	Top Five #1 Priorities
Bus service to Pullman	4
Bike lanes	4
Increase transit service	3
Safe and accessible pedestrian infrastructure	2

Taking into account all of the priorities listed, participants noted bike lanes the most frequently, followed by the need to build sidewalks and accessible streets, including signalization, curb ramps, and well-marked crossings, among others. Bus service to Pullman ranked fourth.

Figure 7 Participants' Overall Transit Improvement Priorities

Priority Transportation Improvement Category	Top 10 Overall Priorities
Bike lanes	11
Build sidewalks	9
Safe and accessible pedestrian infrastructure	7
Bus service to Pullman	5
Increase transit service	4
Bicycle/pedestrian only bridge on Third	4
Snow removal	3
Intersection safety	3
Wayfinding	3

Each general comment on the Comment Card was logged and categorized using the nine categories outlined in Figure 8 below. "Bicycle improvements," "Pedestrian improvements," and "Bike/Ped improvements," were the top three categories noted (representing a combined 62% of the responses).

Figure 8 Open House and Workshop Comment Cards: General Comment Responses

Transportation Improvement	Count	% Share	Example Comments
Bicycle improvement	33	19.6%	▪ "Separate bike and car traffic: ▪ "Pinpoint bicycle parking areas" ▪ "Bike trails north and east of downtown are limited"
Bike/Ped improvement	31	18.5%	▪ "Improve Latah Trail/Paradise Path access from east side of town" ▪ "Retain/expand bike/ped friendliness"
Pedestrian improvement	27	16.1%	▪ Sidewalk infill (Blain to Line and SH8 to F Street) ▪ Need sidewalk continuity on important streets ▪ Hazardous crosswalk at Lieuallen ▪ Getting Bikes off sidewalks
Traffic flow improvement	17	10.1%	▪ Add 4-way stops at all corners of Lena Whitemore blocks ▪ Keep regional traffic and trucks out of downtown ▪ Build highway bypass to redirect traffic out of downtown ▪ Roundabout at 6th and Mountain View, Yes, please install.
Traffic safety improvement	16	9.5%	▪ Slow traffic on neighborhood streets ▪ Right turns from Troy Hwy to Washington are dangerous ▪ Improve snow removal
TDM improvement	10	6.0%	▪ Encourage pedestrian transportation ▪ "Close sections of the city to traffic on Sunday for "open streets" event" ▪ Limit parking along Main Street
Transit improvement	10	6.0%	▪ Bring Pullman bus service back ▪ Provide van or shuttle to Lewiston ▪ Extend bus route coverage
Third Street Bridge	4	2.4%	▪ 3rd Street Bridge for pedestrians ▪ Multimodal 3rd Street Bridge
University Access	3	1.8%	▪ Partner with UI for service projects ▪ A Street Improvements
Other	2	1.2%	▪ Analysis of transportation options should estimate CO_2 emissions and this should be considered in picking which option to pursue.
Downtown Access	1	0.6%	▪ Move farmer's market to Main Street
Total Comments	**168**	**100%**	

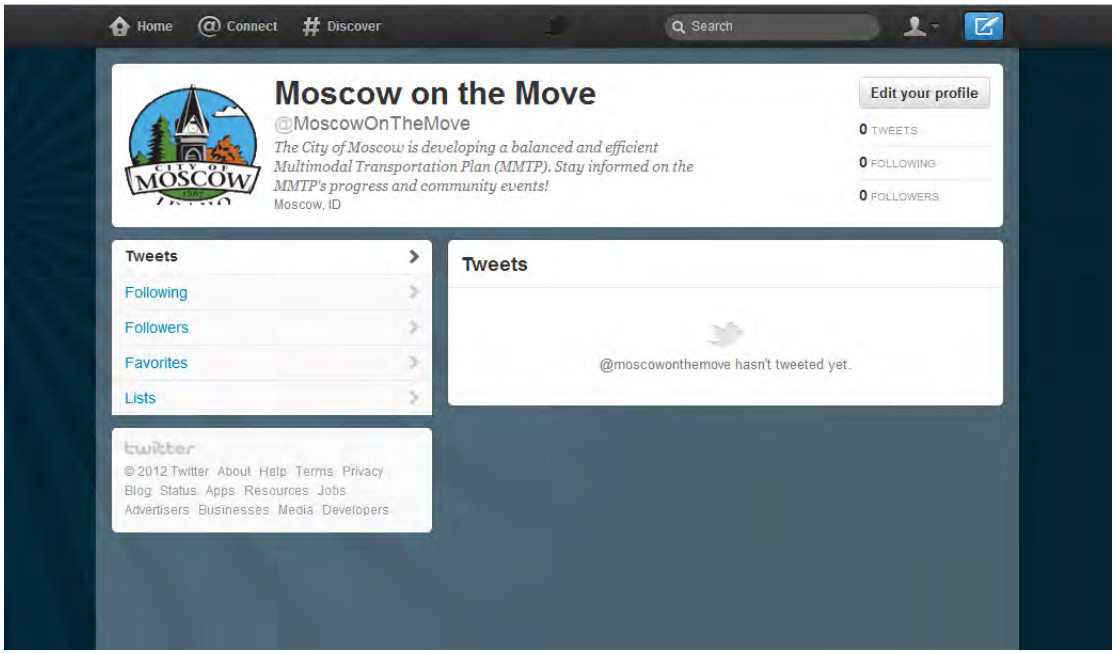
SOCIAL MEDIA

Early in the Moscow on the Move process, the project team established and engaged citizens through a project specific Facebook page and a Twitter feed (@MoscowontheMove). Figure 9 displays screenshots of the Facebook and Twitter outlets. The intent of the web-based outreach tools was to:

- Generate buzz regarding project events, findings, and deliverables (e.g., Transportation Fact Book, Draft and Final Report)
- Provide a forum for robust discussion and feedback
- Allow participants to share photos of critical modal issues
- Send out marketing blasts for community events

The project team linked all open house boards to the social media outlets using QR codes. This was employed as a new way to generate and document comments and feedback. This function was only used by a few community members, but generated appreciation by outreach event participants.

Figure 9 Screenshots of the Moscow on the Move social media interface


Home
Connect
Discover
Search
Moscow on the Move
@MoscowOnTheMove
The City of Moscow is developing a balanced and efficient Multimodal Transportation Plan (MMTP). Stay informed on the MMTP's progress and community events!
Moscow, ID
Edit your profile
0 TWEETS
0 FOLLOWING
0 FOLLOWERS
Tweets
Following
Followers
Favorites
Lists
Tweets
@moscowonthemove hasn't tweeted yet.
twitter
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MOSCOW ON THE MOVE

COMMUNITY TRANSPORTATION SURVEY SUMMARY REPORT

City of Moscow

DECEMBER 2012

NELSON NYGAARD

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1 INTRODUCTION AND METHODOLOGY

Between April 21st and December 11th 2012, Nelson\Nygaard conducted an online Community Transportation Survey using Survey Monkey. This report summarizes the results of this data collection effort and provides a summary of key findings learned from this data. The purpose of collecting data from the Community Transportation Survey is to better understand current issues and gauge the community's perceptions, needs, and interest in a variety of general mobility improvements. Question topics included general travel behaviors, views on transportation issues, and transportation investment priorities. The survey also collected information on community members' personal characteristics, such as age, income, and disability status. The survey was completed by 417 respondents, which represents a 2% survey response rate. This level of response is very respectable for a survey of this type and a city the size of Moscow.

The survey was advertized in a variety of ways to capture as many respondents and generate as much interest in the *Moscow on the Move* process as possible. Advertizing efforts included disseminating and posting flyers, marketing the survey on the City of Moscow website, the *Moscow on the Move* Facebook Page and Twitter feed, advertizing through various local organizations and news outlets, and through word of mouth at the University of Idaho and Moscow's Famer's Market. The survey instrument used is provided in Appendix A.

Respondent Demographics and Post-Stratification Weights

A comparison of the ages of the survey sample to the population of Moscow is presented in Figure 1. Residents between the ages of 18 and 24 are the largest age group in Moscow, at 36%, however only represents 8% of survey respondents. Residents aged 25 to 74 are over-represented in the sample.

Figure 2 shows the proportion of men and women represented in the sample compared to their actual share of the population. The survey sample over-represents women, which is possibly due to the fact that women are typically more likely to fill out a survey than men.

Figure 1 Age, Survey Sample vs. Population

	Under 18	18-24	25-34	35-44	45-54	55-64	65-74	75 and over
Sample	5%	8%	26%	21%	12%	18%	9%	1%
Population[(a)]	16%	36%	16%	9%	8%	7%	4%	4%

Data source: (a) 2010 Census Summary File 1, Table QT-P1

Figure 2 Sex, Survey Sample vs. Population

	Males	Females
Sample	45%	55%
Population[(a)]	52%	48%

Data source: (a) 2010 Census Summary File 1, Table QT-P1

Survey respondents aged 25 to 44 and 55 to 64 are more likely to bicycle as their primary commute mode compared to the actual population in these age groups (Figure 3). Moscow residents aged 18 to 24 who responded to the survey are much less likely to bicycle than the total population in this age group.

Figure 3 Bicycle Mode Share by Age, Survey Sample vs. Population

	Under 18	18-24	25-34	35-44	45-54	55-64	65-74	75 and over
Sample	1%	7%	27%	31%	12%	18%	4%	0%
	16-19	20-24	25-44		45-54	55-59	60-64	65 and over
Population[(a)]	8%	32%	25%		15%	11%	5%	3%

Data Source: (a) 2006-2010 American Community Survey 5-Year Estimates, Table B08101: Means of Transportation to Work by Age

Data Notes: The ACS Means of Transportation to Work question groups together taxicab, motorcycle, bicycle, and other means

Since the sample demographics are not representative of the actual population, post-stratification weights were applied to the survey results. Post-stratification weights based on demographic variables are a common technique used to ensure that no population groups are over- or under-represented in the survey sample compared to their actual representation in the population, thus unduly influencing the results. With a non-random sample, weighting the results to represent the larger population is common practice. Weighting the survey results for age reduces the weight of survey respondents aged 25 to 64 and increases the weight of survey respondents under age 24. Weighting for sex decreases the weight of female survey respondents and increases the weight of male survey respondents. Weighting for age and sex also decreases the influence of survey respondents who bicycle as their primary mode, since this group has been over-sampled.

2 KEY FINDINGS

General Travel Behavior

By and large, people get around Moscow's using a variety of transportation modes and trips are typically short in distance. Many survey respondents bicycle and walk for commute, recreation, and social trips; however transit usage is low for any trip purpose.

- Fewer than half (46%) of survey respondents drive alone to work or school. This confirms the multimodal nature of mobility in Moscow.
- Rates of driving alone are higher for shopping (63%) and medical (58%) type trips.
- High rates of respondents bicycle (21%) and walk (16%) to work or school. Although the survey results are weighted, the prevalence of reported non-motorized travel is likely due to survey sample and the number of University of Idaho affiliates that responded to the survey.
- More respondents bicycle (35%) and walk (19%) for recreation trips.
- Transit usage among survey respondents for any trip purpose is very low; commute (2%), shopping (1%), medical (1%), recreation (<1%), social (1%).
- Most commute trips (59%) and 40%-46% of non-commute trips are two miles or less in distance. Depending on age and skill level, the vast majority of trips are within a bikeable or walkable distance.

Local Transportation Issues

The most important transportation issues and high priority investments, according to survey respondents, generally involve off- or on-street pedestrian and bicycle facilities. Resuming intercity transit service between Moscow and Pullman is also considered an important transportation issue to address. Other key issues are summarized below.

- The most important transportation issues to survey respondents are the lack of comfortable bicycling routes throughout the city and downtown parking availability.
- Expanding the off-street bicycle and pedestrian path network and on-street bicycle facilities are the most important potential transportation enhancements to respondents.
- Intercity bus service between Moscow and Pullman and a safer pedestrian environment are the two transportation enhancements that would most significantly improve getting to and around Moscow in a more convenient, safe, and enjoyable manner.
- A continuous sidewalk network is the most highly influential transportation enhancement on the choice to walk more often.
- Off-street paths and low-stress on-street bikeways are the most highly influential transportation enhancements on the choice to bicycle more often.
- The most important transportation improvements to impact the choice to use transit are regional transit service to Pullman and more frequent bus service.
- Off-street paths for pedestrians and cyclists and on-street bicycle facilities received the most support by respondents as very high priority transportation investments.

GENERAL TRAVEL BEHAVIOR

Three quarters (75%) of survey respondents both live and work or attend school in Moscow (Figure 4). Ten percent (10%) live outside of Moscow and commute into the city and 5% live in Moscow and commute elsewhere. Seven percent (7%) live in Moscow but don't work or attend school. The remaining 3% of survey respondents don't live, work, or attend school in Moscow.

Figure 4 Where Respondents Live and Work

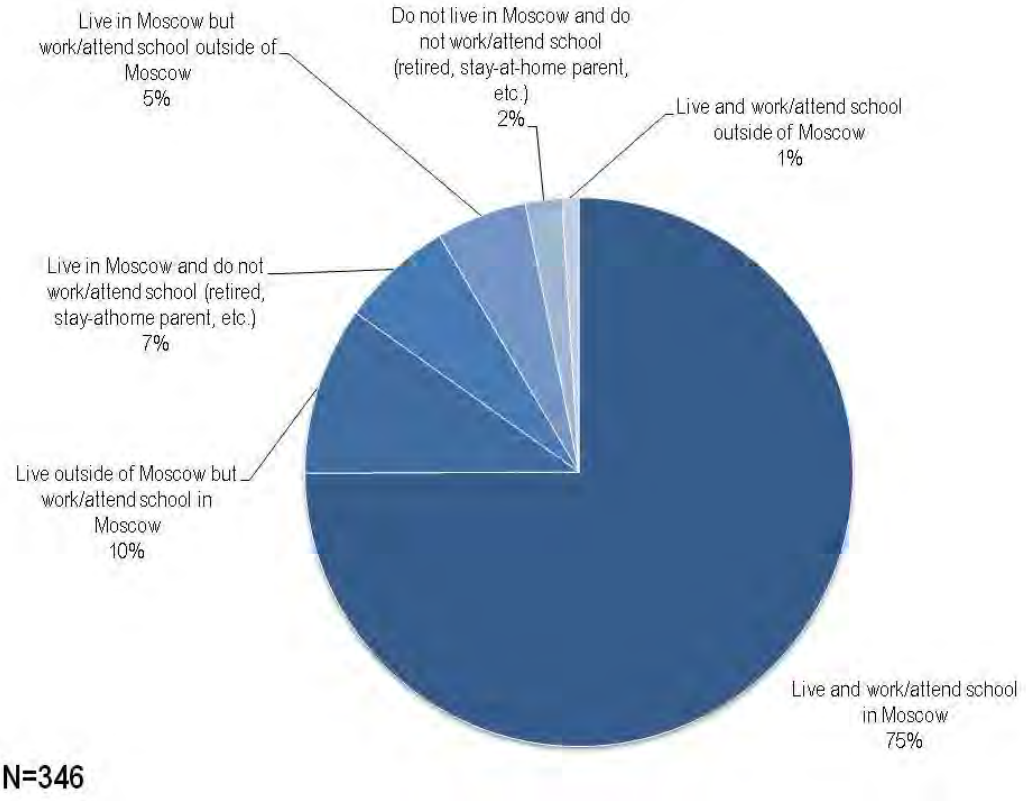
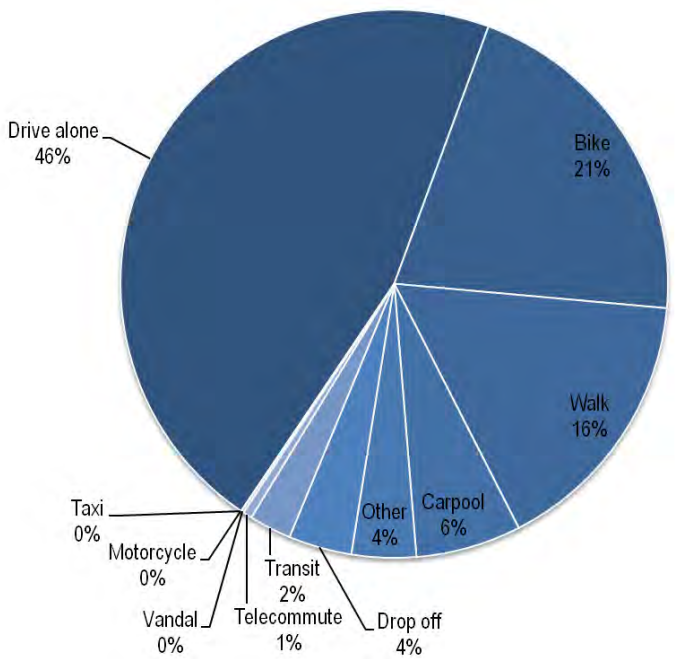


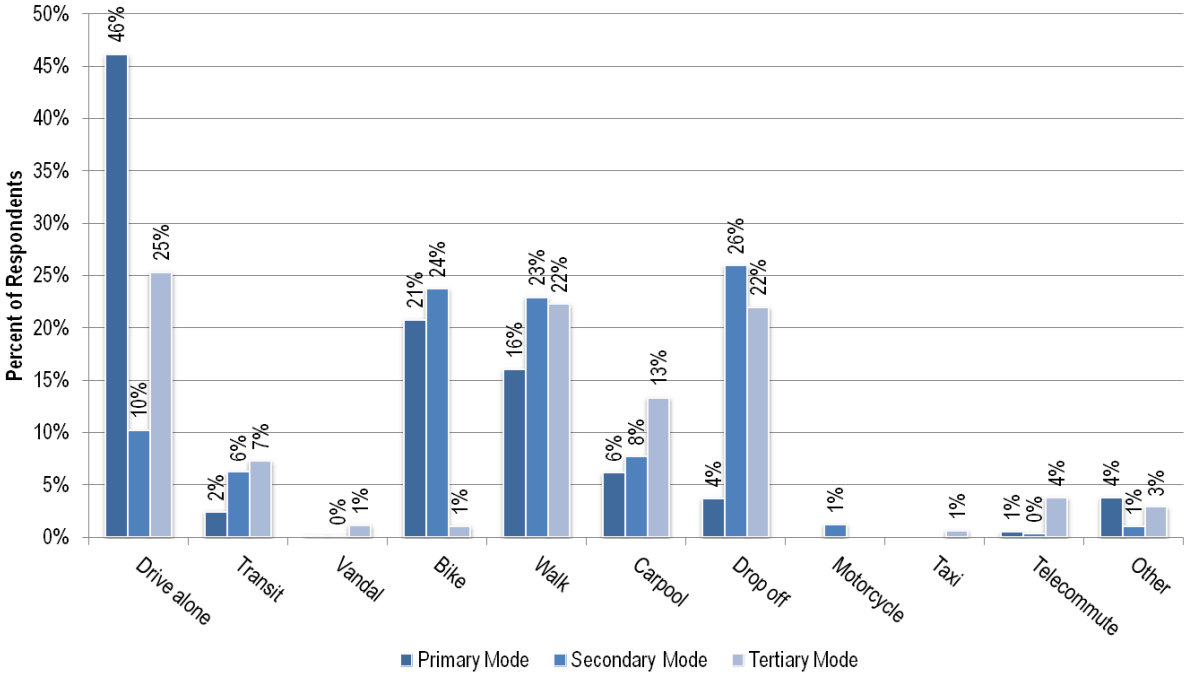
Figure 5 Primary Commute Mode Share



Less than half (46%) of survey respondents drive alone as their primary commute mode (Figure 5). One out of every five respondents (21%) bicycle and 16% walk to work or school. Smaller proportions carpool (6%), get dropped off (4%), take transit (2%), and telecommute (1%). Fewer than 1% of respondents use the Vandal Shuttle.

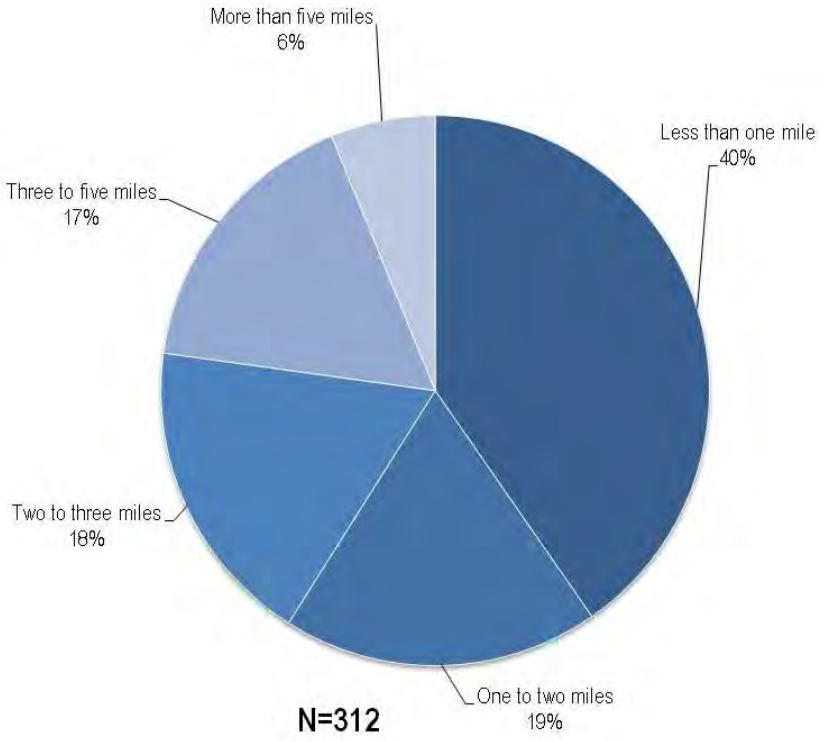
Just as commuters choose different routes to get to a destination, many people decide to use different modes on a daily basis during their journey to work. In order to understand how people move around Moscow and best represent the city's diverse set of travel options, the community transportation survey also tracked the secondary and tertiary modes that survey respondents use to get to work on any given weekday. While drive alone is the most common primary commute mode among respondents, bicycling (24%), walking (23%), and being dropped off (26%) are the most often used secondary commute modes (Figure 6). Transit is used by few respondents as a primary (2%), secondary (6%), or tertiary (7%) commute mode.

Figure 6 Primary, Secondary, and Tertiary Commute Mode Share



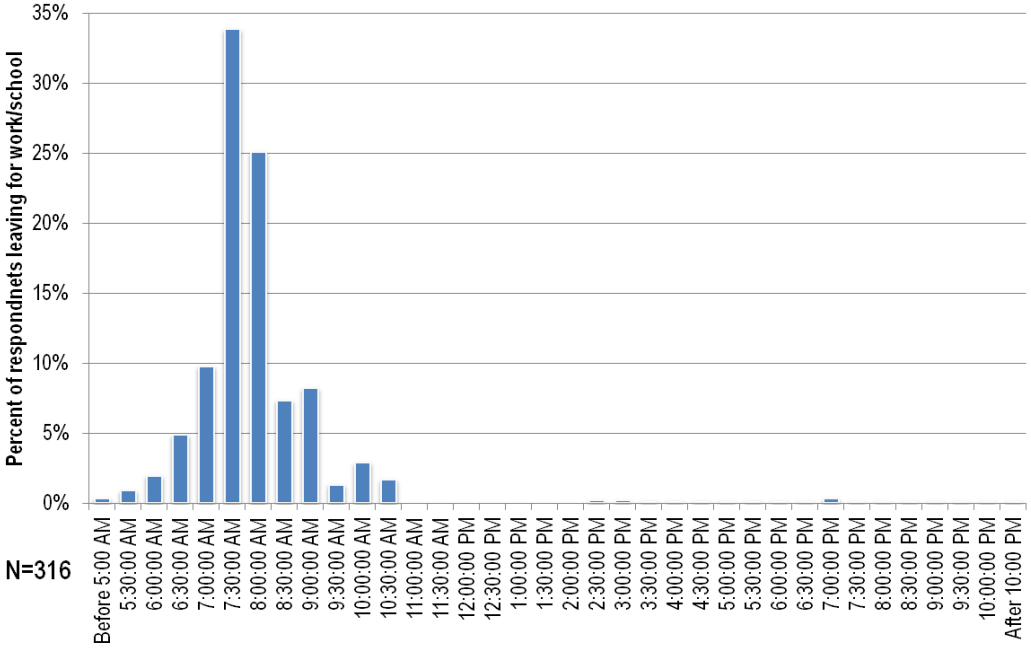
The majority of commute trips are less than two miles, which is well within the range of walking and bicycling trips for most people.Two out of five respondents (40%) commute less than one mile to work or school (Figure 7). One out of five (19%) commutes a distance of one to two miles and one quarter (25%) travel between two and five miles. Only 6% of respondents travel further than five miles to get to work or school.

Figure 7 Commute Distance to Work or School



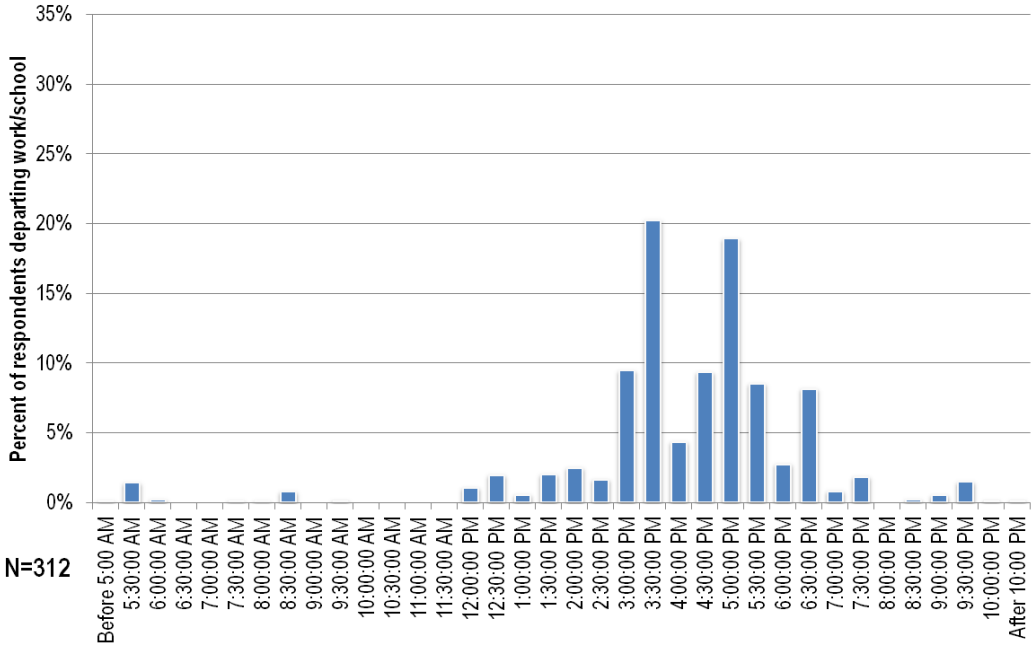
Most (59%) of survey respondents leave home for the day between 7:30AM and 8:00AM (Figure 8). Ten percent (10%) leave home at 6:30AM, 7% leave at 8:30AM, and 8% leave at 9:00AM. Virtually no respondents leave for their work or school day after 10:30AM and very few leave before 6:30AM.

Figure 8 Time of Day Respondents Leave Home for Work or School



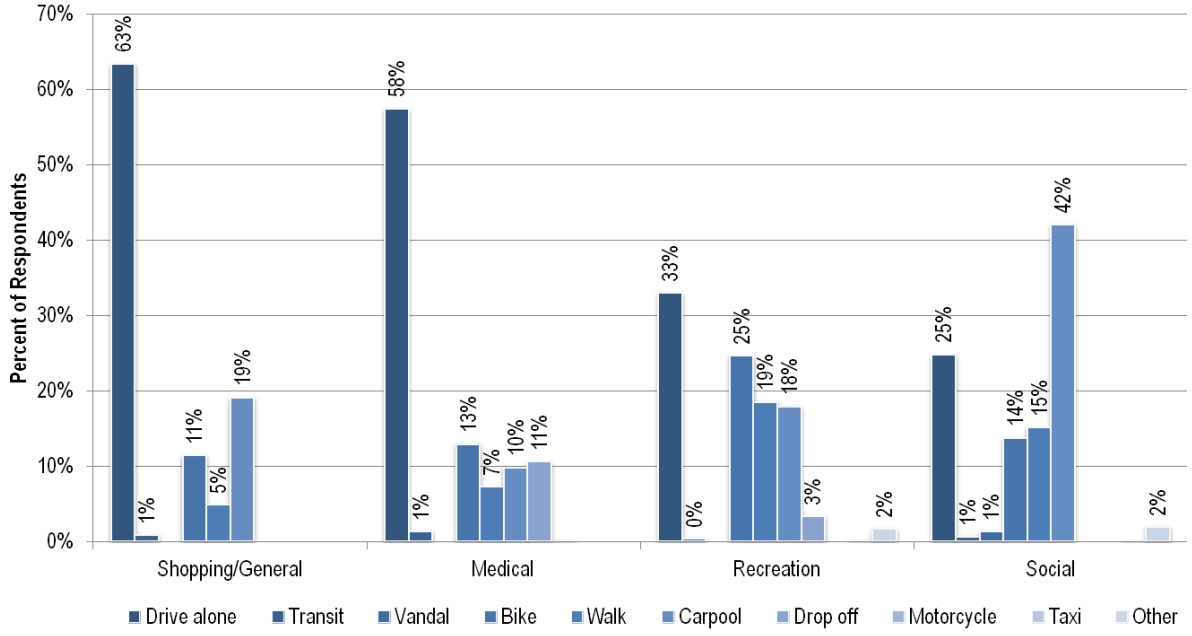
The time of day that survey respondents depart from work or school to return home varies more substantially. Eighty-two percent (82%) return home between 3:00PM and 6:30PM (Figure 9). The most common departure times are 3:30PM and 5:00PM, at 20% and 19%, respectively. Another 8-10% leaves at each of the following times: 3:00PM, 4:30PM, 5:30PM, and 6:30PM.

Figure 9 Time of Day Respondents Depart Work or School for Home



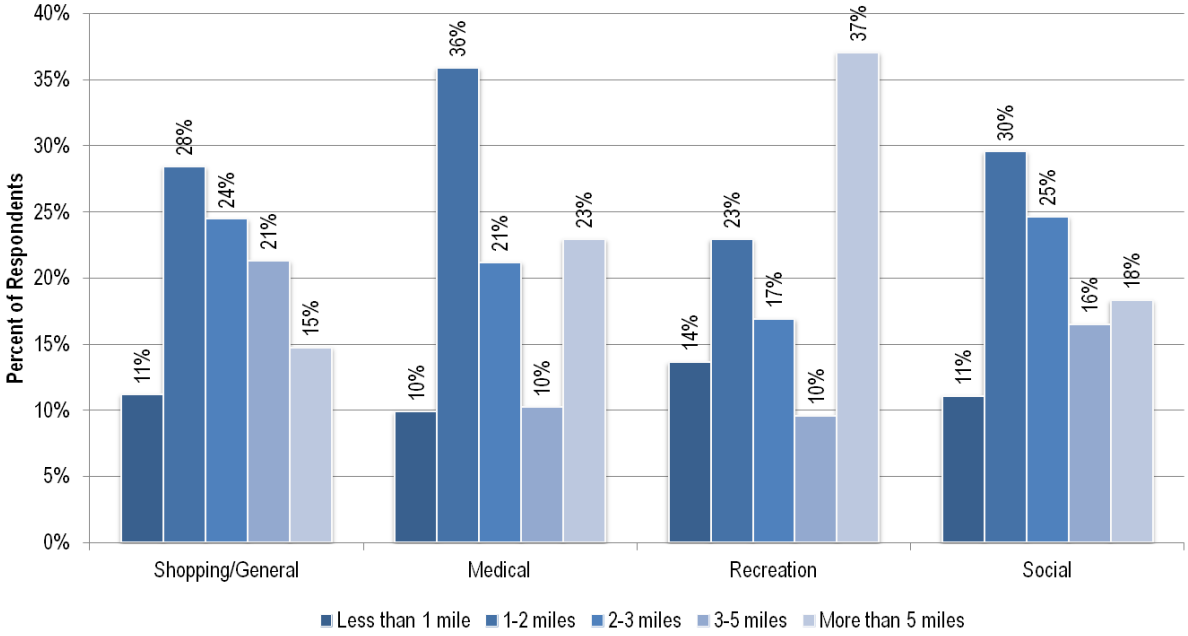
Shopping and medical trips are the most common non-commute type trips to be taken in a single-occupant vehicle, at 63% and 58%, respectively (Figure 10). Bicycling, walking, and carpooling are much more common for recreation and social types of trips. Transit is used by very few respondents for any of these non-commute type trips.

Figure 10 Percent Mode Share by Non-Commute Trip Type



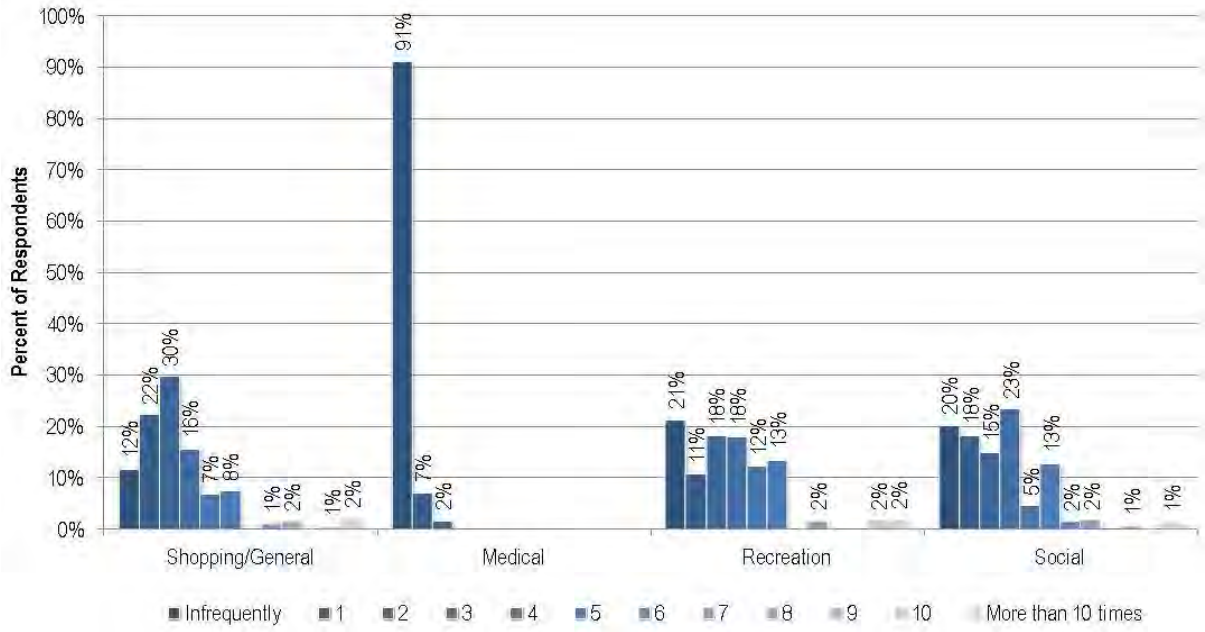
As with commute trips, survey respondents generally report short travel distances for shopping, medical, and social trip types. Around 40%-46% of these trip types are 2 miles or less (Figure 11). Only recreation trips have a large portion of trips over 5 miles in distance (37%).

Figure 11 Distance by Non-Commute Trip Type



During a typical 5-day work week, most survey respondents (47%-68%) report taking 1-3 shopping, recreation, and social trips (Figure 12). One in five (21%) report making recreation and social trips infrequently. Trips for medical purposes are the most uncommon trip types, with 91% of survey respondents reporting taking medical trips infrequently.

Figure 12 Trip Frequency by Non-Commute Trip Type

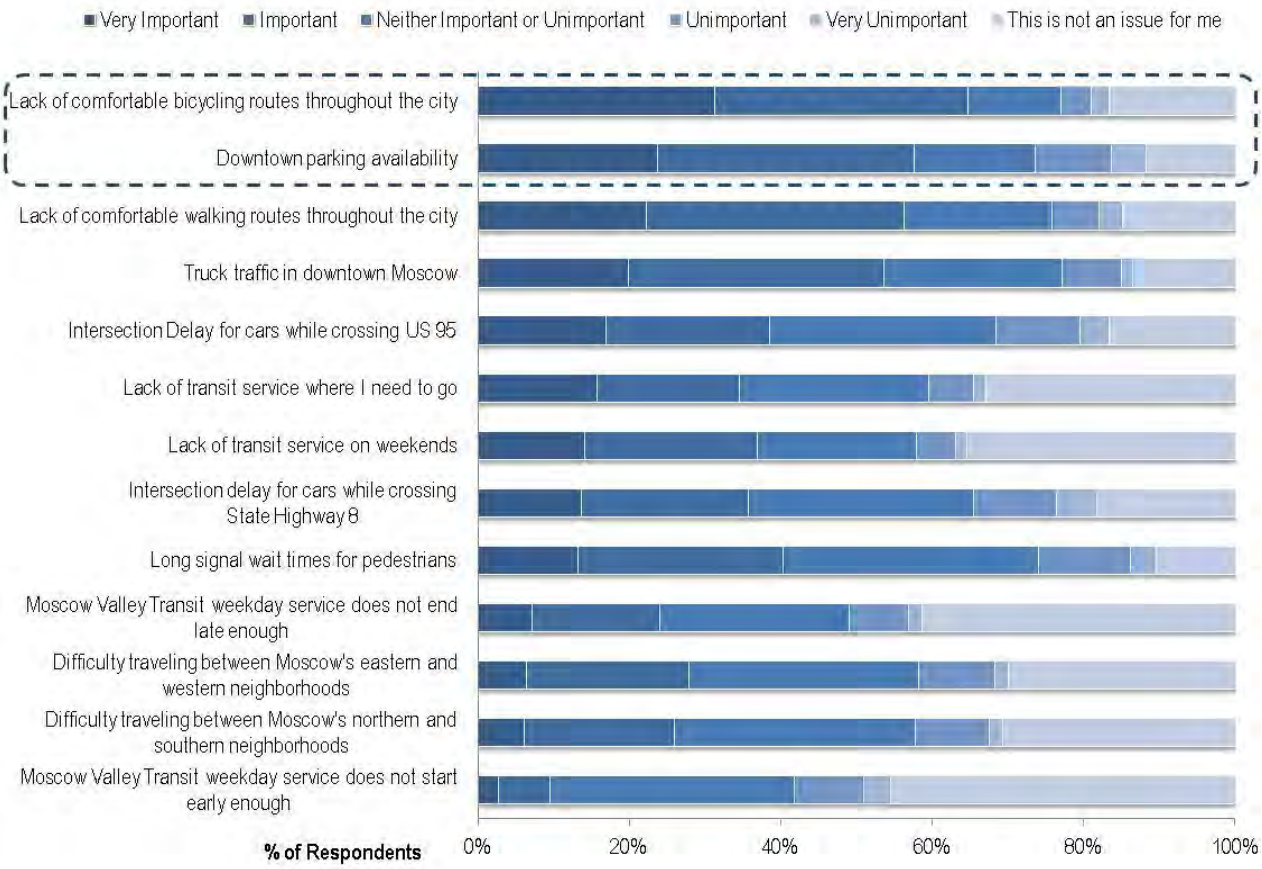


LOCAL TRANSPORTATION ISSUES

The following analysis displays survey respondents' views on local transportation issues, including importance of various transportation matters, improvements necessary to make walking, bicycling, and taking transit more convenient, safe, and enjoyable, and priorities for transportation investments.

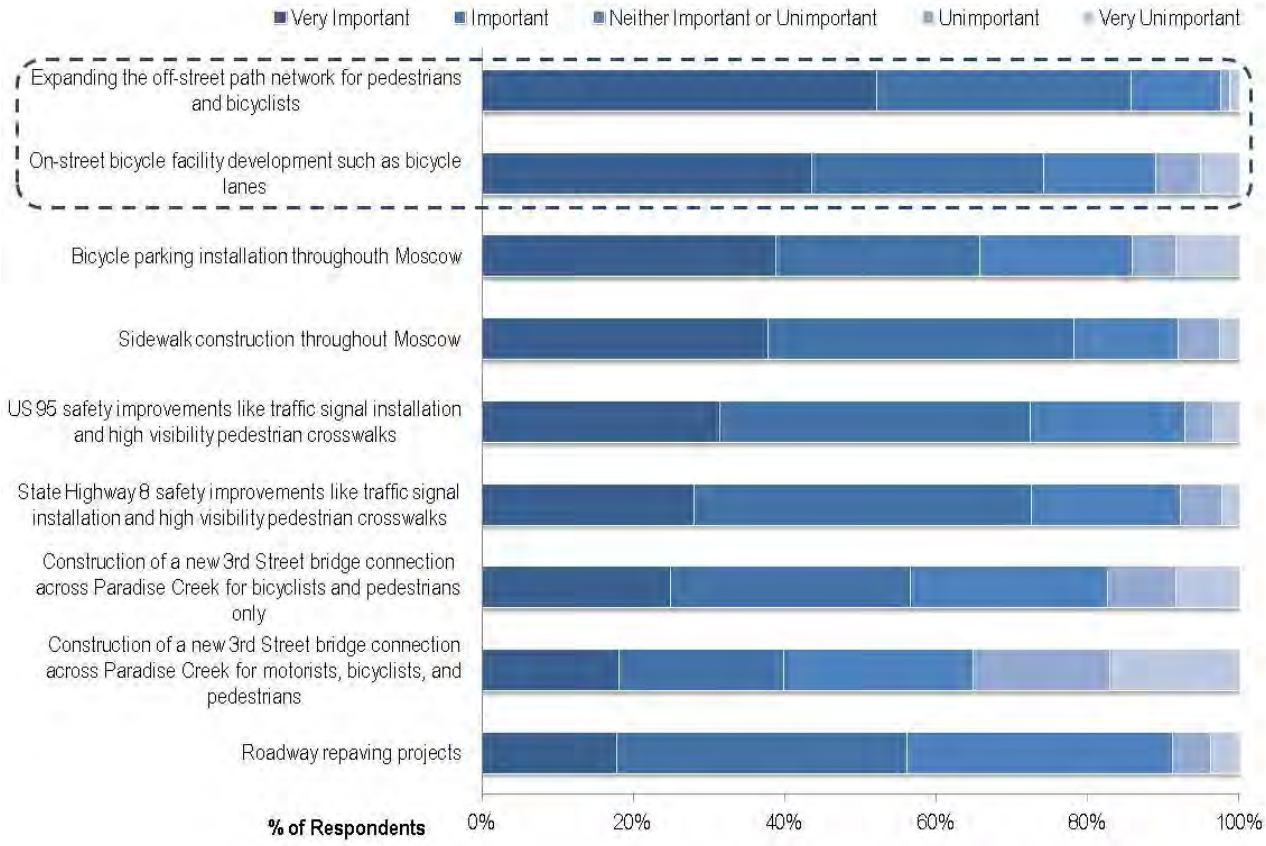
The lack of comfortable bicycling routes throughout the city and downtown parking availability are the top two very important transportation issues cited by respondents, with 30% and 25% of respondents stating that these are very important issues (Figure 13). The lack of comfortable walking routes throughout the city and truck traffic in downtown Moscow are very important issues for 22% and 20% of respondents, respectively. The least concerning issue is the daily start time for Moscow Valley Transit service, with nearly half of respondents stating this is not an issue of concern.

Figure 13 Views on Importance of Local Transportation Issues



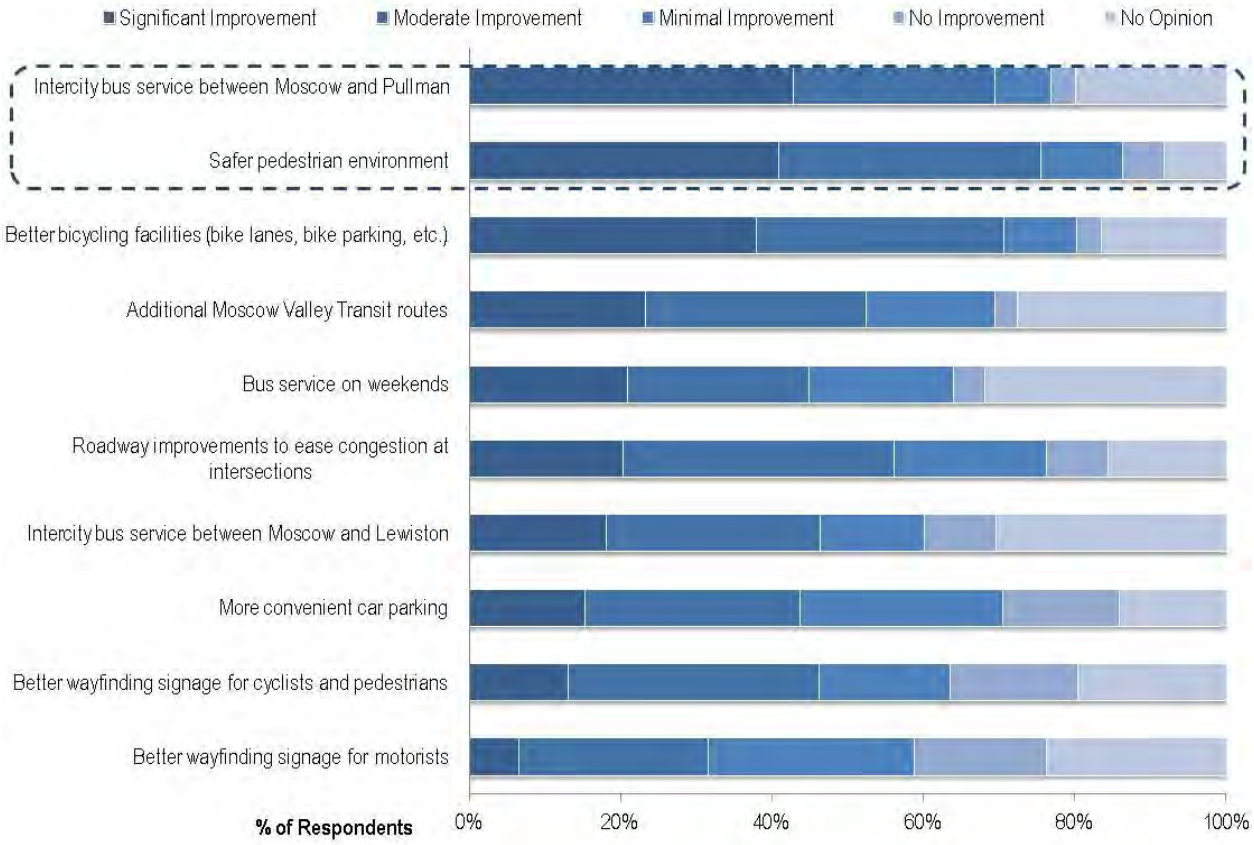
Expanding the off-street path network for pedestrians and bicyclists and on-street bicycle facility development are deemed as the top two potential transportation enhancements by survey respondents, receiving very important ratings by 52% and 44%, respectively (Figure 14). Installing bicycle parking and sidewalk construction throughout Moscow also received high ratings, with nearly 40% stating these improvements as very important. Construction of a new Third street bridge connection across Paradise Creek for motorists, bicyclists, and pedestrians is the least pressing transportation enhancement, with 35% of respondents assessing this project as unimportant or very unimportant.

Figure 14 Views on Importance of Potential Transportation Enhancements



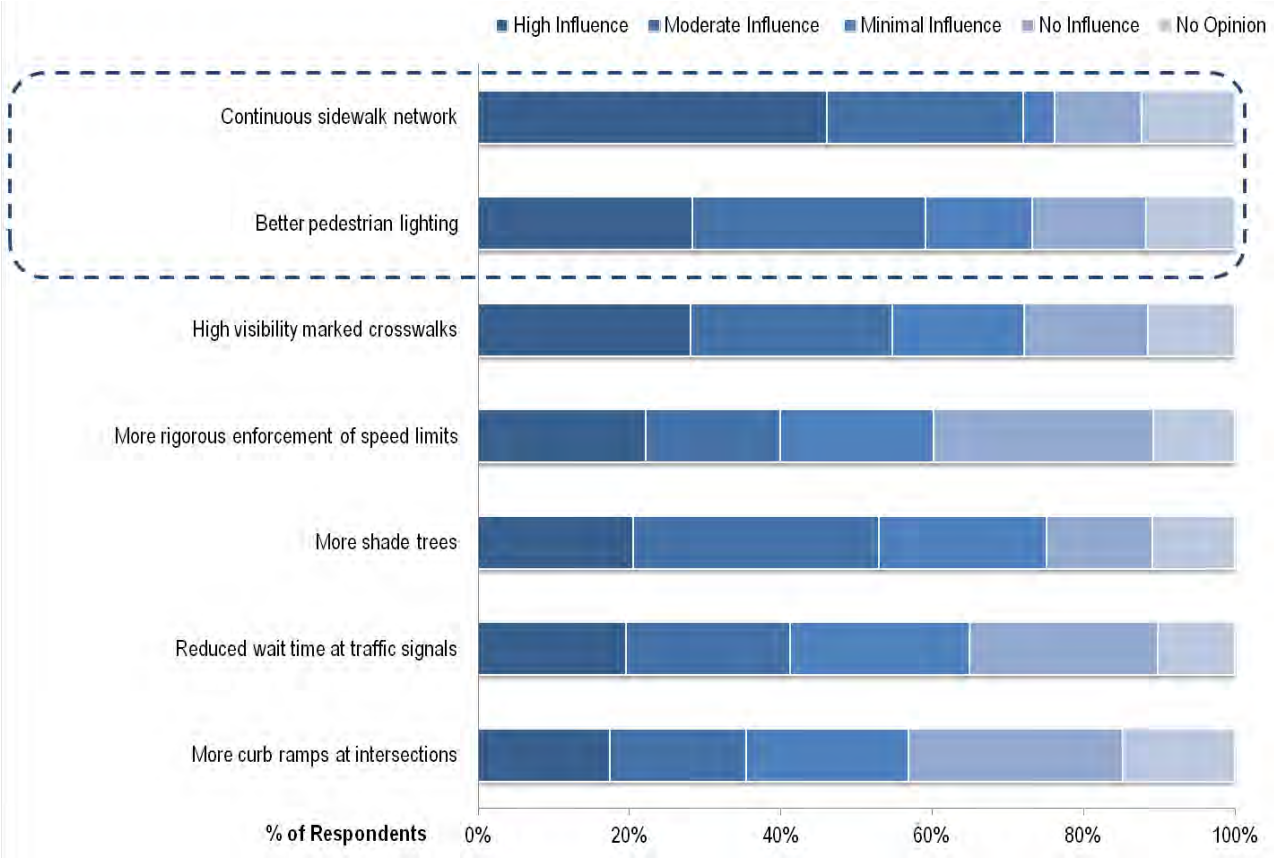
Survey respondents were also asked to rate the level of importance various improvements had on mobility in Moscow. Intercity bus service between Moscow and Pullman and a safer pedestrian environment are the top two transportation enhancements deemed by respondents (just over 40% each) to significantly improve getting to and around Moscow in a more convenient, safe, and enjoyable manner (Figure 15). Better bicycling facilities (such as bike lanes and bike parking) also received the highest rating by 38% of respondents. A large proportion of respondents think the following would provide minimal or no improvement: more convenient car parking (42%), better wayfinding signage for cyclists and pedestrians (34%), and better wayfinding for motorists (45%).

Figure 15 Views on Level of Improvement Posed by Transportation Enhancements



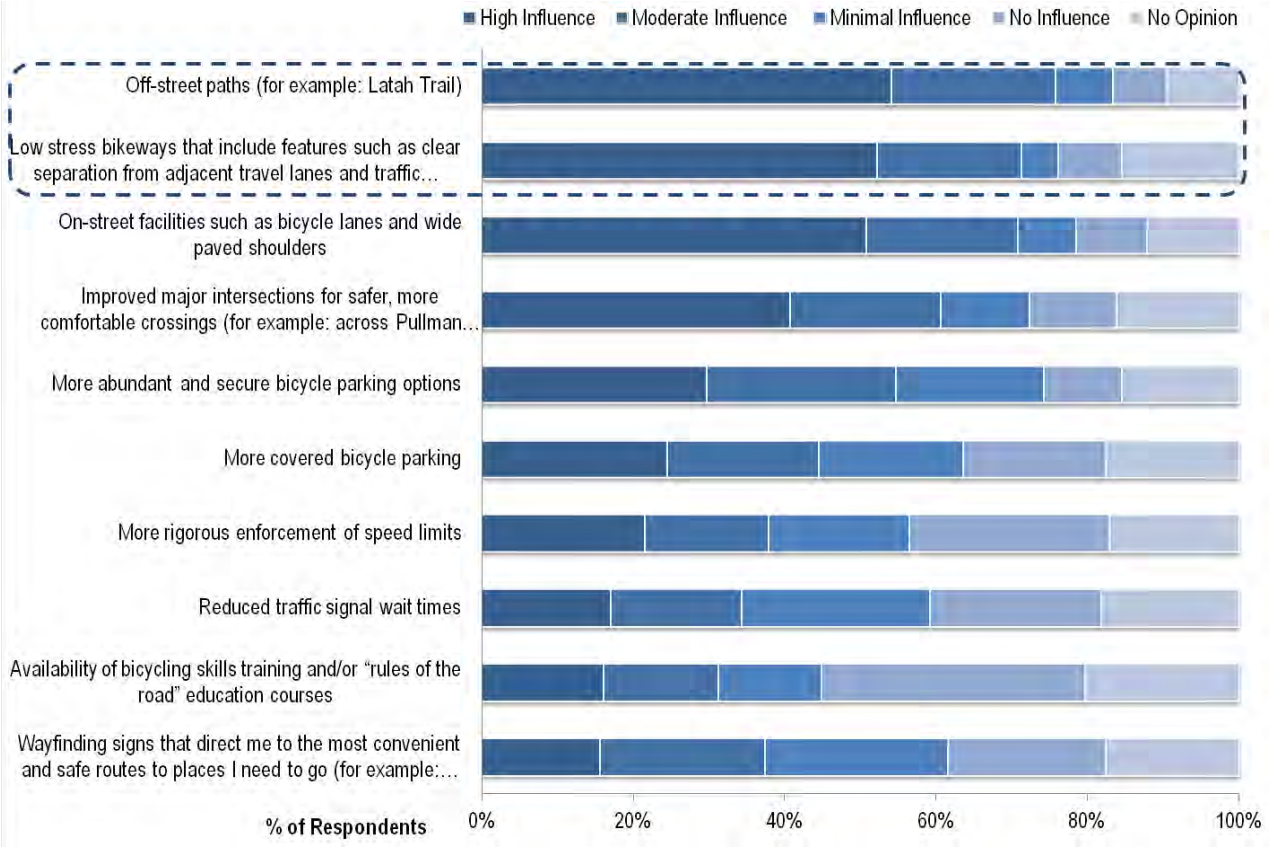
A continuous sidewalk network is considered by respondents to have the largest impact on the choice to walk to a destination, with 72% of respondents rating this enhancement as highly or moderately influential (Figure 16). Better pedestrian lighting and high visibility marked crosswalks are considered highly or moderately influential by 55% and 59% of respondents, respectively. Half (50%) of respondents think more rigorous enforcement of speed limits, reduced wait time at traffic signals, and more curb ramps at intersections would minimally or not at all influence their choice to walk.

Figure 16 Influence of Transportation Enhancements on Choice to Walk



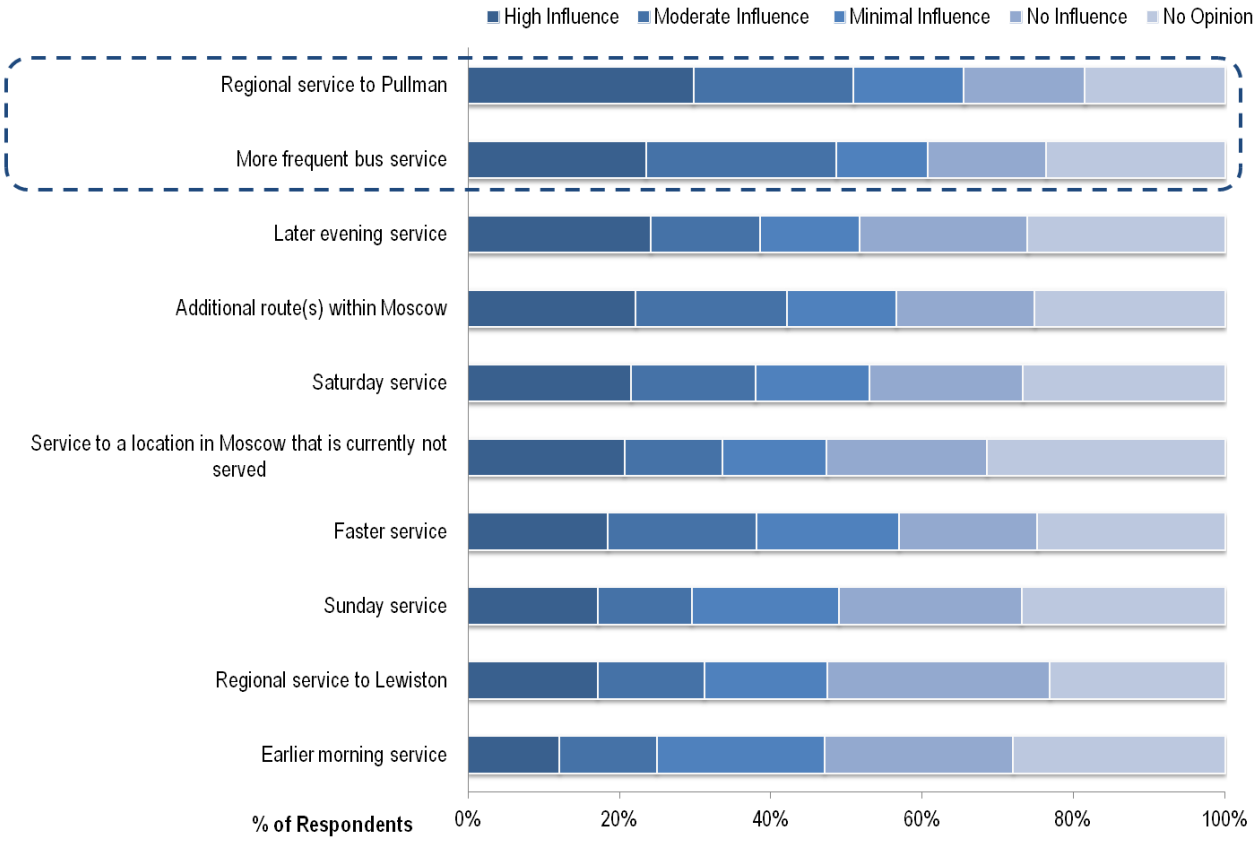
The transportation enhancements that are most influential on the choice to bicycle, according to survey respondents, are off-street paths (76%), low-stress bikeways (71%), and on-street facilities (71%) (Figure 16). The following transportation enhancements are considered to have only minimal or no influence on increasing cycling by 45%-48% of respondents: availability of bicycling skills training, reduced traffic signal wait times, wayfinding signs for convenient and safe routes, and more rigorous enforcement of speed limits.

Figure 17 Influence of Transportation Enhancements on Choice to Bicycle



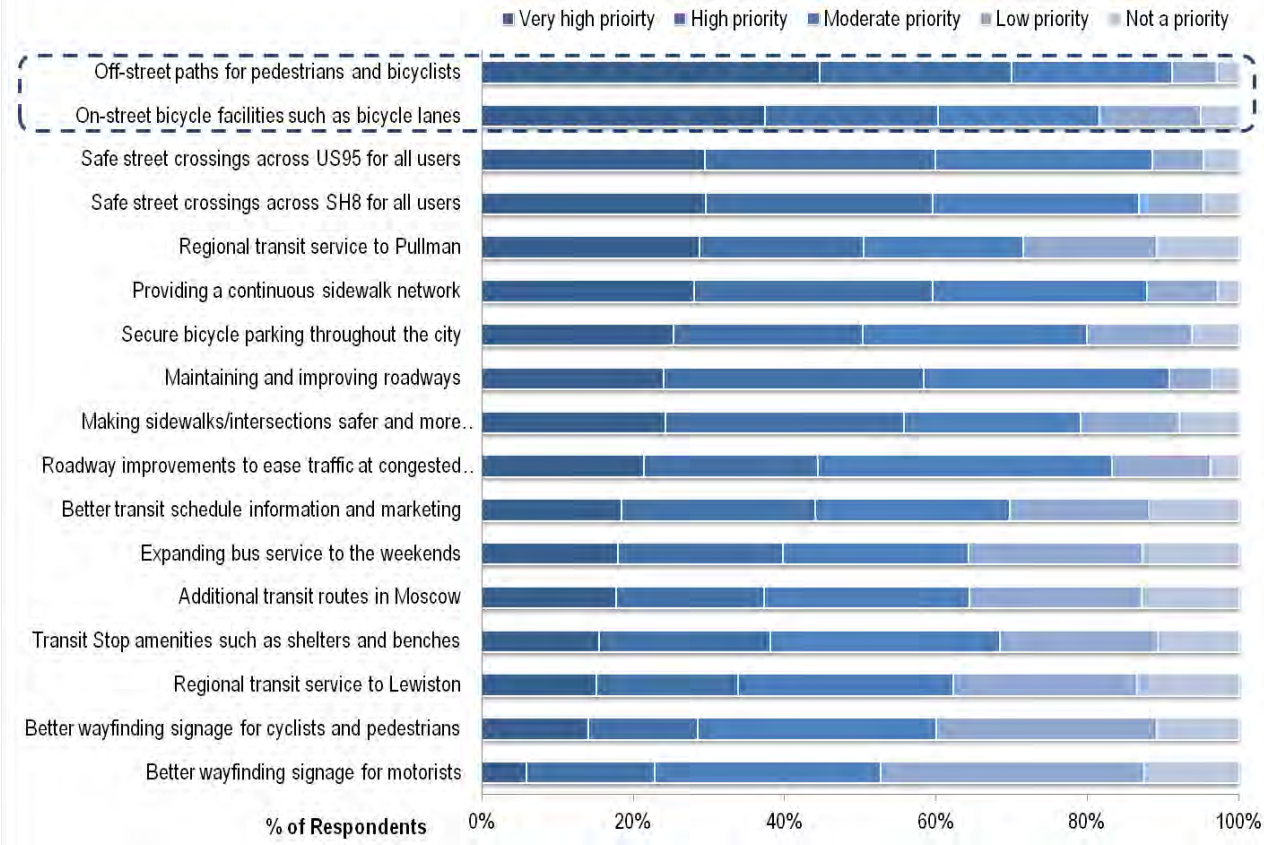
Regional service to Pullman and more frequent bus service are the most influential transportation enhancements on the choice to take transit, according to 51% and 49% of survey respondents, respectively (Figure 18). The improvements that would have minimal or no influence on increasing transit use according to survey respondents are regional service to Lewiston (46%) and earlier morning service (47%).

Figure 18 Influence of Transportation Enhancements on Choice to Take Transit



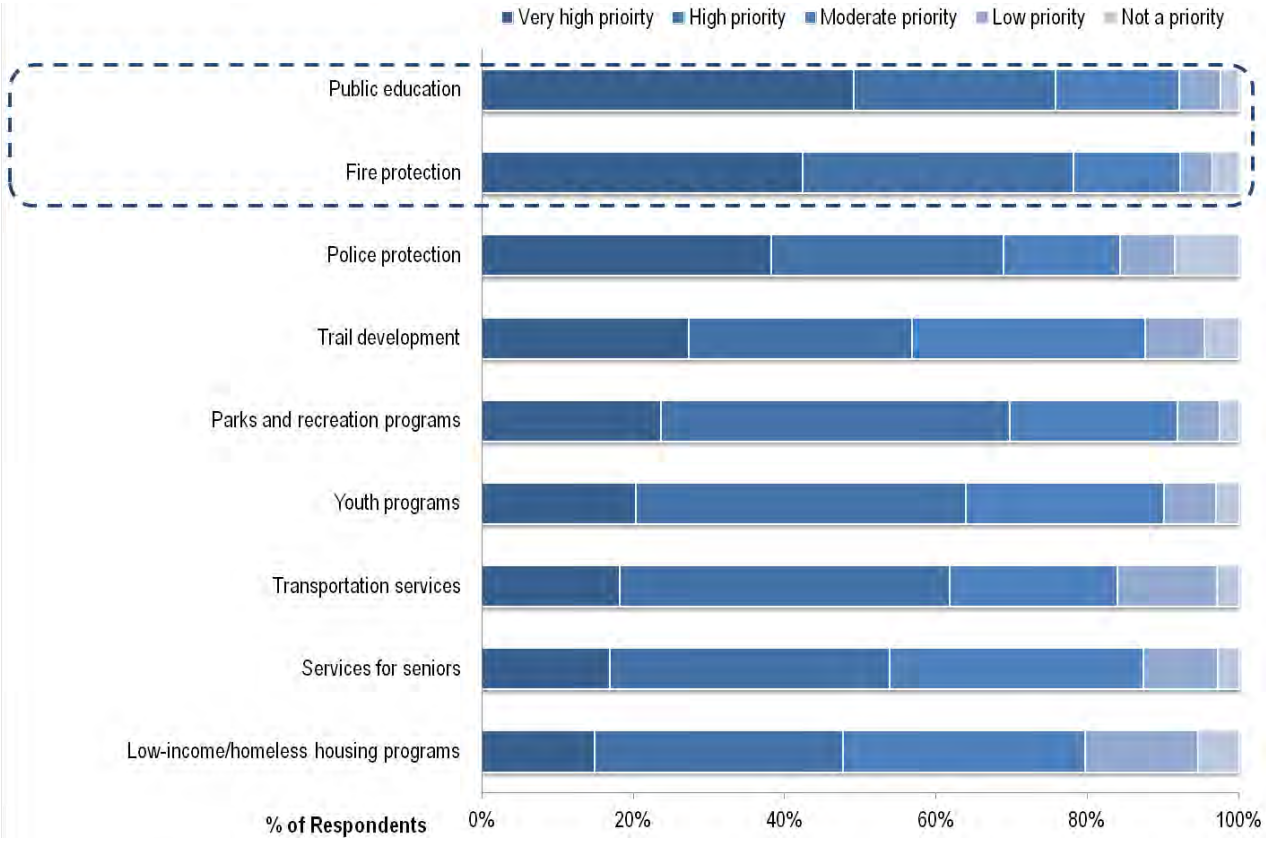
Providing off-street paths for pedestrians and bicyclists is the top very high or high priority transportation investment, according to 70% of survey respondents (Figure 19). Other transportation projects that received very high or high priority ratings by a large margin include on-street bicycle facilities (60%), safe street crossings across US95 (60%) and SH8 (60%), providing a continuous sidewalk network (60%), maintaining and improving roadways (58%), making sidewalks and intersections safer and more accessible (56%). Better wayfinding signage for motorists is the lowest priority project, rated as low priority or not a priority by 47% of respondents. Better wayfinding for bicyclists and pedestrians is also a low priority project, with a low or no priority rating by 40% of survey respondents.

Figure 19 Priority of Transportation Investments



The community transportation survey contextualized the importance of different public services and investments. Public education and fire protection are considered the most important public services, with a very high or high priority rating by 76% and 78% of respondents, respectively (Figure 20). Transportation services and trail development, while relatively lower public service priorities, are a very high or high priority for 62% and 57% of survey respondents, respectively.

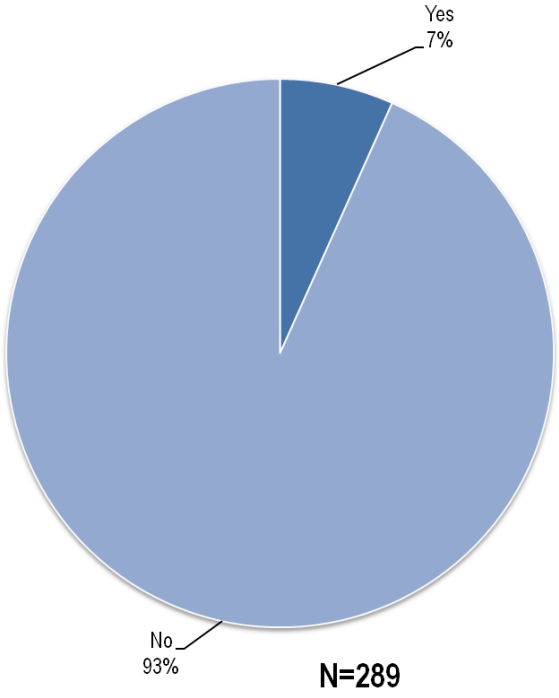
Figure 20 Priorities of Public Services



RESPONDENT DEMOGRAPHICS

The following section exhibits select demographic variables for the weighted survey sample. Since the survey is weighted to represent the population age and sex composition, these variables are not presented here.

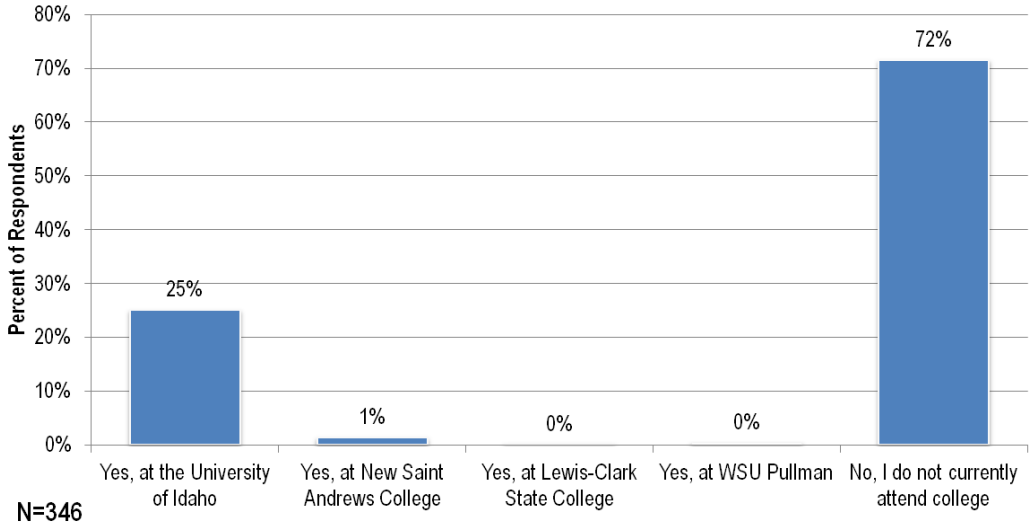
Figure 21 Disability Status



Seven percent (7%) of survey respondents reported a mobility, sight, or cognitive disability or impairment that impacts their movement around the city of Moscow (Figure 21). Communities of this size, typically exhibit disability rates less than 5%. Moscow's lack of continuous sidewalks and accessible intersections impacts a relatively large segment of the city.

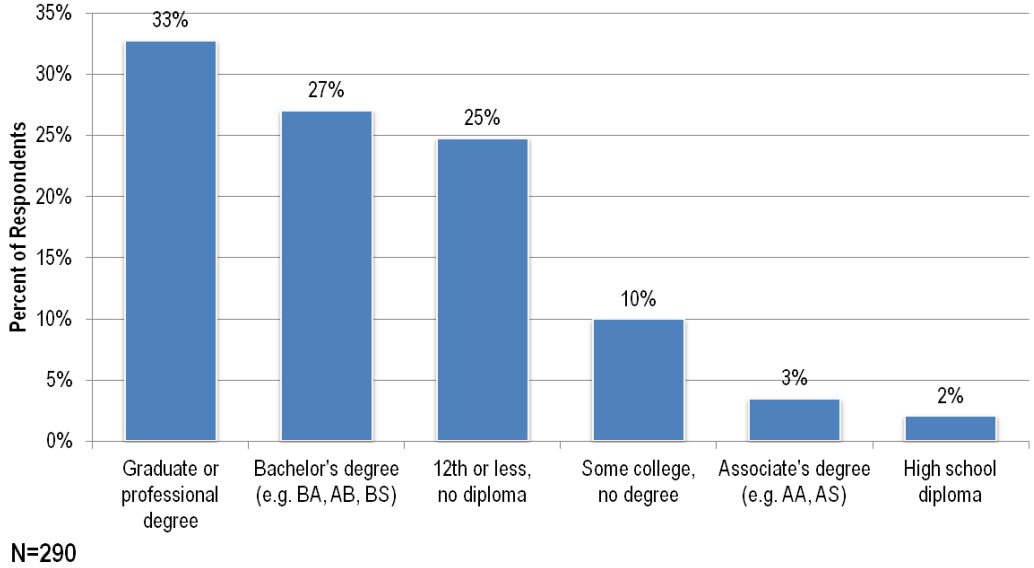
Most (72%) of survey respondents are not currently attending college (Figure 22). One quarter (25%) of respondents are students at the University of Idaho, 1% attends New Saint Andrews College and fewer than 1% attend Lewis-Clark State College and WSU Pullman.

Figure 22 College Attendance



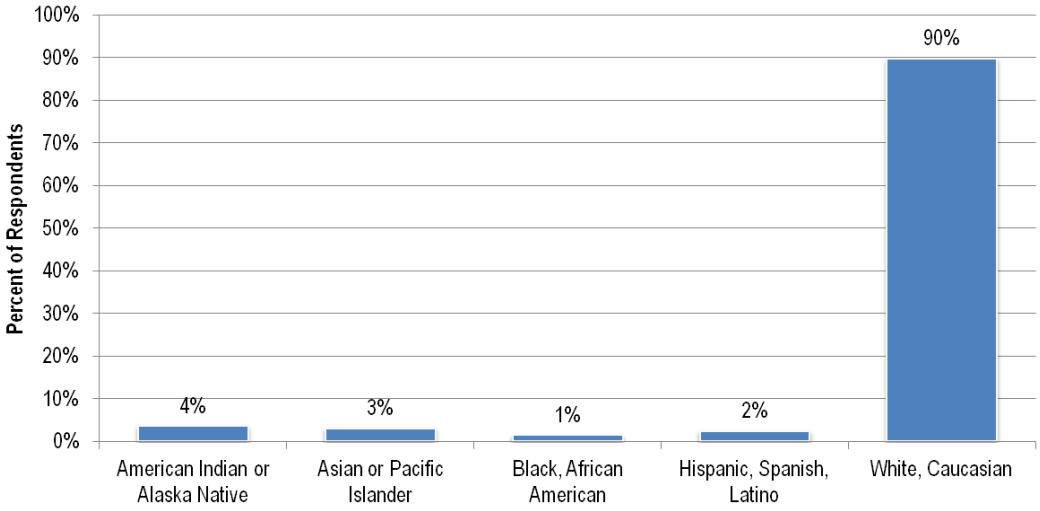
One third (33%) of respondents hold a graduate or professional degree and 27% have a bachelor's degree (Figure 23). One quarter (25%) of respondents reached 12th grade or less (no diploma) and 10% attended college but did not receive a degree.

Figure 23 Educational Attainment



The vast majority (90%) of the survey sample reported their race as Caucasian (Figure 24). The rest of the respondents reported their race or ethnicity as American Indian or Alaska Native (4%), Asian (3%), African American (1%), and Latino (2%).

Figure 24 Race and Ethnicity



N=350

Thirty eight percent (38%) of respondents have an income of between $50,000 and $99,000 (Figure 25). Nearly equal percentages of respondents have incomes of less than $24,999 (22%; largely comprised of the University population), $25,000 to $49,000 (22%), and $100,000 or more (18%).

Figure 25 Total Household Income

N=270

MOSCOW ON THE MOVE

RIDECHECK ANALYSIS AND ON-BOARD PASSENGER SURVEY SUMMARY

City of Moscow

In conjunction with
Moscow Valley Transit

June 2012

NELSON
NYGAARD

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1 INTRODUCTION

In April 2012, Nelson\Nygaard conducted on-board passenger survey and ridecheck on Moscow Valley Transit's East and West Routes. This report summarizes the results of this data collection effort and draws conclusions as the implications of passenger travel behavior, attitudes, and unmet needs.

Passengers waiting at the Farm Road stop at Winco/Palouse Mall. Passengers rated passenger amenities and access to transit enhancements as a priority for improving quality of service.

Image from Nelson\Nygaard

2 RIDECHECK ANALYSIS

Methodology

In order to identify Moscow's key boarding and alighting locations and land uses that generate transit trips, Nelson\Nygaard conducted a 200% on-board ridecheck (a ridecheck conducted over two weekdays on Moscow Valley Transit's East and West Routes. The data collection was conducted on two normal operating weekdays –Tuesday April 3rd, 2012 and Wednesday April 4th, 2012. A 200% ridecheck was employed to account for the variation in passenger travel behavior on different University of Idaho class days. For example, typical University class schedules have heavier class loading and, therefore, campus population on Tuesdays and Thursdays compared to Mondays, Wednesdays and Fridays. The ridecheck entailed counting every passenger that boarded and alighted each service for all runs that make up a single week day. Appendix A summarizes all ridecheck data obtained and indicates key boarding and alighting locations and the maximum load carried by stop. This ridecheck is intended to tally all boardings and alightings for a *typical* service day.

The April, post-winter timeframe was intentionally chosen to mimic typical passenger travel behavior and ridership in Moscow. The data collection process ensured that the following key conditions were met:

- **Normal weekday.** The ridecheck occurred during a normal weekday in Spring. No atypical event occurred during this timeframe (e.g., Vandal football game, alumni/homecoming week, etc.).
- **University is in session.** The ridecheck effort was conducted during normal school days for the University of Idaho and the Moscow School District.
- **Normal weather conditions.** Weather was relatively normal for a Spring day in Moscow, although it did snow for a short portion of the Tuesday data collection period.
- **University is not in a testing period.** This data collection effort did not occur during the University of Idaho's final or mid-term periods.

Moscow Valley Transit East and West Routes

Boarding, Alighting, and Passenger Load Summary

Figure 1 summarizes East and West Route boardings and alightings, while Figure 2 highlights the stop with the highest average daily boarding activity. The East Route (438 average daily boardings) averages 31% more daily boardings than the West Route (302 average daily boardings). This is likely because the East Route has 30% more stops than the West Route and the East Route serves a large population ot students and faculty living immediately south and southeast of the campus.

The stop at St Augustine's, which serves as the hub for the Moscow Valley Transit system, experiences the greatest boarding and alighting activity for both the East and West Routes. Ridership is strongest along the East Route at bus stops that serve key origins and destinations, like the University of Idaho, Friendship Square, Moscow Senior High School, Moscow Junior High School, Eastside Marketplace, and residential areas off Styner Avenue that house a large University population. The West Route's most productive stops include the St Augustine's and the Living Learning Community at the University, Winco/Palouse Mall, University housing along A Street, the Disability Action Center, and downtown Moscow. Less productive portions of both routes (typically exhibited combined boarding and alighting activity below 20) are located along lower density residential and employment areas that do not typically serve the University population.

Figure 1 Daily Boardings and Alightings – East Route and West Route

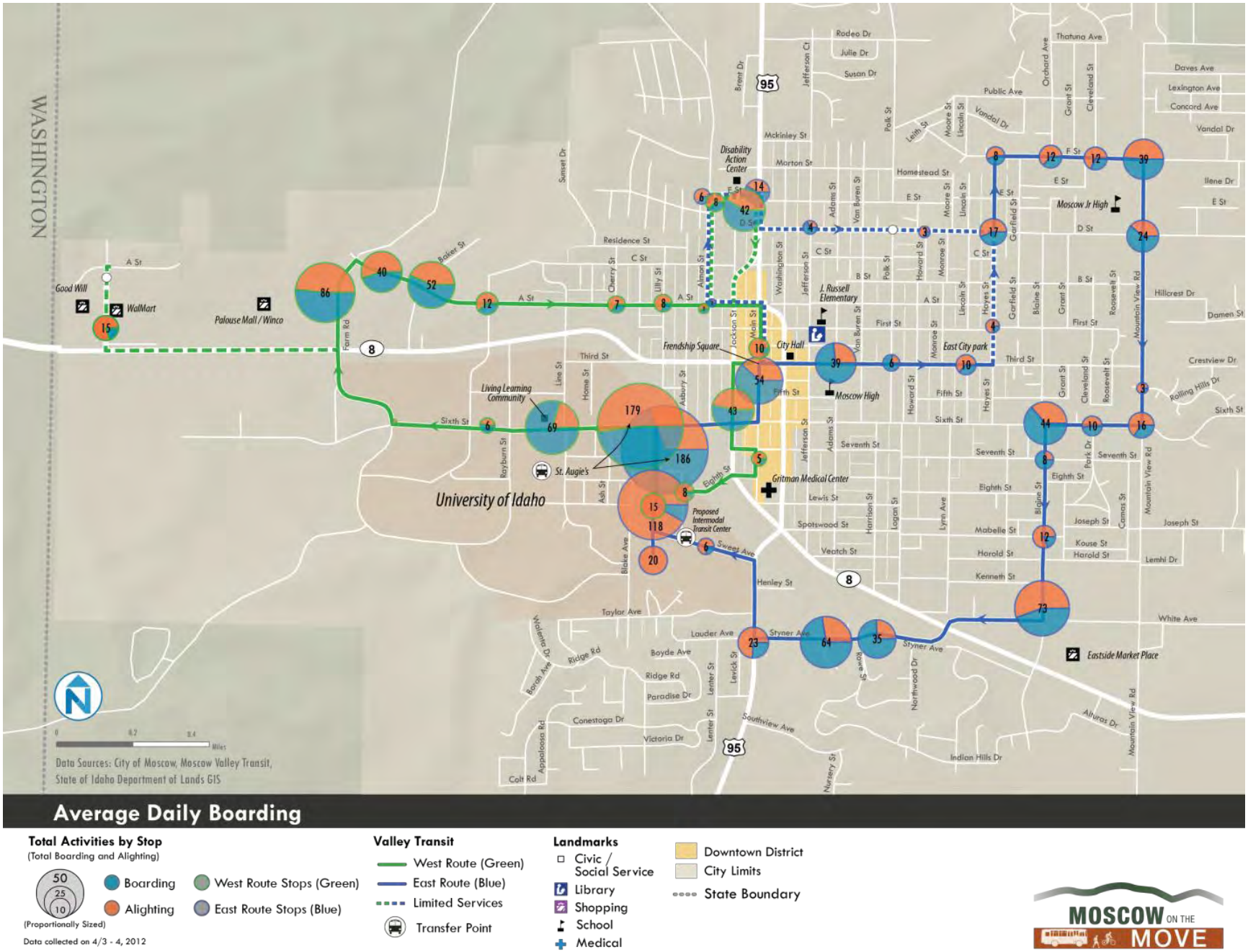


Figure 2 Top Boarding Locations in Moscow by Route

East Route	Average Daily Boardings
St. Augustine's south of W 6th Street	129
Styner Ave and Hawthorne Drive	46
Eastside Marketplace	33
Friendship Square	33
Moscow Senior High School at S Adams Street	29

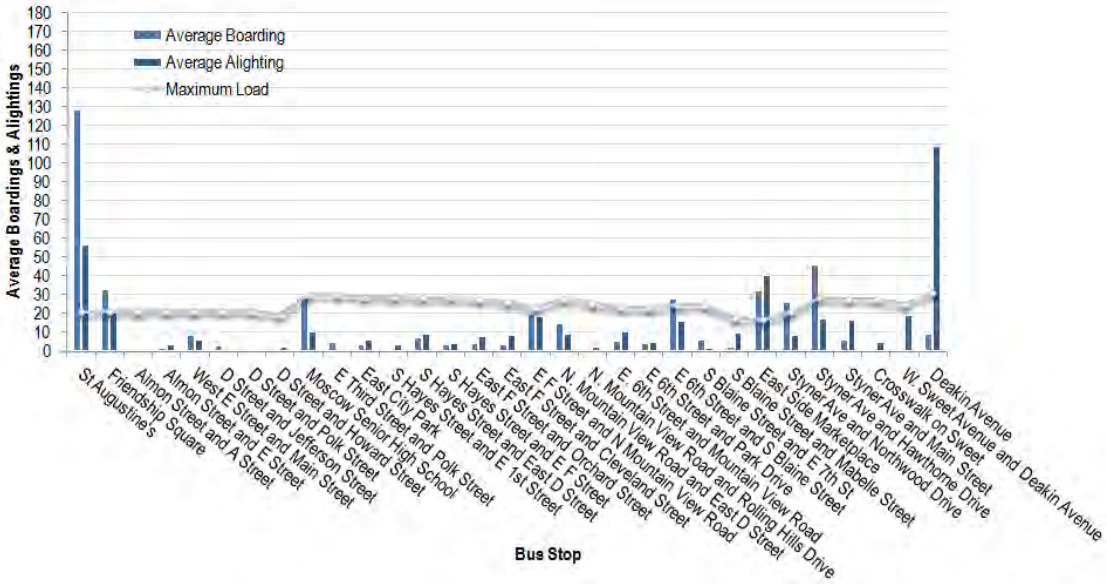
West Route	Average Daily Boardings
St. Augustine's south of W 6th Street	66
Living Learning Community at Line Street	55
Winco/Palouse Mall on Farm Road	44
W A Street and Baker Street	30
Main Street and E Street (Disability Action Center)	25

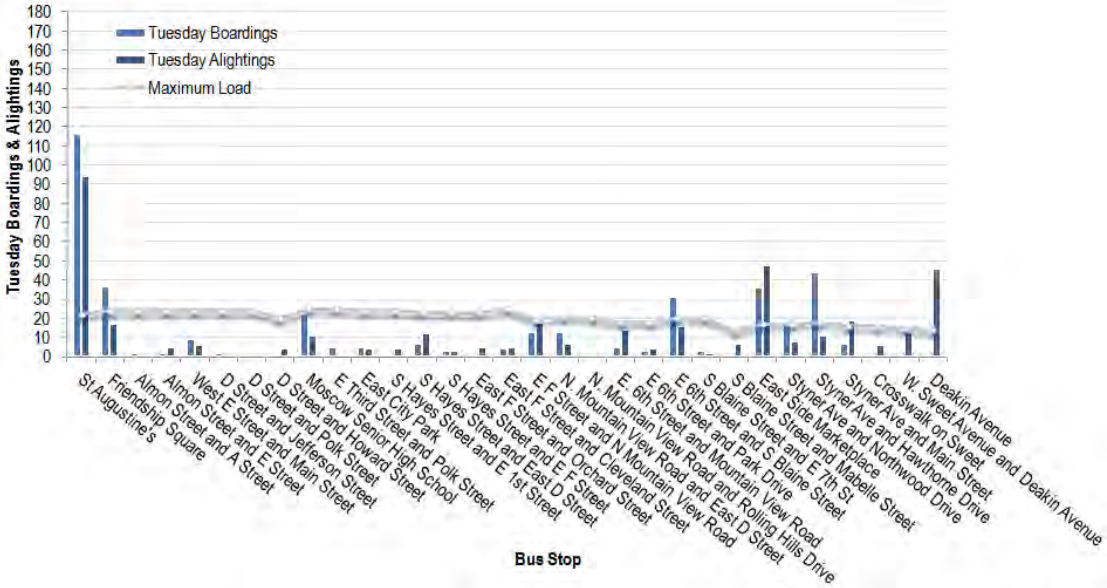
Figures 3 and 4 illustrate boardings and alightings by stop. Each chart series demonstrate both an average total passenger activity by stop and passenger activity disaggregated by each survey day. Passenger load by stop is also included on these charts. On the East Route, a large number of passengers board and alight at St. Augustine's and Friendship Square. Additional high activity stops are located at Moscow Junior and Senior High Schools. Passenger loads dip prior to the Eastside Marketplace signaling a large number of home-bound passengers alight along Mountain View Road and Blaine Avenue. Conversely passenger loads tend to gradually increase and hit maximum load along the stretch of stops that serve students and faculty seeking to access the University and commercial along Pullman Road. The West Route exhibits less variation in passenger load than the East Route. Loading is greatest at the beginning of the loop as many West Route passengers board the bus at University campus stops. Passengers board and alight fairly evenly throughout the day at major destinations along West A Street and downtown. The bulk of the passengers alight in downtown Moscow and along the route's return leg to campus, which is represented in the route's gradual decrease in passenger load on the back end of the loop. Boarding and alighting activity is nearly 20% greater on Wednesday on the East Route and over 10% greater on Tuesday on the West Route.

Boardings and Passenger Load by Time of Day

Figures 4 and 5 display boardings and maximum passenger load by time of day (or run). Generally, the East Route exhibits stronger morning and afternoon peak demand, whereas the West Route experiences consistent demand throughout the day with relatively stronger demand in the afternoon and evening than the morning runs. For the East Route, the 7:40 AM and 8:40 AM runs see the greatest morning boardings and the 3:10 PM time period experiences the largest afternoon boardings. Boardings on the West Route are generally stable throughout the day and start to pick up around 2:10 PM. For both routes, peaks in boarding activity correspond with peaks in on-board passenger load.

Figure 3 East Route – Average, Tuesday & Wednesday Boarding, Alighting, and Max Load by Stop





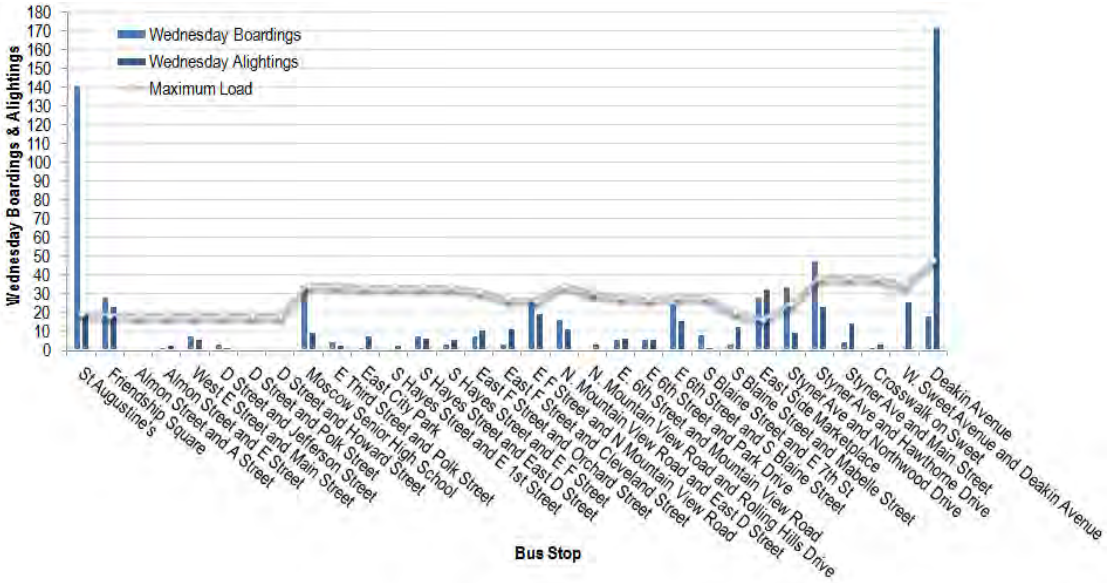


Figure 4 West Route – Average, Tuesday & Wednesday Boardings, Alightings, and Max Load by Stop

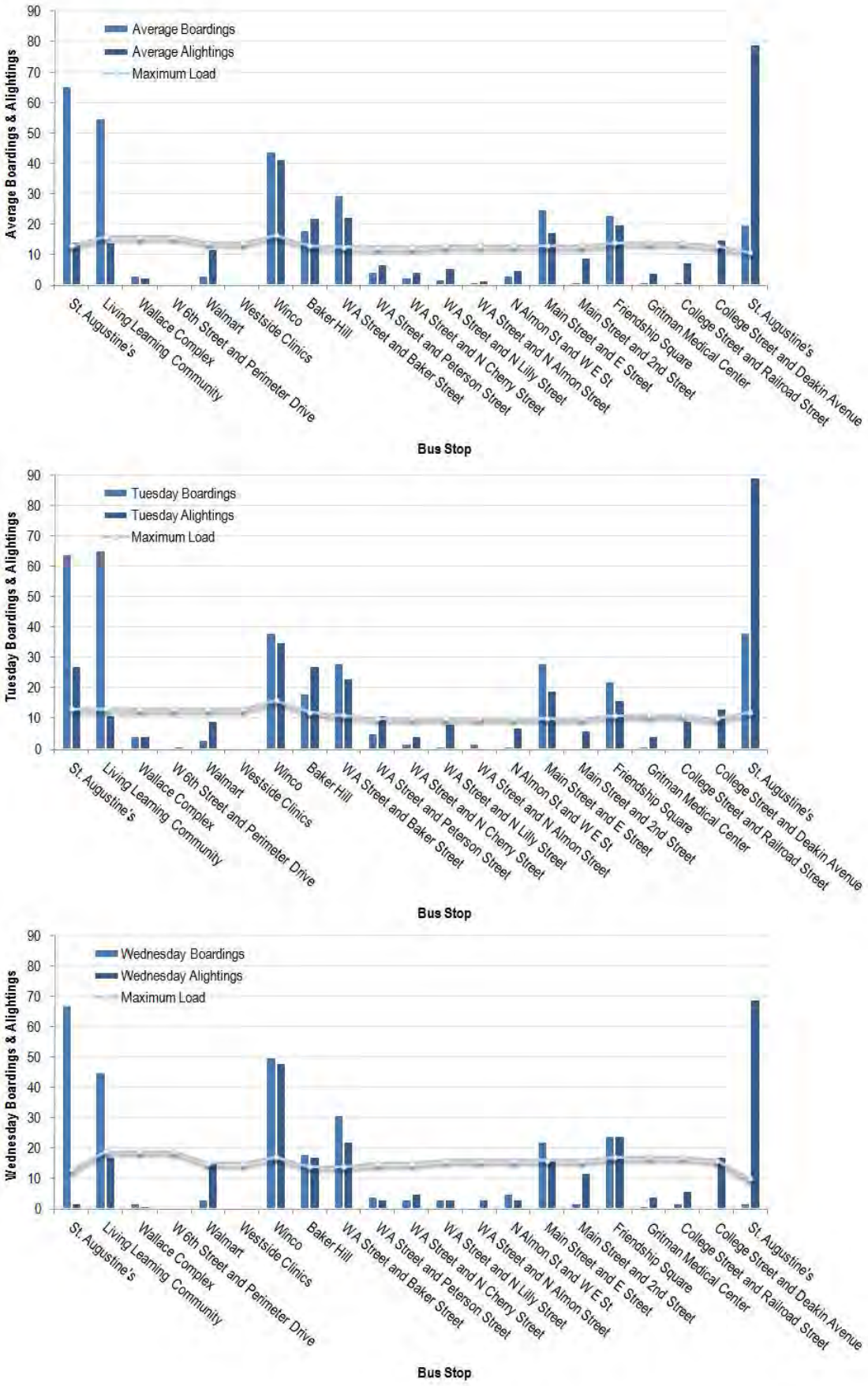


Figure 5 East Route – Average, Tuesday, & Wednesday Boarding and Max Load by Time of Day

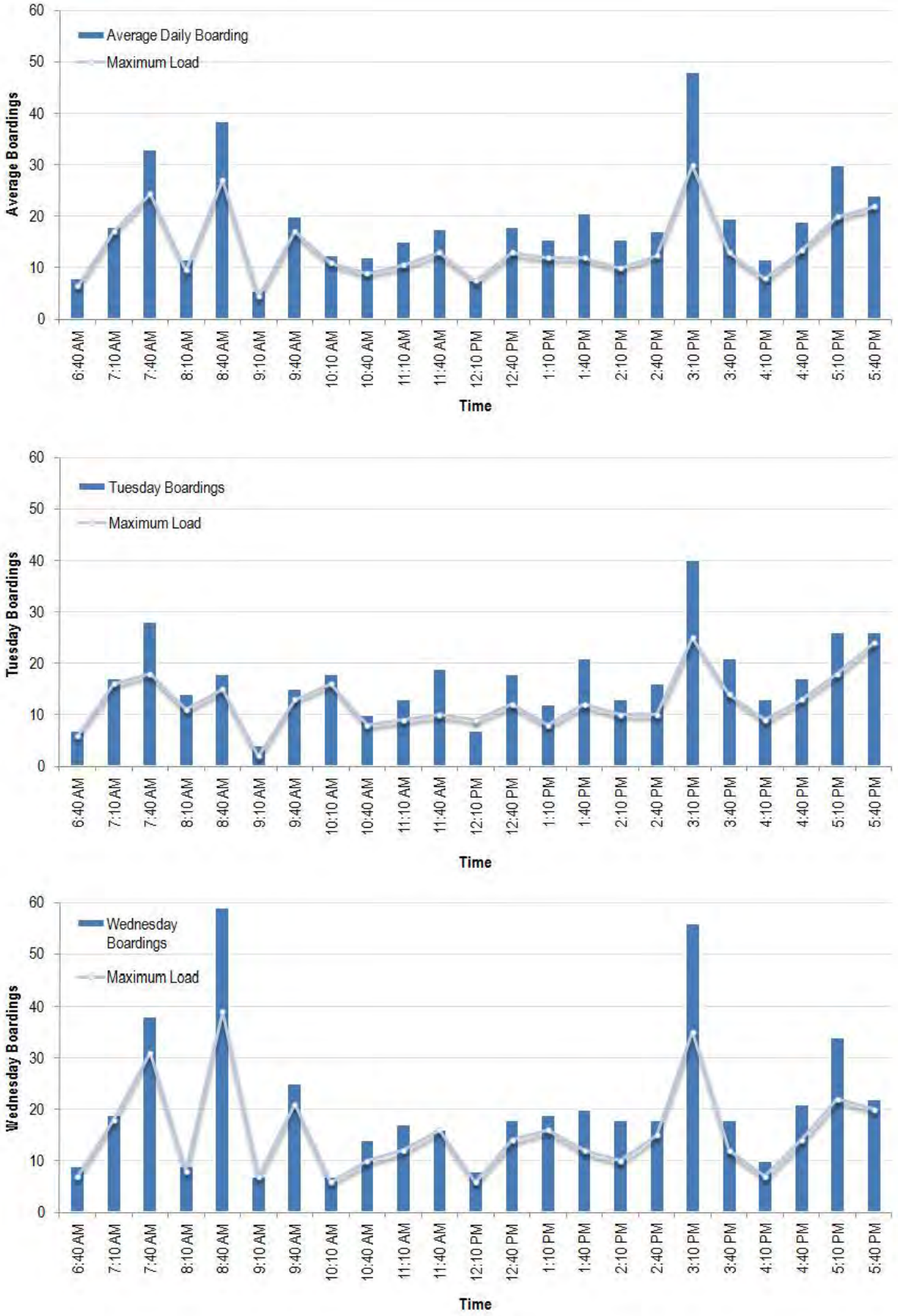
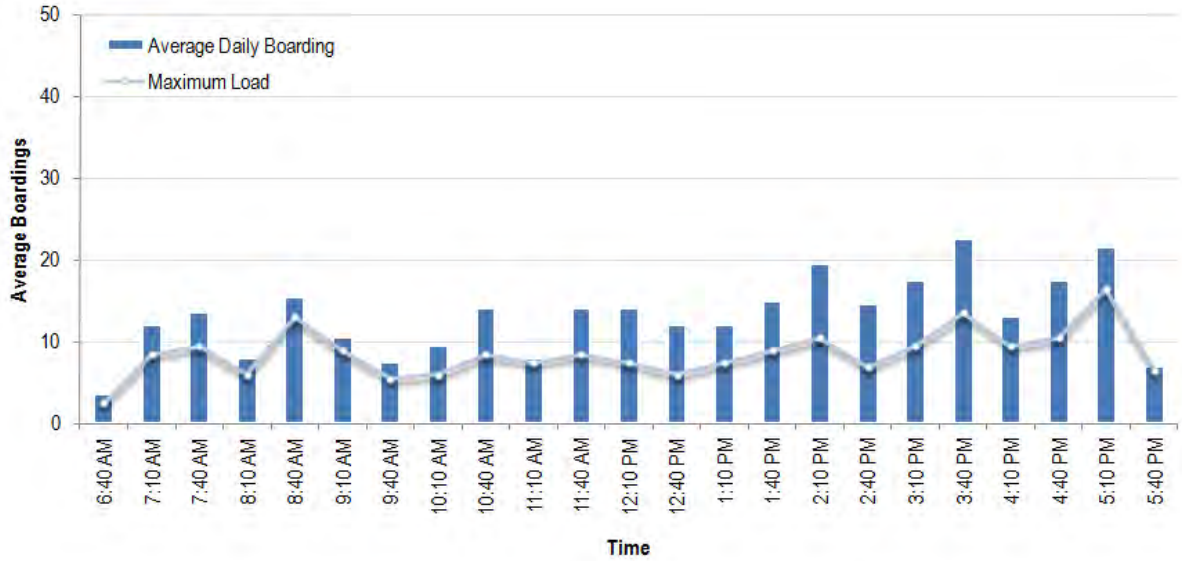
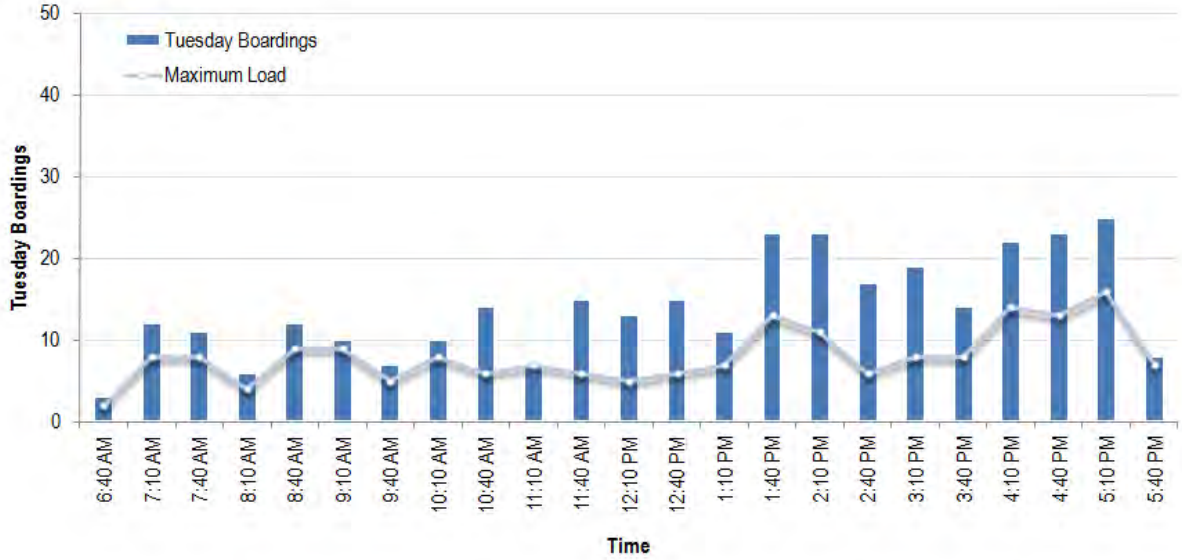
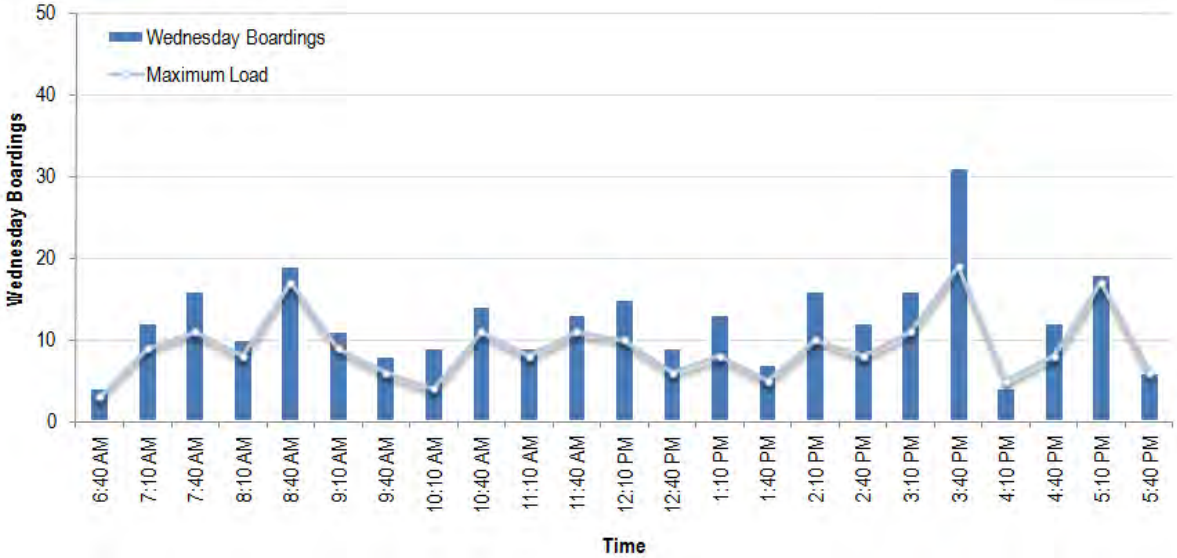


Figure 6 West Route – Average, Tuesday & Wednesday Boarding and Max Load by Time of Day







On-time Performance

During the on-board ridecheck, each run was timed to test schedule adherence. The results of the timepoint analysis are displayed in Figures 7 through 10, which demonstrates the difference between the scheduled run time (20 minute frequency) and the actual run time the bus left a timed stop over the span of service. If no passengers signaled to get off the bus or if no individuals were waiting for pick up, the time was recorded was based on when the bus passed by the timed stop. A bus can become behind or ahead of schedule for a number of reasons, including heavy ridership, traffic congestion, and using the lift to pick up people with personal mobility devices, strollers, or other personal belongings.

The East Route experiences greater difficulty remaining on-time and has more prominent fluctuations over and under the scheduled stop time than the West Route (up to 7 minutes behind and 5 minutes ahead of schedule, respectively). Performance for both routes varies day-to-day. On the Tuesday ridecheck, the East Route was behind schedule during most of the AM runs and ahead of schedule the second half of the day. On the second day (Wednesday), the East Route spent most of the day behind schedule likely due to the higher boarding levels on that day. The West Route spent most of both days oscillating between being ahead of and behind schedule, and by the afternoon was by and large behind schedule. The West Route's most significant periods of delay occurs in the morning and late afternoon (during the 8:40 AM and 11:40 AM runs. respectively). The farthest the West Route was behind schedule was 5 minutes.

Overall, both East and West routes adhere to the schedule at most timepoints throughout the day—depending on the time-of-day. The East Route averages 20 minute runs throughout the day on Tuesday and 22 minute runs on Wednesday. Similarly, the West Route averages 20 minute runs throughout the day on both Tuesday and Wednesday.

Figure 7 East Route Scheduled vs. Actual Run Time –Tuesday April 3rd, 2012

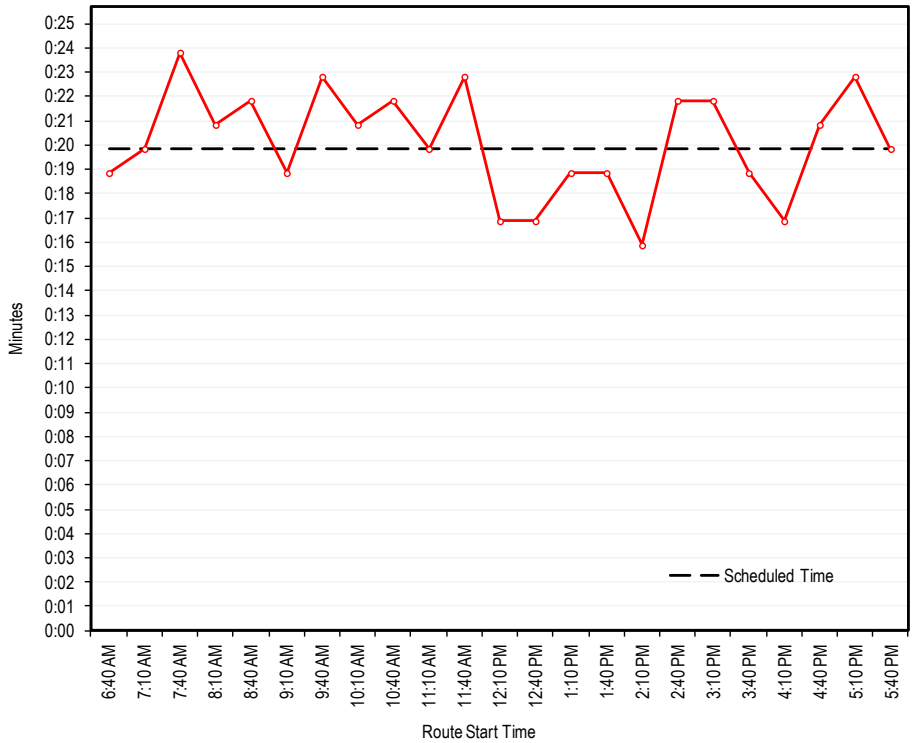


Figure 8 East Route Scheduled vs. Actual Run Time – Wednesday April 4th, 2012

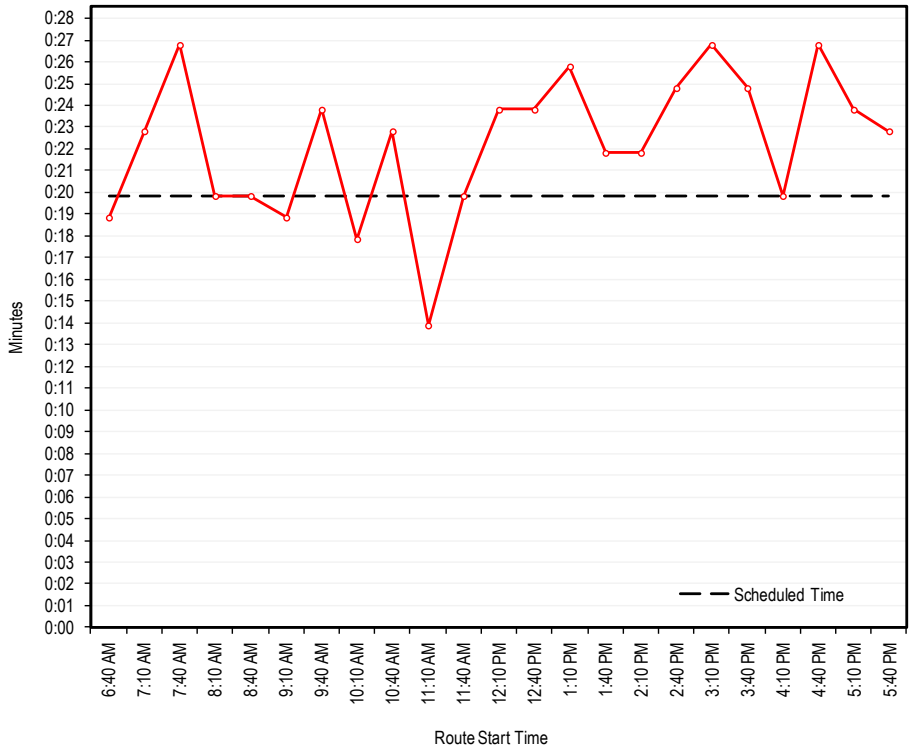


Figure 9 West Route Scheduled vs. Actual Run Time –Tuesday April 3rd, 2012

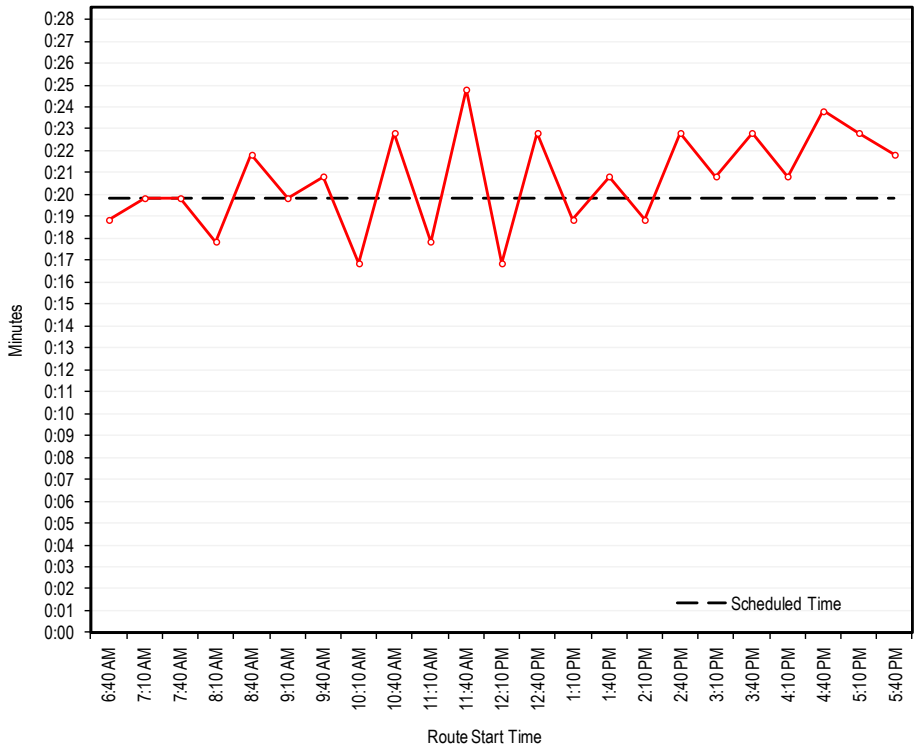
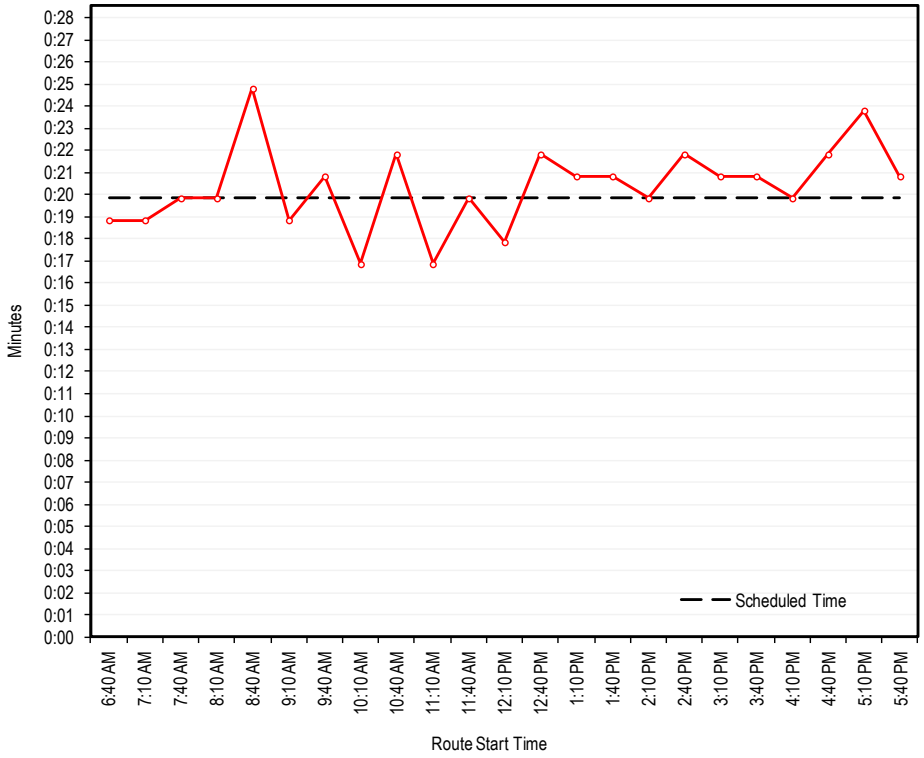


Figure 10 West Route Scheduled vs. Actual Run Time – Wednesday April 4th, 2012



3 ON-BOARD PASSENGER SURVEY

An on-board survey is the best way to obtain information about existing riders and their travel choices. The passenger survey asked detailed questions about how each passenger completes his or her trip and opinions on the existing services. The survey also collected information on riders' personal characteristics, such as age, income, employment status.

Methodology

Surveyors administered surveys to passengers on Moscow Valley Transit's East and West Routes from April 3rd, 2012 through April 6th, 2012. Surveys asked respondents to provide information about their *one-way* trip, and were asked to only fill out a survey once. Questions ranged from asking passengers about the basics of their particular trip (origin, destination, mode of access) to asking their opinion about the quality of transit service and which service improvements would encourage them to ride transit more frequently. Demographic information was also asked and a summary of these data follow below.

Weather plays a role in total ridership and the type of rider willing to use transit on a given day. Moscow experienced a short period of snow on one of the four days the passenger survey was performed. Despite this weather blip, 294 completed surveys were returned to the City of Moscow—representing a response rate of 60% of total riders over the four-day survey period. This is unusually high for a transit passenger survey, which is a testament of how valuable transit is to the community. It should also be noted that passengers were offered the opportunity to complete a web survey or finish the paper version at home and mail it in if they were unable to complete their survey on board. Passengers were handed a survey card with a weblink to the online version of the survey as well as a self-addressed envelope with pre-paid postage. All questions in the web survey were identical to those used in the physical survey instrument. Only three surveys were completed online and 15 surveys were returned via mail (accounting for 1% and 5% of total responses, respectively). Appendix B displays the survey instrument used for the on-board passenger survey.

Key Findings

High customer satisfaction. Existing passengers on Moscow Valley Transit are highly satisfied with the service overall – about 95% said the overall service quality was either "good" or "very good." This is very high for a system of this size.

Access to the bus is important. Overall, walking played a very important role in all trips made on the bus. The large majority of passengers reach the bus stop and their final destination by walking. While every trip begins and ends by walking, the average time people spent walking to and from the bus stop averaged about 5 minutes. This is suggests that pedestrian safety improvements and sidewalk provision are key opportunities to enhance the transit experience.

Transit is primarily used for school trips. Roughly 40% of all trips began at home and ended at a local school or the University of Idaho. The bus is therefore an integral part of how students and faculty

access education and jobs. Roughly one-tenth of riders use transit for shopping trips, signaling that transit is important for completing daily errands.

High proportion of regular users. About 86% of all passengers use Moscow Valley Transit two or more days per week, and 47% use the bus at least five days per week. Likewise, almost 60% of existing passengers (60%) have ridden Moscow Valley Transit for more than one year.

Relatively low level of transit dependence, but relatively high ridership. Only 7% of passengers said that they would not have made this trip if the bus were not available. Because Moscow is relatively small and walkable (in terms of distances), walking is the preferred alternative to transit as 70% of passengers said they would just walk if the bus were not available. Only 19% said that they would have someone drive them.

Reestablish transit connection between Pullman and Moscow. When existing passengers were asked where they would like to see Moscow Valley Transit go that it doesn't currently go, 33% said that offering service to Pullman was needed. Another 12% would like service between Lewiston and Moscow.

Weekend service. When asked to provide specific and general comments, over half of respondents (59%) said that Saturday service and 34% that Sunday service would encourage them to ride the bus more often. Over half (52%) would pay for weekend service.

Later service is a need. Likewise, 59% of existing passengers said that expanded service later into the night would encourage them to ride the bus more often. 60% of those needing later transit service would like service to extend anywhere between 7:00 PM and 8:00 PM

Route Respondent Demographics

This section presents relevant demographic data from survey respondents on both the East and West Routes. The following figures provide an overview of respondents' (riders') age, household income, and employment status.

Age

As shown in Figure 11, most riders are between the ages of 18 and 64. Almost half are between 25 and 64, and 44% are between 18 and 24. Students under age 18 make up 4% of riders. Another 4% of riders are age 65 and above.

Income

Figure 12 shows that a majority of Moscow Valley Transit riders are low-income residents mostly stemming from the large number of college students without an income source that use the system. A little over half of respondents (51%) reported a yearly income of less than $15,000. Respondents reporting $15,000 to $34,999 make up another 21%.

Figure 11 Respondent Age

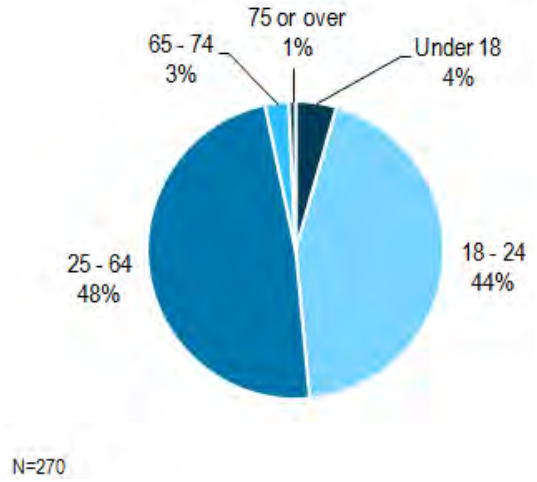
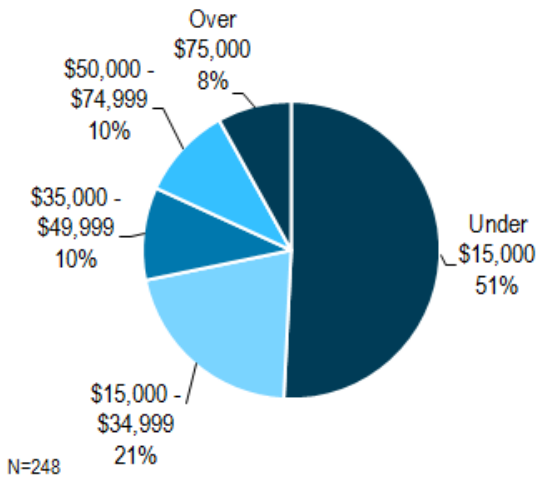


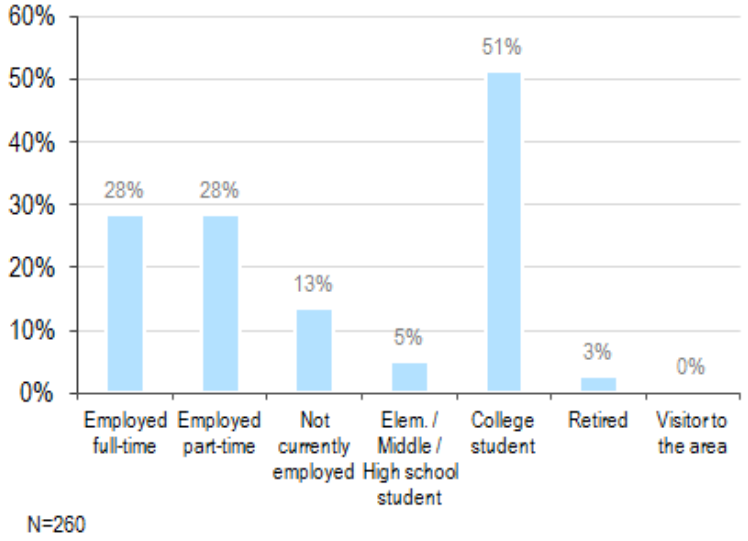
Figure 12 Respondent Household Income Level



Employment Status

Figure 13 summarizes the employment and educational status or survey respondents. Over half of survey respondents are college students. Equal numbers of respondents are employed full-time and part-time (28% each). Over half of the riders who are employed full-time are University of Idaho employees. Five percent of the respondents are elementary, middle, or high school students. Thirteen percent of survey respondents are not currently employed, primarily due to the large contingent of full-time college students.

Figure 13 Respondent Employment Status

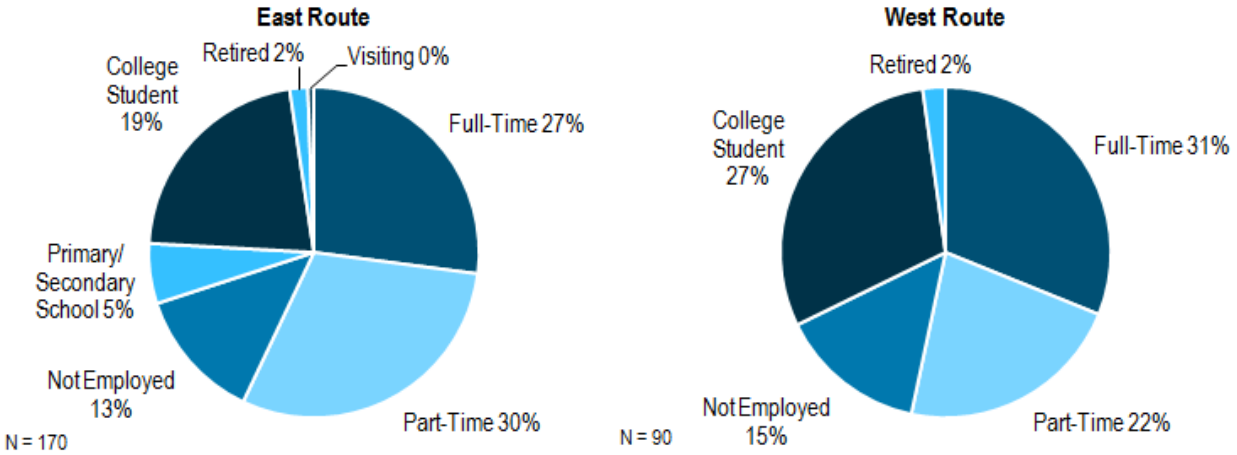


Note: Because respondents were asked select all that apply, responses do not add up to 100%. For example, some students also work part or even full time jobs. However, it is reasonable to deduce that half of passengers are college students.

Employment Status by Route

As illustrated in Figure 14, the East Route and West Route serve slightly different markets. Since the East Route runs through the areas of Moscow with elementary, junior high, and high schools, this route provides service for these younger populations. The East Route also provides more service to employees than the West Route. The West Route serves a larger proportion of college students than the East Route.

Figure 14 Respondent Employment Status by Route



Route Ridership Characteristics

Route Choice

The majority of Moscow Valley Transit system users ride the East Route (see Figure 15). Two-thirds of passenger survey rode the East Route and one-third rode the West Route. As shown in Figure 16, over three-quarters of respondents were had a direct, one seat ride using (i.e., their trip did not involve a transfer). Five percent were transferring to the Vandal Access Shuttle for campus circulation on the University of Idaho campus and 17% were transferring to another Moscow Valley Transit route.

Figure 15 Share of Passengers by Route

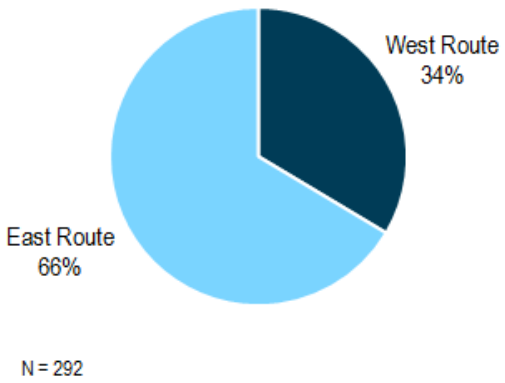


Figure 16 Transfer Activity

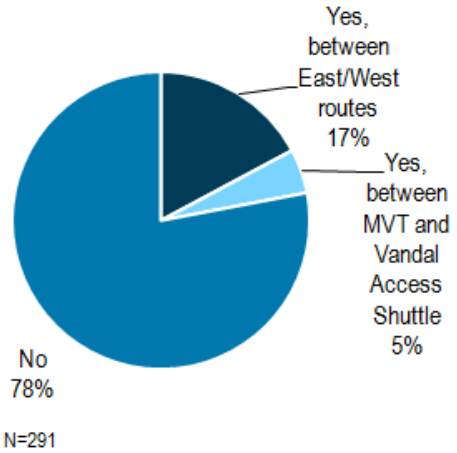
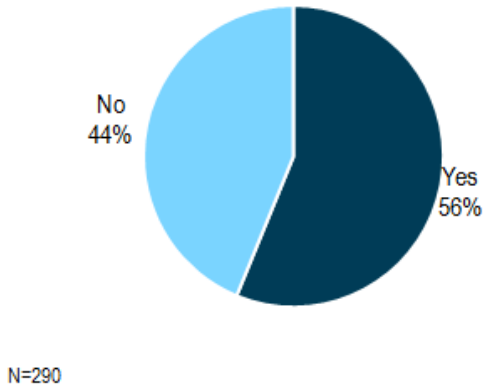


Figure 17 Rate of Round Trips

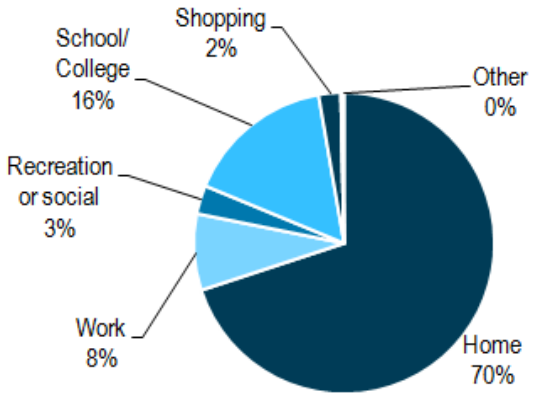


A little over half of survey respondents (56%) reported making a round trip by bus (see Figure 17 to the left). This rate is relatively low for transit riders and may be explained by Moscow Valley Transit's loop route structure and city's small geographic size. A system comprised of two one directional loops coupled with walkable distances, riders may take the bus in one direction and choose walk or bike back to their trip origin. Additionally, since distances in Moscow are relatively short, residents may choose another mode for the trip to their destination or the return trip.

Trip Purpose

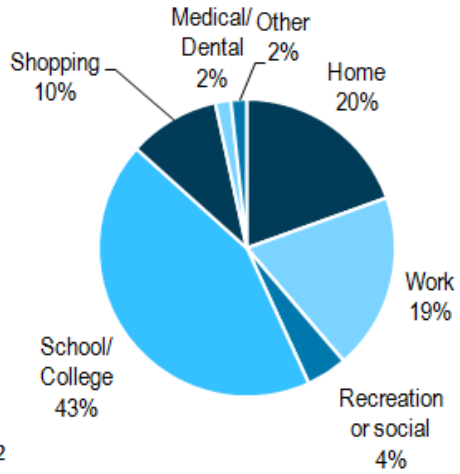
Figure 18 and Figure 19 identifies the most common trip origins and destinations for transit passengers. The most common trip origin from where respondents' started their trip is at home. Other common trip origins include school/college (16%) and work (8%). School or college is the most common trip destination, with 43% of respondents reporting their trip will end at a school or college. About the same numbers of respondents took the bus to work and home, at 20% each. Shopping is also an important destination, with 10% of respondents reporting this destination. Fewer respondents use transit for recreation or social purposes.

Figure 18 Respondents' Trip Origin



N=293

Figure 19 Respondents' Trip Destination



N=292

Mode of Access To/From the Bus

Determining the mode of access to and from the bus stop, as illustrated in Figure 20 and Figure 21, is important because it is one indication of how well the bus routes are penetrating the service area. In general, transit systems that seek to expand service coverage to a large segment of the population should strive to be more accessible by walking than any other mode of transportation, although some MVT buses are equipped with bike racks.

The vast majority of respondents (95%) reported that they walked to the bus stop. A small number drove alone and parked (3%) or were dropped off by car (1%), and 1% biked to reach the bus.

Transportation modes used to reach passengers' trip destination from the bus are very similar to modes used to access the bus. Almost all respondents said they walked to their trip destination (93%). Two percent bicycled, 1% drove alone, and 3% were dropped off by car.

It takes most people (94%) who walk to the bus less than 10 minutes to reach the stop (as displayed in Figure 22). Over half of pedestrians (57%) walked for less than five minutes. Only 1% of respondents reported walking more than 20 minutes to each the bus.

Of the few respondents who reported bicycling to the bus stop, the majority (67%) cycled for ½ mile or less. Half of the respondents who bicycle from the bus to their destination said they cycle ½ mile or less and half said they cycle between ½ and 1 mile. Some passengers may be using their bicycle to circulate throughout the University of Idaho campus between classes. This may explain the high percentage of passengers using the bicycle to bridge a relatively short connection (½ mile or less) to their final destination.

Figure 20 Mode of Access to the Bus

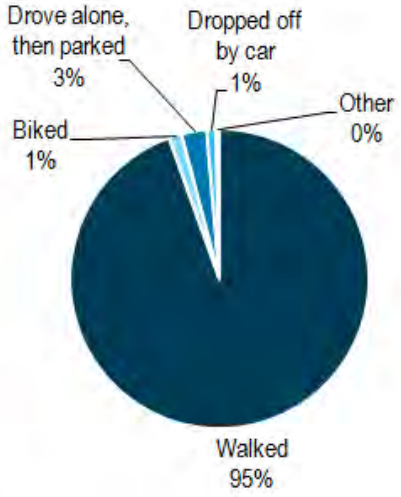


Figure 21 Mode of Access to Destination

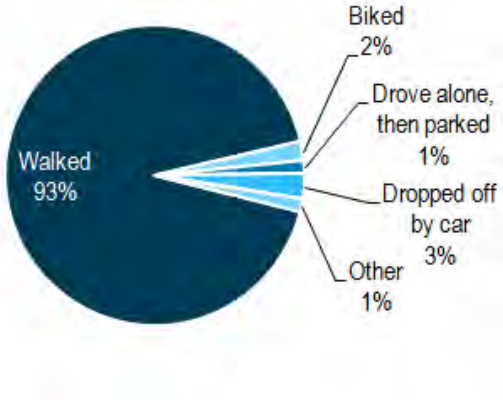
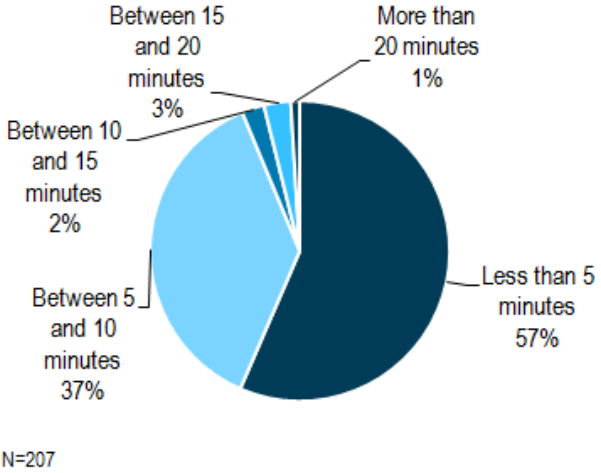


Figure 22 Time to Walk to the Bus



Transit Use Characteristics

According to Figure 23, roughly four out of five respondents are considered frequent transit users. Almost half of respondents ride Moscow Valley Transit 5 or more days per week and nearly 40% ride 2–4 days per week. Only 6% ride once per week, 5% ride 1—4 days per month, and 2% ride less than 1 day per month. Respondents use the East Route service more often than the West Route; 51% of East Route riders use the service 5 or more days per week compared to 39% of West Route riders. More respondents use the West Route 2—4 days per week (44%) than the East Route (35%). These results indicate that a large majority of MVT riders depend on this service for daily travel, especially for those using the East Route.

In terms of longevity (summarized in Figure 24), almost 40% of respondents said they have been riding MVT for less than 1 year, 24% have been riding for 1—2 years, and 36% have been riding for more than 2 years. These findings reveal that a large portion of riders on MVT routes are somewhat new to the service. These results may correlate to the use of the service by college students, who may be relatively new to the area or may be using the service concurrent with their studies.

Figure 23 How Often Respondents Ride MVT

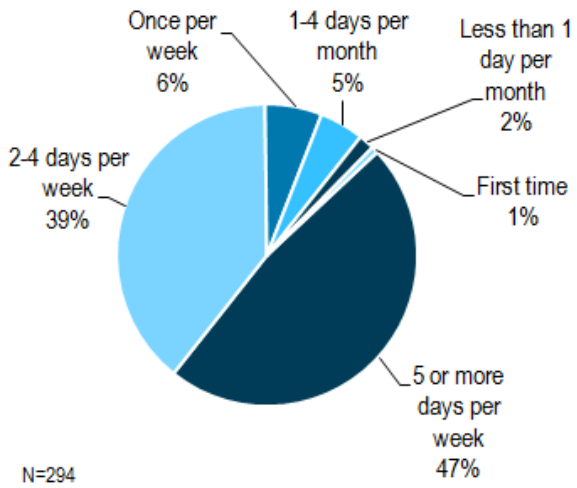
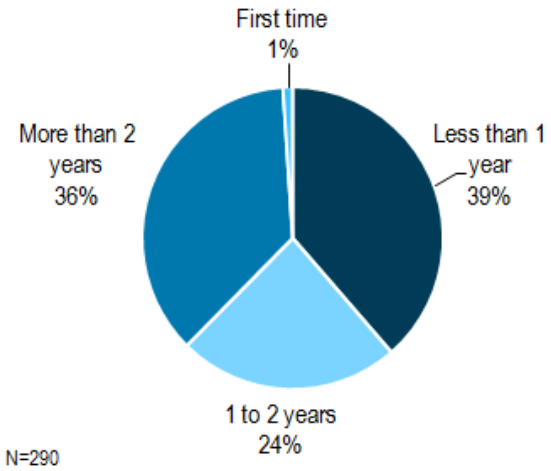


Figure 24 How Long Respondents Have Been Riding MVT

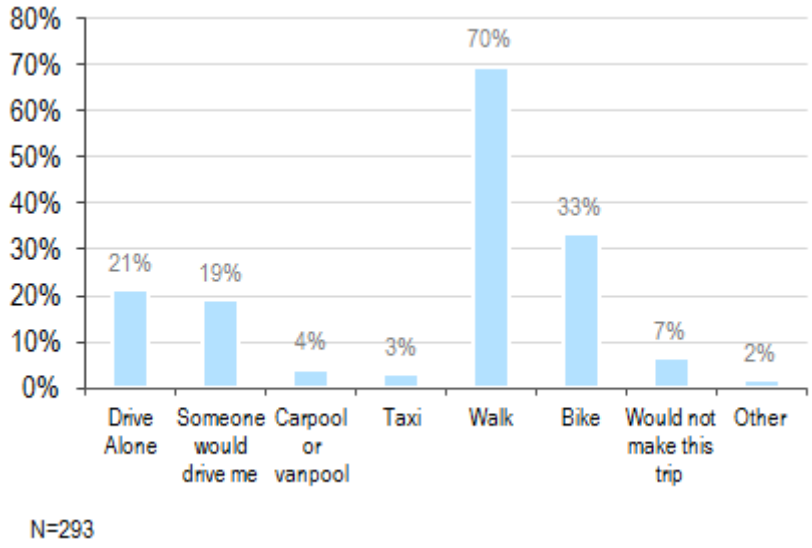


Transit Dependency

Respondents were asked the types of ways they would make their current trip if bus service was not available. The results of this question are summarized in Figure 25. By far the most common response, 70% of respondents replied that they would walk to their destination if they couldn't take the bus. Another 33% answered that they would bicycle, 21% would drive alone, and 19% said someone would drive them. Bicycling as an alternative was higher among East Route bus riders than West Route bus riders, 35% compared to 26%. Nearly one-quarter of East Route bus riders would drive alone if bus service was not available, compared to 18% of West Route bus riders. The high share of people that would walk if transit were not available helps confirm that trips in Moscow are generally short and distances between major activity centers within Moscow (such as Downtown, Palouse Mall, and the University) are generally walkable.

Seven percent of respondents replied that they would forgo the trip completely if bus service was not available. Respondents using the West Route service were more likely to report that they would do without making the trip than East Route riders, 11% compared to 4%.

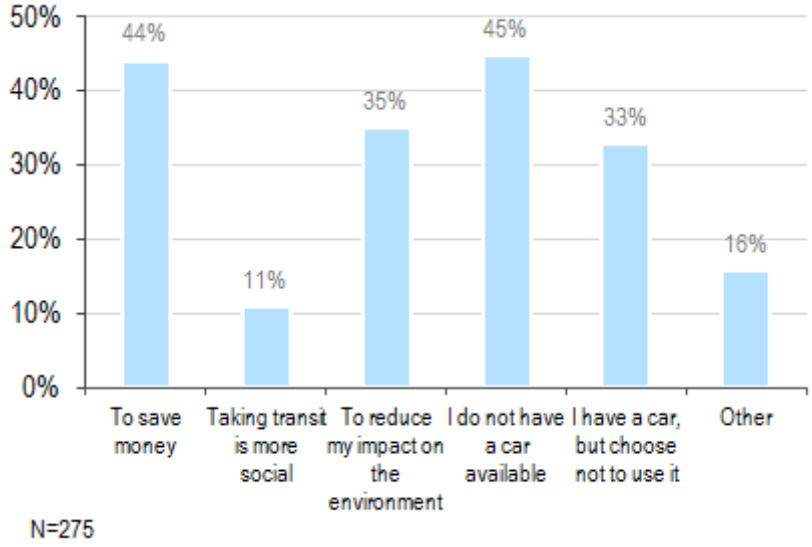
Figure 25 How Respondents Would Make the Trip without Bus Service



Note: Percentages do not add up to 100 because respondents could choose more than one answer.

The two most commonly cited reasons why people use transit (shown in Figure 26 below) are to save money and lack of access to a car, both of which were selected by nearly half (44-45%) of riders. Over one-third of passengers ride transit to reduce their impact on the environment and because they choose not to use their car.

Figure 26 Why Respondents Ride the Bus



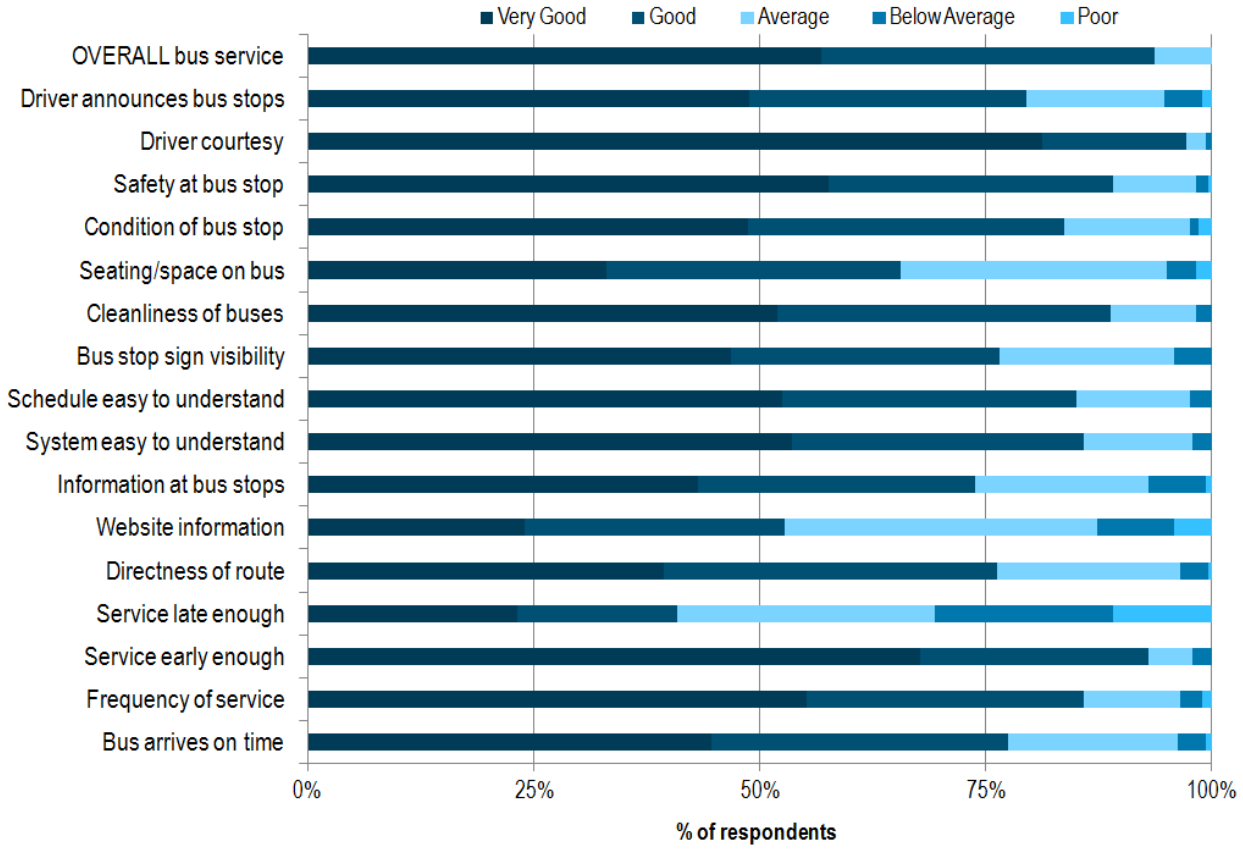
Note: Percentages do not add up to 100 because respondents could choose more than one answer.

Passenger Satisfaction

Overall, Moscow Valley Transit riders are very satisfied with Moscow Valley Transit's fixed route service; Figure 27 shows that nearly 95% of respondents rated overall bus service as good or very good. Aspects of Moscow Valley Transit service with high good or very good ratings include driver courtesy (97%), service early enough (92%), safety at bus stops (89%), and cleanliness of buses (89%). Areas with generally favorable ratings include frequency of service (86%), system easy to understand (86%), and schedule easy to understand (86%).

Still, there are some areas of Moscow Valley Transit service that passenger see needed improvements. Nearly one-third of respondents rated service duration during the day as below average or poor, and 13% rated website information as below average or poor. Seating and space on the bus, directness of route, information at bus stops, bus stop sign visibility, bus stop announcements from drivers, and on-time performance are areas respondents indicated could be improved.

Figure 27 Moscow Valley Transit Service Ratings

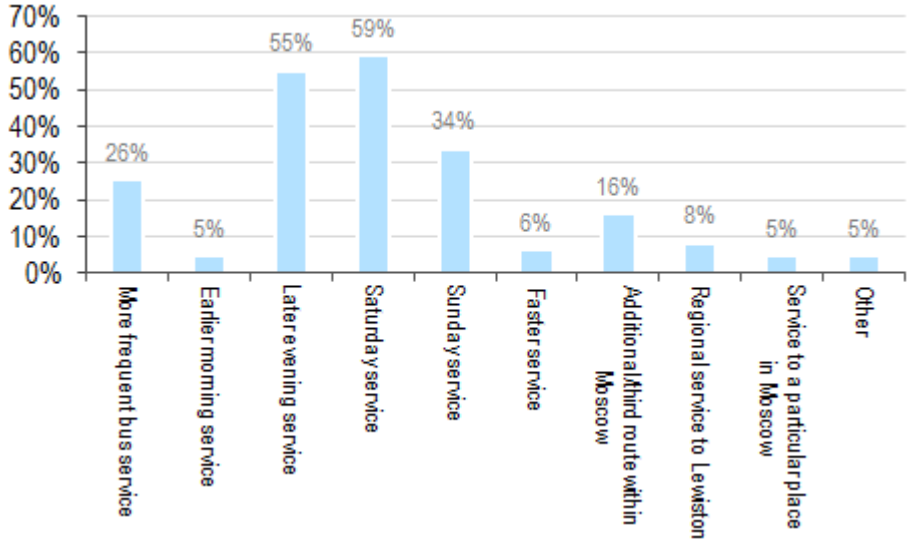


Preferred Service Improvements

Corresponding to the respondent attitudes about transit service quality above, Figure 28 below summarizes the improvements that are key priorities for passengers. Saturday service and later evening service were the changes to Moscow Valley Transit that most people reported would encourage them to ride transit more often, with 59% and 55% of passengers requesting these changes respectively. One-third of respondents reported they would ride more often if Sunday service were available and 26% would like more frequent bus service.

When asked to choose the one most important change, 37% identified *later evening service* as the most important improvement and 28% chose *Saturday service*. About 16% of respondents would ride more often if an additional route within Moscow was provided. By far, the most commonly cited additional location respondents would like Moscow Valley Transit to serve was Pullman.

Figure 28 What Improvements Would Encourage Respondents to Ride Transit More Often



Note: Percentages do not add up to 100 because respondents could choose more than one answer.

When asked if the lack of weekend service limits their mobility (see Figure 29), 52% of survey respondents answered "Yes," while 39% answered "No." The same number of respondents who experience limited weekend mobility were willing to pay a fare for weekend service, while only 28% were not willing to pay for this extended service (see Figure 30). These findings indicate that Moscow Valley Transit riders are interested in weekend service and may be willing to pay for the increase in their mobility.

Figure 29 Lack of Weekend Service Limits Respondents' Mobility

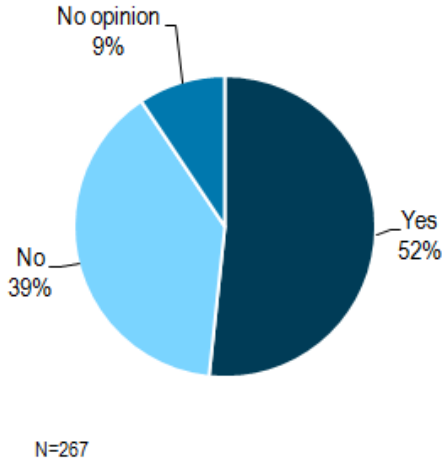
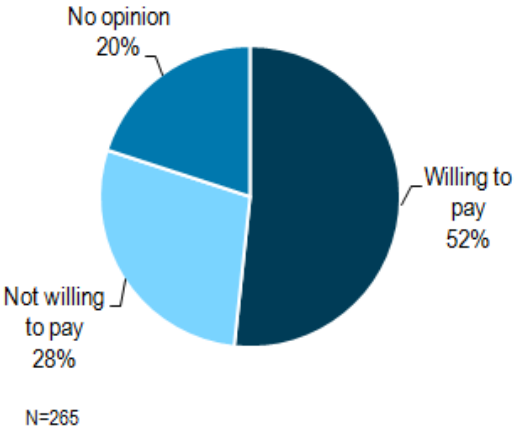


Figure 30 Willingness to Pay Fares for Weekend Service



Summary of comments

The survey asked respondents to provide suggestions for improving service or general comments, which are categorized in Figure 31. The most noted comment by respondents related to general praise for the service, requests to continue service, and praise for driver courtesy. The most frequently cited suggestions included expanding service later into the night and establishing weekend service.

Figure 31 Summary of Respondent Suggestions/Comments

Comment Category	Count	Percent
General praise/Request to continue service/Courteous drivers	55	29%
Needs later service	17	9%
Needs weekend service	17	9%
Willingness to pay for more service	6	3%
Discontent with driver behavior (e.g., speeding, misses stop, etc.)	5	3%
Needs better rider/system information	5	3%
Schedule needs adjustment to meet class schedules	5	3%
Service to WSU/Pullman	4	2%
More frequent service	3	2%
Buses get crowded	3	2%
Request for half hourly service to Rosauers	3	2%
Not willing to pay for transit	2	1%
Buses need to be cleaned	2	1%
Unsavory passenger behavior (e.g., drunk passengers, foul language, etc.)	2	1%
Switch back to the old schedule	2	1%
Discontent with SUB layover	2	1%
More seating	1	1%
Service to Lewiston	1	1%
Unhappy with travel speed	1	1%
Additional route(s) needed	1	1%
Request to move a stop	1	1%
Need for sidewalks to transit	1	1%
Switch direction of routes	1	1%
Needs newer buses	1	1%
Less stops	1	1%
Total	**142**	**100%**

APPENDIX A

Ridecheck Summary

Figure 32 East Route Ridecheck Summary – April 3rd, 2012

STOP ID	TIME POINT ID	STREET	CROSS STREET (DESTINATION)	TOTAL OFFS	TOTAL ONS	MAX LOAD
1	T	Deakin Ave.	Before W 6th St (St Augustine's)	94	116	22
2	1	W 6th St.	S Main St (Friendship Square)	17	37	24
3		Almon St.	A Street	0	2	24
4		Almon St.	E Alt	5	2	24
5	2	West E Street	Main Alt	6	9	24
6		D Street	Jefferson	1	2	24
7		D Street	Polk St	0	0	24
8		D Street	Howard	4	1	20
9		E Third St.	S Adams St (Moscow Senior High School)	11	22	25
10		E Third St.	Polk St	0	5	25
11		E Third St.	S Lincoln St (East City Park)	4	5	24
12		S Hayes St.	E First St.	4	1	24
13		S Hayes St.	East D St.	12	7	23
14		S Hayes St.	East F St.	3	3	23
15		East F St.	Orchard St.	5	1	23
16		East F St.	Cleveland St.	5	4	25
17	3	E F St.	N. Mountain View Rd.	18	13	19
18		N. Mountain View Rd.	East D St. (Skateboard Park)	7	13	21
19		N. Mountain View Rd.	Dogwood Ct./Rolling Hills Drive (Rolling Hills)	1	1	20
20		E. 6th St.	Mountain View Rd.	14	5	18
21		E 6th St.	Park Drive	4	3	18
22	4	E 6th St.	S Blaine St.	16	31	20
23		S Blaine St.	E 7th St.	2	3	20
24		S Blaine St.	Mabelle St.	7	1	17
25	5	S Blaine St.	Johnson St. (East Side Marketplace)	48	36	17
26	6	Styner Ave.	Northwood Dr.	8	18	18

STOP ID	TIME POINT ID	STREET	CROSS STREET (DESTINATION)	TOTAL OFFS	TOTAL ONS	MAX LOAD
27		Styner Ave.	Hawthorne Dr.	11	44	16
28		Styner Ave	Highway 95/Main St	19	7	16
29		Crosswalk on Sweet		6	1	15
30		W. Sweet Ave.	Deakin	13	0	14
31	T	Deakin Ave.	University	46	0	14
TOTAL				**391**	**393**	**25**

Figure 33 East Route Ridecheck Summary – April 4th, 2012

STOP ID	TIME POINT ID	STREET	CROSS STREET (DESTINATION)	TOTAL OFFS	TOTAL ONS	MAX LOAD
1	T	Deakin Ave.	Before W 6th St (St Augustine's)	20	141	20
2	1	W 6th St.	S Main St (Friendship Square)	24	29	19
3		Almon St.	A Street	1	0	19
4		Almon St.	E Alt	3	2	19
5	2	West E Street	Main Alt	6	8	19
6		D Street	Jefferson	2	4	19
7		D Street	Polk St	0	0	19
8		D Street	Howard	1	0	19
9		E Third St.	S Adams St (Moscow Senior High School)	10	35	35
10		E Third St.	Polk St	3	5	35
11		E Third St.	S Lincoln St (East City Park)	8	2	34
12		S Hayes St.	E First St.	3	1	34
13		S Hayes St.	East D St.	7	8	34
14		S Hayes St.	East F St.	6	4	34
15		East F St.	Orchard St.	11	8	32
16		East F St.	Cleveland St.	12	4	28
17	3	E F St.	N. Mountain View Rd.	20	27	27
18		N. Mountain View Rd.	East D St. (Skateboard Park)	12	17	35

STOP ID	TIME POINT ID	STREET	CROSS STREET (DESTINATION)	TOTAL OFFS	TOTAL ONS	MAX LOAD
19		N. Mountain View Rd.	Dogwood Ct./Rolling Hills Drive (Rolling Hills)	4	0	31
20		E. 6th St.	Mountain View Rd.	7	6	29
21		E 6th St.	Park Drive	6	6	28
22	4	E 6th St.	S Blaine St.	16	25	29
23		S Blaine St.	E 7th St.	2	9	29
24		S Blaine St.	Mabelle St.	13	4	17
25	5	S Blaine St.	Johnson St. (East Side Marketplace)	33	29	25
26	6	Styner Ave.	Northwood Dr.	10	34	39
27		Styner Ave.	Hawthorne Dr.	24	48	39
28		Styner Ave	Highway 95/Main St	15	5	39
29		Crosswalk on Sweet		4	2	35
30		W. Sweet Ave.	Deakin	26	0	9
31	T	Deakin Ave.	University	172	19	9
TOTAL				**481**	**482**	**39**

Figure 34 West Route Ridecheck Summary – April 3rd, 2012

STOP ID	TIME POINT ID	STREET	CROSS STREET (DESTINATION)	TOTAL OFFS	TOTAL ONS	MAX LOAD
1	T	Deakin Ave.	Before W 6th St (St. Augustine's)	27	64	13
2		W 6th St.	Line St. (Living Learning Community)	11	65	13
3		W 6th St.	Rayburn St. (Wallace Complex)	4	4	13
4		W 6th St.	Perimeter Drive	1	0	13
5	1	Warbonnet	(Walmart)	9	3	13
6		Warbonnet	(Westside Clinics)	0	0	13
7	2	Farm Rd.	(Winco)	35	38	16
8		W A Street	(Baker Hill)	27	18	12
9		W A Street	West of Baker St	23	28	11
10		W A Street	West of Peterson	11	5	10
11		W A Street	N Cherry St.	4	2	10

STOP ID	TIME POINT ID	STREET	CROSS STREET (DESTINATION)	TOTAL OFFS	TOTAL ONS	MAX LOAD
12		W A Street	N Lilly St.	8	1	10
13		W A Street	N Almon St.	0	2	10
14	3	N Almon St	W E St	7	1	10
15		Main Street	E Street	19	28	10
16		Main Street	2nd Street	6	0	10
17	4	W 6th St.	S Jackson St (Friendship Square)	16	22	11
18	5	Main Street	(Gritman Medical Center)	4	1	11
19		College St.	Railroad St.	9	0	11
20		College St.	Deakin St.	13	0	10
21	T	Deakin Ave.	Before W 6th St (St. Augustine's)	89	38	12
TOTAL				**323**	**320**	**16**

Figure 35 West Route Ridecheck Summary – April 4th, 2012

STOP ID	TIME POINT ID	STREET	CROSS STREET (DESTINATION)	TOTAL OFFS	TOTAL ONS	MAX LOAD
1	T	Deakin Ave.	Before W 6th St (St. Augustine's)	2	67	13
2		W 6th St.	Line St. (Living Learning Community)	17	45	19
3		W 6th St.	Rayburn St. (Wallace Complex)	1	2	19
4		W 6th St.	Perimeter Drive	0	0	19
5	1	Warbonnet	(Walmart)	15	3	15
6		Warbonnet	(Westside Clinics)	0	0	15
7	2	Farm Rd.	(Winco)	48	50	17
8		W A Street	(Baker Hill)	17	18	14
9		W A Street	West of Baker St	22	31	14
10		W A Street	West of Peterson	3	4	15
11		W A Street	N Cherry St.	5	3	15
12		W A Street	N Lilly St.	3	3	16
13		W A Street	N Almon St.	3	0	16

STOP ID	TIME POINT ID	STREET	CROSS STREET (DESTINATION)	TOTAL OFFS	TOTAL ONS	MAX LOAD
14	3	N Almon St	W E St	3	5	16
15		Main Street	E Street	16	22	16
16		Main Street	2nd Street	12	2	16
17	4	W 6th St.	S Jackson St (Friendship Square)	24	24	17
18	5	Main Street	(Gritman Medical Center)	4	1	17
19		College St.	Railroad St.	6	2	17
20		College St.	Deakin St.	17	0	16
21	T	Deakin Ave.	Before W 6th St (St. Augustine's)	69	2	10
TOTAL				**287**	**284**	**19**

APPENDIX B

On-Board Passenger Survey Instrument

Transit Passenger Survey

IMPORTANT: Please tell us about the **ONE-WAY TRIP** you are making **NOW**. The answers are completely confidential. If you have already filled out a survey, please **DO NOT** fill out another one.

1. Which Moscow Valley Transit bus route are you on right now?

☐ 1 West Route ☐ 2 East Route

2. Are you making a ROUND TRIP on the bus today?

☐ 1 Yes ☐ 2 No

3. Did/will you transfer between this bus and any other route on this one-way trip? *If yes, check which Moscow Valley Transit route you will or have transferred to/from.*

☐ 1 Yes, between West/East routes
☐ 2 Yes, between Moscow Valley Transit and Vandal Access Shuttle
☐ 3 No, I will not make a transfer on this trip

4. Where are you coming FROM? *Check one* ✓

☐ 1 Home ☐ 5 Shopping
☐ 2 Work ☐ 6 Medical/Dental
☐ 3 Recreation or social
☐ 4 School/College *(Name of School:* _____)
☐ 7 Other *(Please specify* _____)

5. Specifically, where is the location selected in #4?

Please list nearest intersection (for example: S Main Street & E Sixth Street) - OR - Name the location or landmark (for example: Palouse Mall, University of Idaho, Friendship Square, etc; NOT THE BUS STOP)

_____
(STREET & CROSS STREET or LANDMARK)

6. How did you GET TO the bus stop? *Check one* ✓

☐ 1 Walked *(How many minutes?* _____)
☐ 2 Biked *(How many miles?* _____)
☐ 3 Drove alone then parked *(Parking location?* _____)
☐ 4 Dropped off by car *(Where?* _____)
☐ 6 Used wheelchair or mobility device *(How many minutes?* _____)
☐ 5 Other *(Please specify* _____)

7. Where are you going TO? *Check one* ✓

☐ 1 Home ☐ 5 Shopping
☐ 2 Work ☐ 6 Medical/Dental
☐ 3 Recreation or social
☐ 4 School/College *(Name of School:* _____)
☐ 7 Other *(Please specify* _____)

8. Specifically, where is the location selected in #7?

Please list nearest intersection (for example: E White Avenue & S Blaine Street) - OR - Name the location or landmark (for example: Palouse Mall, University of Idaho, Friendship Square, etc.; NOT THE BUS STOP)

_____
(STREET & CROSS STREET or LANDMARK)

9. How will you GO FROM this bus to the end of your trip? *Check one* ✓

☐ 1 Walk *(How many minutes?* _____)
☐ 2 Bike *(How many miles?* _____)
☐ 3 Drive alone *(Parking location?* _____)
☐ 4 Get picked up
☐ 6 Use wheelchair or mobility device *(How many minutes?* _____)
☐ 5 Other *(Please specify* _____)

10. How often do you ride Moscow Valley Transit? *Check one* ✓

☐ 1 5 or more days per week ☐ 4 1-4 days per month
☐ 2 2 to 4 days per week ☐ 5 Less than 1 day per month
☐ 3 Once per week ☐ 6 First time

11. How long have you been riding Moscow Valley Transit? *Check one* ✓

☐ 1 Less than 1 year ☐ 3 More than 2 years
☐ 2 1 to 2 years ☐ 4 First time

12. If there was no bus service available, how would you make this trip? *Check one or more* ✓

☐ 1 Drive alone ☐ 4 Taxi
☐ 2 Someone would drive me ☐ 5 Walk
☐ 3 Carpool or vanpool ☐ 6 Bike
☐ 8 Other (_____) ☐ 7 Would not make this trip

13. If it were snowing, how would you make this trip? *Check one or more* ✓

☐ 1 Transit ☐ 5 Taxi
☐ 2 Drive alone ☐ 6 Walk
☐ 3 Someone would drive me ☐ 7 Bike
☐ 4 Carpool or vanpool ☐ 8 Would not make this trip
☐ 9 Other (_____)

14. Please rate the following items about Moscow Valley Transit: *Circle one per item*

	Poor		Average		Very Good
1. Bus arrives on time	1	2	3	4	5
2. Frequency of service	1	2	3	4	5
3. Service early enough	1	2	3	4	5
4. Service late enough	1	2	3	4	5
5. Directness of route	1	2	3	4	5
6. Website information	1	2	3	4	5
7. Information at bus stops	1	2	3	4	5
8. System easy to understand	1	2	3	4	5
9. Schedule easy to understand	1	2	3	4	5
10. Bus stop sign visibility	1	2	3	4	5
11. Cleanliness of buses	1	2	3	4	5
12. Seating/space on bus	1	2	3	4	5
13. Condition of bus stop	1	2	3	4	5
14. Safety at bus stop	1	2	3	4	5
15. Driver courtesy	1	2	3	4	5
16. Driver announces bus stops	1	2	3	4	5
17. OVERALL bus service	1	2	3	4	5

Please turn page and complete other side

15. Why do you take transit? *Check one or more* ✓

- ☐ 1 To save money
- ☐ 2 Taking transit is more social
- ☐ 3 To reduce my impact on the environment
- ☐ 4 I do not have a car available
- ☐ 5 I have a car, but choose not to use it
- ☐ 6 Other (_____)

16. Where do you primarily get information about Moscow Valley Transit? *Check one* ✓

- ☐ 1 Written schedules
- ☐ 2 Internet
- ☐ 3 Customer service telephone
- ☐ 4 Other (_____)

17. What improvements would help you choose to ride Moscow Valley Transit more often? *Check no more than 3* ✓

- ☐ 1 More frequent bus service
- ☐ 2 Earlier morning service (begin when?_____)
- ☐ 3 Later evening service (until when?_____)
- ☐ 4 Saturday service
- ☐ 5 Sunday service
- ☐ 6 Faster service
- ☐ 7 Additional/third route within Moscow
- ☐ 8 Regional service to Lewiston
- ☐ 9 Service to_____
- ☐ 10 Other_____

18. Please circle the ONE improvement in #17 that you think is most important. *Please circle your choice*

19. Where would you like Moscow Valley Transit to go that it doesn't go now?
Write in up to three specific locations in order of priority:

1._____

2._____

3._____

20. The lack of weekend service limits my mobility.

- ☐ 1 True
- ☐ 2 False
- ☐ 2 No opinion

21. Would you be willing to pay fares for weekend service only?

- ☐ 1 True
- ☐ 2 False
- ☐ 2 No opinion

22. Do you ride Moscow Valley Transit's Dial-A-Ride service?

- ☐ 1 More than once per week
- ☐ 2 Once weekly
- ☐ 3 A couple times per month
- ☐ 4 Never

Please tell us about yourself!

23. What is your age? *Check one* ✓

- ☐ 1 Under 18
- ☐ 2 18 - 24
- ☐ 3 25 - 64
- ☐ 4 65-74
- ☐ 5 75 and over

24. What is your TOTAL household income? *(Add all household members' income; Check one* ✓*)*

- ☐ 1 Under $15,000
- ☐ 2 $15,000-$34,999
- ☐ 3 $35,000-$49,999
- ☐ 4 $50,000-$74,999
- ☐ 5 Over $75,000

25. Are you: *Check one or more* ✓

- ☐ 1 Employed full-time (____UI or ____Other)
- ☐ 2 Employed part-time (____UI or ____Other)
- ☐ 3 Not currently employed
- ☐ 4 Elementary, Middle School or High School Student
- ☐ 5 College Student (____UI or ____Other)
- ☐ 6 Retired
- ☐ 7 Visitor to the area

Do you have any other comments or suggestions on how to improve transit service in Moscow? Please write them here:

_____

_____

_____

_____

_____

We appreciate your comments!
Please return this survey to us in one of three ways:

1. **Placing it in the collection tray** at the front of the bus
2. **Sending it to the City of Moscow via mail** using the attached pre-paid envelope
3. **Completing the web survey version: https://www.surveymokey.com/s/moscowtransit**