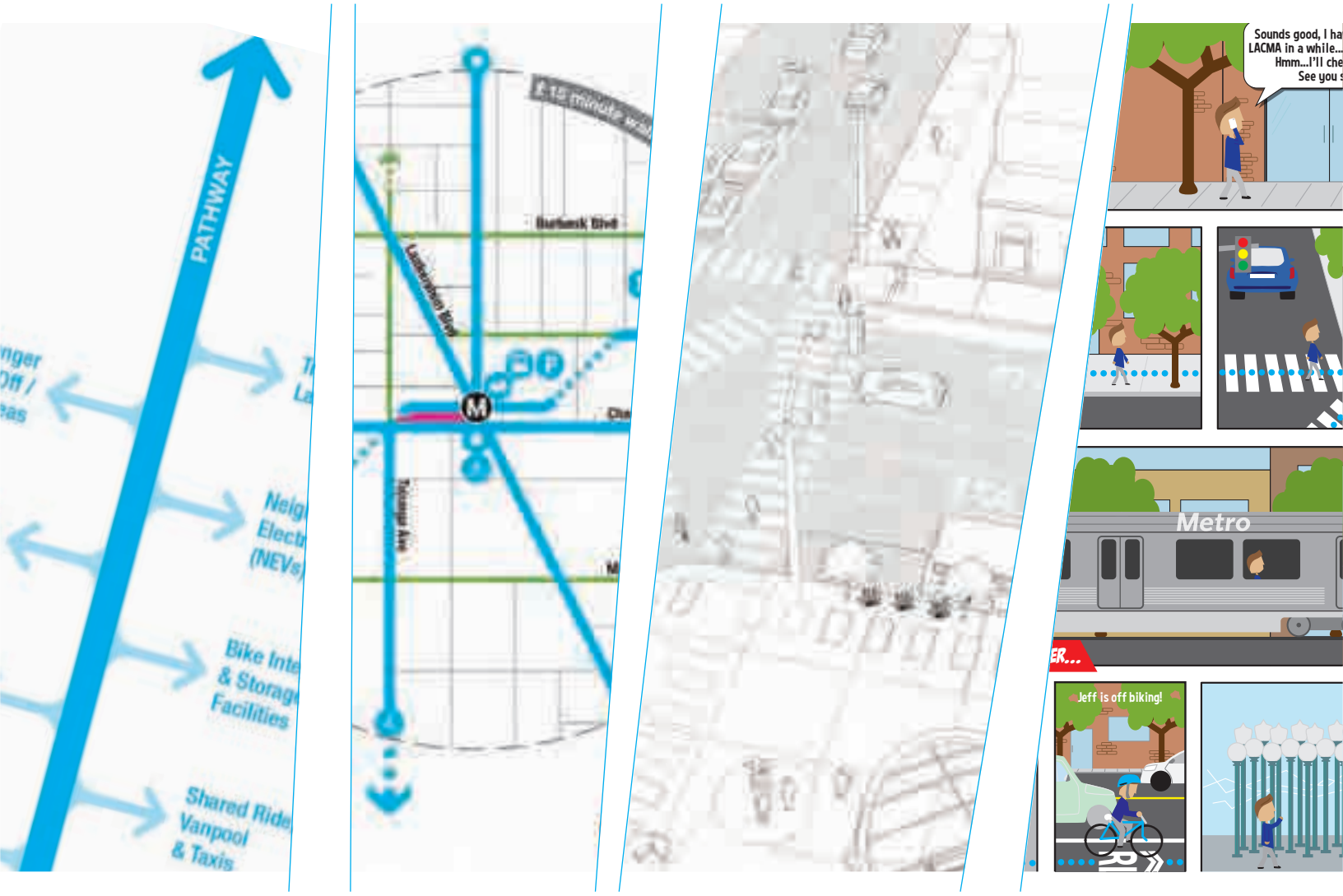
First Last Mile Strategic Plan

& PLANNING GUIDELINES



Metro

Los Angeles County Metropolitan Transportation Authority - Metro | Southern California Association of Governments - SCAG

MARCH - 2014

ACKNOWLEDGMENTS

The Los Angeles County Metropolitan Transportation Authority (Metro)

Diego Cardoso, Metro
Shahrzad Amiri, Metro
Neha Chawla, Metro
Steven Mateer, Metro
Alexandra Oster, Metro

Southern California Association of Governments (SCAG)

Sarah Jepson, SCAG
Alan Thompson, SCAG
Matt Gleason, SCAG

Consultants (IBI Group Team)

Dylan Jones, IBI Group
Bill Delo, IBI Group
Christina de Frietes, IBI Group
Matt Redmond, IBI Group
Avery Carrig, IBI Group
Lissette Valenzuela, IBI Group
Nadim Kurani, IBI Group
Melani Smith, Meléndrez
Amber Hawkes, Meléndrez
Shannon Davis, Meléndrez
David Koo, Meléndrez
Brian Gaze, Alta Planning
Ryan Johnson, Alta Planning

First Last Mile Technical Advisory Committee (Project TAC)

Rye Baerg, Safe Routes to School
Ellen Blackman, Accessibility Advisory Committee
Robert Boardman, City of Redondo Beach
Maddie Brozen, UCLA Luskin School of Public Affairs
Eric Bruins, Los Angeles County Bicycle Coalition
Connie Chung, County of Los Angeles
Allan Crawford, City of Long Beach
Troy Evangelho, County of Los Angeles
Michelle Glickert, City of Santa Monica
Jay Kim, City of Los Angeles
Alexis Lantz, LA County Department of Public Health
Brian Ludicke, City of Lancaster
Ryan Lehman, Living Streets LA
Jessica Meaney, Safe Routes to School
Deborah Murphy, LA Walks
Mark Nitti, Metrolink
Hilary Norton, Fixing Angelenos Stuck in Traffic (FAST)
Ghloria Ohland, Move LA
Simon Pastucha, Los Angeles Department of City Planning
Katherine Sims, SCRRA
Walker Wells, Global Green
Cory Wilkerson, City of Burbank
Mark Yamerone, City of Pasadena
Lori Abrishami, Metro
Stewart Chesler, Metro
Maggie Derk, Metro
Adela Felix, Metro
Lynne Goldsmith, Metro
Diana Gonzalez, Metro
Rufina Juarez, Metro
Todd Mitsuhata, Metro
Tham Nguyen, Metro
Desiree Portillo-Rabinov, Metro
Yvonne Price, Metro
Janna Smith, Metro
Cory Zelmer, Metro

Notes:

This page intentionally left blank.

First Last Mile Strategic Plan

& PLANNING GUIDELINES

TABLE OF CONTENTS

Notes:

This page intentionally left blank.

1 INTRODUCTION

Los Angeles County Metropolitan Transportation Authority (Metro) is developing a world-class rail system with stations that will be a short distance (three miles or less) from the homes of 7.8 million Los Angeles County residents. Over time, this number will continue to grow as cities modify their land-use plans to provide more housing and jobs near stations, consistent with market demand and regional goals for more sustainable communities. These planning guidelines outline a specific infrastructure improvement strategy designed to facilitate easy, safe, and efficient access to the Metro system. They introduce a concept herein referred to as 'the Pathway', and provide direction on the layout of transit access networks and components within Metro Rail and fixed route Bus Rapid Transit (BRT) station areas. They serve as a resource for Metro and the many public and private organizations throughout the region working to update programs, land-use plans, planning guidelines, business models, entitlement processes, and other tools that take advantage of LA County's significant investment in the public transportation network.

Metro First Last Mile Strategic Plan Goals

1. *Expand the reach of transit through infrastructure improvements.*
2. *Maximize multi-modal benefits and efficiencies.*
3. *Build on the RTP/SCS and Countywide Sustainable Planning Policy (multi-modal, green, equitable and smart).*

First Last Mile Strategic Plan Goals

In 2012, the Metro Board adopted the Countywide Sustainability Planning Policy and Implementation Plan and the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Joint Work Program, both of which direct the development of a First Last Mile Strategic Plan. The goal of this plan is to better coordinate infrastructure investments in station areas to extend the reach of transit, with the ultimate goal of increasing ridership.

These guidelines help facilitate the integration of mobility solutions in a complex, multi-modal environment. Strategies will need to be flexibly deployed to contend with widely varying environments throughout the county; yet will aim to improve the user experience by supporting intuitive, safe and recognizable routes to and from transit stations. This effort will require coordination among the many cities and authorities who have jurisdiction over the public realm throughout the county.

The Purpose of the Planning Guidelines

The purpose of these Planning Guidelines is to:

1. *Provide a coordination tool and resource for Metro, LA County, municipal organizations, community groups, and private institutions.*
2. *Serve as a key source of direction for LA Metro when undertaking planning and design efforts aimed at improving first and last mile connections to transit.*
3. *Clearly articulate the Pathway concept including objectives, characteristics, and the role the Pathway plays in supporting transit access and regional planning goals.*

How to use these Guidelines

The guidelines are structured around the following sections:

Introduction The introduction provides an overview of these guidelines, strategic goals and project purpose.

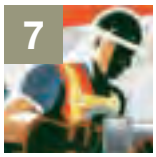
First Last Mile Planning Chapter 2 defines the first and last mile access challenge in transportation planning, provides guiding policy context, and reviews challenges specific to transit access in Los Angeles County.

The Pathway The Pathway is introduced in Chapter 3 as a strategic response to the first and last mile challenge. Pathway goals, policy context and guiding principles are reviewed. Pathway users, both today and in the future, are discussed.

Network Identification This chapter provides a methodology and approach for the layout of Pathway networks within station areas. Site area definition, existing conditions analysis, network component and layout are all covered.

Pathway Toolbox This chapter outlines possible improvements that may occur along identified Pathway network routes. Each individual improvement includes a visual example, discussion of goals, and guidance on how to integrate the specific improvement with the overall Pathway system.

Illustrations Pathway networks and component design scenarios are developed utilizing the strategies and tools set forth in these guidelines at three selected stations areas around Metro Rail and BRT stops. This has been done for illustrative purposes only, and is intended to demonstrate key ideas of the Pathway concept.



Strategies for Plan Application An Implementation Table and ridership targets are dispresented to guide next step efforts.

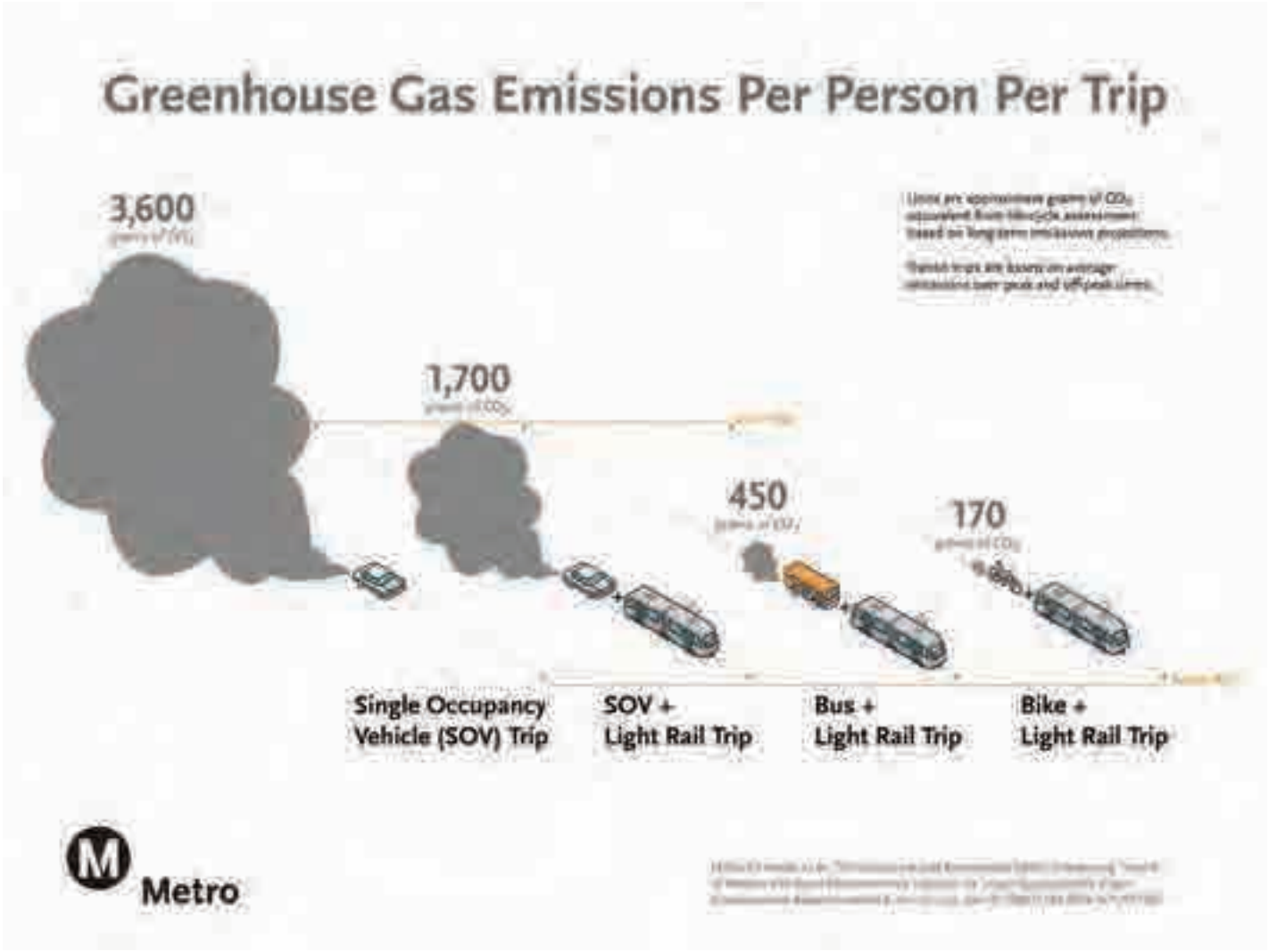
Appendix

2 FIRST LAST MILE PLANNING

First Last Mile Definition

An individual's trip is understood as the entire journey from origin to destination. Individuals may use a number of modes of transport to complete the journey; they may walk, drive, ride a bicycle, take a train, or in many cases combine a number of modes. Public transportation agencies typically provide bus and rail services that may frame the core of such trips, but users must complete the first and last portion on their own; they must first walk, drive or roll themselves to the nearest station. This is referred to the first and last mile of the user's trip, or first last mile for short, even though actual distances vary by users.

Though the streets and infrastructure that comprise the first last mile fall outside the boundaries of Metro's jurisdiction and control, they remain critical components of an effective public transportation system. Simply put, all Metro riders must contend with the first last mile challenge, and the easier it is to access the system, the more likely people are to use it.


Greenhouse Gas Emissions Per Person Per Trip
3,600
1,700
450
170
Single Occupancy Vehicle (SOV) Trip
SOV + Light Rail Trip
Bus + Light Rail Trip
Bike + Light Rail Trip
Metro

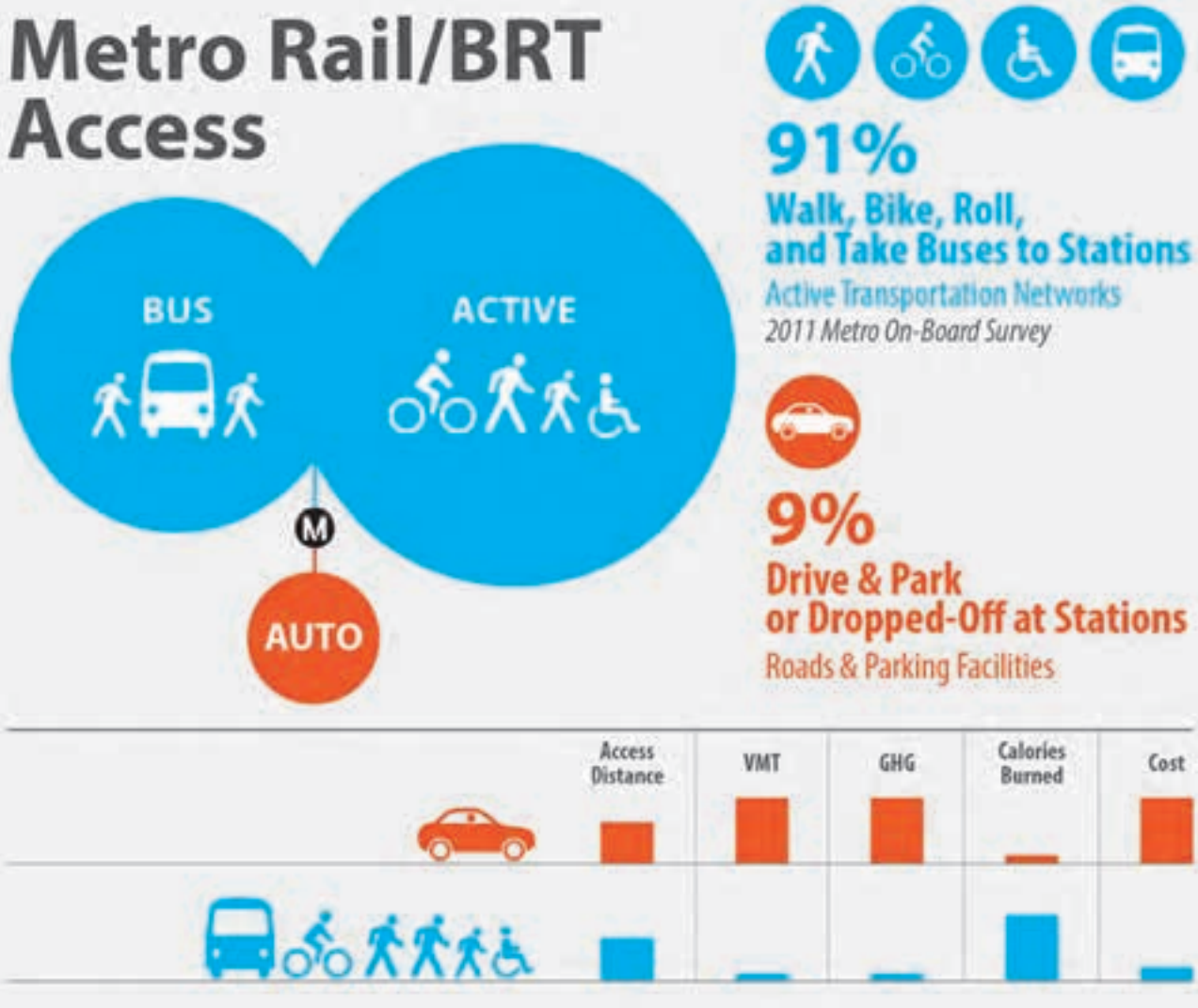
Policy Context

Federal, state, regional and local policies support increased use of public transportation as a means to ease roadway congestion, reduce greenhouse gas emissions, and support economic and physical health in communities. The 2012-2035 Southern California Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) reflects significant progress within Los Angeles County to achieve this policy vision both through transit investment and local land-use planning. By 2035, Metro's fixed guideway system will have nearly doubled in size. More than half the new housing provided in the region over the next twenty years will be in areas served by high-quality transit (with service every 15 minutes or less).

In 2012, Metro adopted a Countywide Sustainability Planning Policy (CSPP) as a complement to regional planning efforts and to provide the foundation for achieving further greenhouse gas reductions in the 2016 RTP/SCS. The CSPP is particularly notable in the context of first last mile planning, because it highlights the need to focus on integrated planning and partnerships to optimize the benefits of Metro's investments. Key concepts include "bundling strategies for greatest impact" which encourages Metro to think beyond a single mode or project in its planning efforts, and "act regionally and locally" which recognizes that local connectivity is paramount to securing the social, economic and environmental benefits associated with the expansion of transit. These guidelines were created in accordance with the principles and priorities outlined in the CSPP.

These guidelines were also developed in consideration of California's Complete Street law, which requires cities and counties to consider the needs of all users in the circulation element of municipal general plans. In addition to accommodating the efficient flow of vehicles, streets must accommodate safe and efficient multi-modal transfer activity and support a wide range of mobility options. Federal transit law explicitly recognizes the need to ensure that active transportation networks connect with public transit. Under Federal Transit Law, pedestrian improvements located within one-half mile and all bicycle improvements located within three miles of a public transportation stop have a de facto physical relationship to public transportation.

The 2012 RTP/SCS outlines a broad and ambitious strategy for sustainably managing regional growth. Mobility, land-use and health inform an integrated approach to achieving regional policy goals related to clean air and economic vitality.



The fact that the vast majority of transit users are already walking or rolling themselves to stations or to complete multi-modal connections demands a careful consideration of the inherent relationship between active transportation and the regional transportation system. A number of questions must be asked: What are the conditions of the active transportation networks in Los Angeles County? Is the network designed to support modern modes of active mobility? Do existing networks seamlessly integrate transit users with transit stations? What part of active transportation networks are integral components of the county-wide transportation system? The First Last Mile Strategic Plan responds to these questions, and proposes a transit access strategy built on rationally developed active transportation networks located around Metro Rail and BRT stations.

Challenges

There are a number of challenges associated with improving first last mile connections throughout the County. In many situations, especially along higher traveled corridors, right-of-way (ROW) is limited and already overburdened. Providing more robust access facilities could potentially put strain on other complementary travel modes. For example, providing protected bike lanes on a heavily used transit access route may affect vehicular throughput and bus operations in some situations.

Coordination is a challenge; there are many custodians of the public realm throughout the County. Metro is committed to the *"continuous improvement of an efficient and effective transportation system for Los Angeles County"* but Metro does not own or have jurisdictional control over transit access routes beyond the immediate confines of station facilities.

Funding is limited; there are numerous competing demands on public funds throughout the county. From a user perspective cost is a challenge; pay-for-service access solutions can be promising, but do not help those already struggling to pay for basic transit services.

There are a range of site specific physical challenges faced by individual transit users. For some, stations remain too far to access in a reasonable amount of time. Others don't move fast or nimbly enough to comfortably contend with broken sidewalks and hazardous street crossings, most notably the elderly and access impaired. Some are afraid to make the short walk from stations in the dark. All of these challenges can be addressed through thoughtful consideration, strategic planning, engineering, design and, most importantly, active coordination.

Metro Users

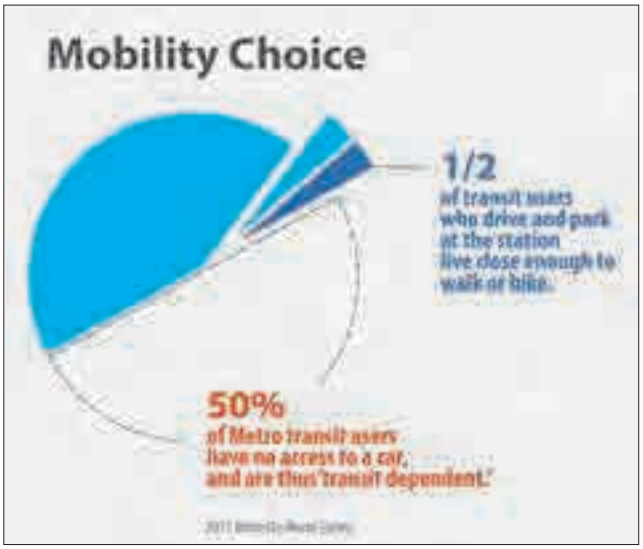
Metro goes to great lengths to better understand county transit riders in order to improve operations and service. Metro conducts on-board passenger surveys as part of this effort. A review of the Metro 2011 System Wide On-Board Origin-Destination Study provides insights into transit users at a demographic level, some key findings include:

- ***75% of transit riders belong to households earning less than $25,000.***
- ***Half of all transit riders are transit-dependent, i.e., they belong to households that do not own any vehicles.***
- ***Transit dependency increases as age increases, and/or as income decreases.***
- ***Active transportation modes (walking/biking/wheelchair/etc.) are the dominant access and egress modes for all riders; representing 85% of system access/egress at Rail/BRT stations and over 95% total system access.***
- ***Nearly 64% of riders make at least one transfer to complete their one-way trip.***

One of the more surprising findings from the Metro survey data is the small number of transit riders parking at stations. Though highly visible in communities, parking facilities support only 6.2% of Metro Rail users, and only 3.8% of Metro BRT users. Of this relatively small user group half live close enough to walk or bike to stations.

Transfer Activity

The Metro system is witness to a significant amount of transfer activity; nearly 64% of riders make at least one transfer to complete their one-way trip. Transfer activity, when not happening within a station is reliant on active transportation networks in the immediate vicinity of the subject stations. Active transportation networks are comprised of sidewalks, bike lanes (where existing), street crossings, signals, signs, curb returns, lighting, furnishings and landscaped elements. These networks support muti-modal access and transfer activity.



User Safety along Access Routes

Transit users need safe and efficient routes when accessing stations and while making multi-modal transfers. They rely on existing active transportation networks. A review of recent collision statistics for both pedestrians and bicyclists in LA County suggests there are significant challenges in terms of safety.

The provision of a safe transportation system is a cornerstone of Metro's Vision, and given the fact that most transit users are pedestrians during the first, last and transfer components of their trips, pedestrian safety is a major concern. Pedestrians are at risk within environments surrounding transit stations, primarily from automobile traffic. LA County has an alarming incidence of fatality rates, especially among some of the more transit dependent populations (the very young and very old). Risks can be significantly mitigated through design and vehicular speed control measures, and should be done so along prioritized access routes within station catchment areas.

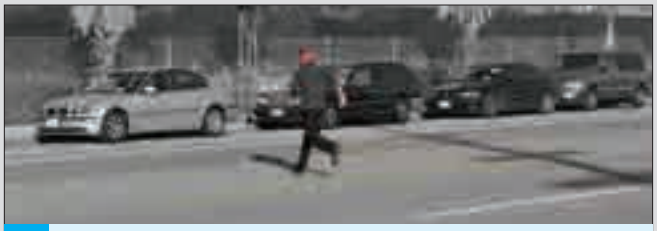
Existing Conditions

Knowing that active transportation networks play such a significant role in enabling transit access and transfer activity, a deeper understanding of existing active transportation networks is required to better address challenges currently faced by users. As part of the First Last Mile Strategic Plan study, project team members selected 12 station sites throughout the County and reviewed the existing transit access conditions within these sites. It was observed that current active transportation networks serving access routes to Metro stations present a number of access challenges to transit riders.

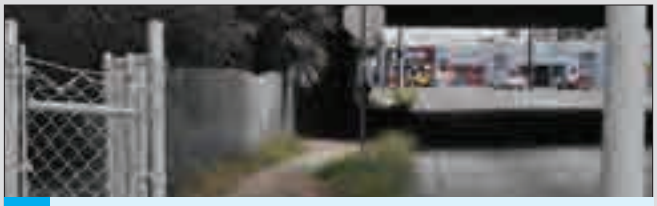
In some cases sidewalks were physically constrained or literally broken and heaved, or even more surprisingly, discontinuous. Long blocks and large parking lots create circuitous access routes for pedestrians. Lack of adequate lighting, dark freeway underpasses and general neglect all challenge users' sense of personal security. In some areas of the county, the existing right-of-way is severely constrained. Transit rider wayfinding is often impeded just a few blocks from transit stations due to the lack of, or in other areas the confusing overabundance of, street signage.

All of these noted existing conditions represent challenges to transit system access, system efficiency, user experience and safety. A strategy that addresses these issues directly will increase transit ridership, improve user experience, and contribute to meeting Metro, regional and state policy goals relating to sustainability, clean air, and health.

Top 6 L.A. County Transit Access Barriers

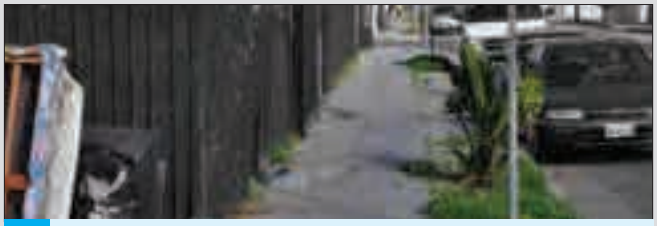


1 ***Long Blocks*** *– Transit riders prefer direct routes to their destination. Long blocks often equate to unnecessarily long routes, or unsafe crossing activity.*



2 ***Freeways*** *– Freeways carve our region into a number of 'pedestrian islands'. Links between these islands are effectively broken by dark and unpleasant underpasses or equally challenging overpasses.*

3 ***Maintenance*** *– Many of our basic walking and rolling surfaces are buckled, broken and generally impassable to all but the nimble footed.*



4 ***Safety and Security*** *– Pedestrians in LA County are victim to some of the highest pedestrian fatality rates in the country. The neglect of infrastructure also adds to concerns over personal security.*

5 ***Legibility*** *– It is too easy to get lost in LA County. Effective transit systems utilize sophisticated yet simple signage and wayfinding strategies. These strategies do not currently extend much beyond station boundaries*

6 ***ROW Allocation and Design*** *– Traffic congestion along some streets crowd out all but the most fearless bike riders – on other streets wide roads are underutilized, and all active modes are relegated to a 4 foot wide broken strip of concrete. A more holistic and integrated approach is needed to provide equitable mobility along access routes.*

3 The Pathway

Metro First Last Mile Strategy

Metro survey data tells us that the vast majority of transit users in the county are utilizing active transportation networks to access the overall system, and field observation confirms that there are a number of obvious challenges being faced by current users of existing networks. These challenges reduce overall system ridership in two important ways; they artificially decrease the size of transit access sheds around stations, and they reduce discretionary use within current access sheds.

Access sheds are defined by the distance people travel in a set duration of time. For example, if pedestrians are willing to walk up to fifteen minutes to a given station, and they walk at four miles per hour, the access shed can be defined by a half mile radial circle centered on the station. In reality this access shed is compromised by the street grid, breaks in the access network, location and number of street crossings, and fluctuations in average speed of pedestrians due to crossing characteristics and sidewalk conditions. An effective strategy will work to increase the size of access sheds around transit stations while improving access conditions within those sheds.

Policy: **Reality:** **Goal:**

There are a wide range of approaches to addressing the first last mile challenge, ranging from high level policies (for example supporting mixed-use density in station areas) to specific infrastructure investments (for example providing additional bike racks at stations). Metro's plan can allow for the 'coordinated bundling' of first last mile strategies by identifying access networks that partner agencies and alternative transportation providers can build from and/or plug into.

The Pathway

The Pathway is a proposed county-wide, transit access network designed to reduce the distance and time it takes people to travel from their origins to stations and from stations to destinations, while simultaneously improving the user experience. At its core, the Pathway is a series of active transportation improvements that extend to and from Metro Rail and BRT stations. The Pathway is proposed along specific access routes selected to shorten trip length and seamlessly connect transit riders with intermodal facilities. Intermodal facilities may include bus stops, bike hubs, bike share, car share, parking lots, or regional bikeways, depending upon the location and context of the station.

The Pathway is envisioned to include standard elements that support an association with the overall transit experience, and more flexible elements that respond to the context and character of varying communities and site specific challenges.

The Pathway aims to broaden the reach of transit and improve the transit experience by increasing the size of transit access sheds and by improving access conditions within station areas. The Pathway extends the positive experience of the transit user. It is intuitive, safe, efficient, universally accessible and fun.

The Pathway and Regional Policy

The Pathway helps integrate the various modes provided by Metro (i.e. Bus and Rail) and also allows the integration of non-Metro provided solutions into a more seamless user experience. In so doing, the Pathway aims to support broader policy directives related to clean air, health, and economic sustainability. By improving transit access and effectiveness, more people will likely opt into public transportation which in turn will reduce vehicle miles traveled (VMTs) and green house gas emissions (GHGs), integrate physical activity into daily commute patterns, and improve economic vitality by connecting people to regional markets.

The Pathway is a bold concept that takes into consideration the pressing need for mobility solutions against a backdrop of population growth, demographic shifts, increased concern and awareness of human health and safety, environmental concerns and a rapidly expanding public transportation system.

The Pathway – Expanding User Access Sheds

The Pathway expands transit user access sheds by:

1. Increasing the average speed of active transportation users – This is achieved by decreasing wait times at intersections and by increasing speed and capacity along walking/rolling routes. Pedestrian prioritized Signal timing improvements decrease waiting times for pedestrians; reduced crossing distances reduce average street crossing time; and the provision of improved walking and rolling facilities that cater to a growing range of mobility devices increases the average speed of users.

2. Decreasing point to point distances – This is achieved through the utilization of strategic short-cuts and increased crossing opportunities. Diagonal routes through large parking lots or parks and mid block crossings can be used to significantly reduce point to point distances.

3. Supporting multi-modal transfer activity – The Pathway strengthens links between modal access points (i.e. bus stops and stations, or bike share kiosks and stations) by providing easily identifiable safe and efficient access routes between modes. Furthermore, the Pathway allows for strategic integration of mobility solutions (i.e. car share) into an existing network.

The proliferation of personal mobility devices by all age groups, from skateboards to bicycles to electric mobility scooters, presents a tremendous opportunity to extend the reach of public transit investments. It is well known that the time it takes to walk to a station is the metric by which access sheds are realized. Supporting personal mobility devices that allow an aggregate increase in average personal mobility speeds can dramatically increase regional access sheds. Better policies, new infrastructure and a careful look at mode integration is needed when assessing how best to realize the potential offered by the growing range of mobility devices. A Taxonomy of Mobility Devices is provided in the Appendix.

The Pathway – Improving the User Experience

In addition to expanding access sheds for transit users, the Pathway supports overall ridership by improving the quality of access conditions *within* access sheds. Personal sense of safety, security, and comfort along access routes all play a role in an individual's choice to utilize public transportation. A dark, unlit sidewalk is a deterrent to many when considering a short walk to or from a station after dark, and can be improved utilizing a number of design strategies. The lack of pedestrian facilities at street crossings poses undue risks to transit users, and can be mitigated by improved signaling strategies and painted crossings. For transit riders wanting to use, or requiring the use of, any form of wheeled access device something as simple as a broken sidewalk or missing curb ramp is a significant barrier; maintenance and provision of well designed sidewalks and curb ramps improves the experience for these users.

Pathway Users – Today and Tomorrow

Pathway users are understood as being broadly representative of county transit users, who in turn are broadly representative of county residents. Various demographic and social trends give good insight into *future* pathway users. Demographic trends suggest the population is aging, and as average age increases, transit dependency increases. Many people are choosing to age-in-place and have an opportunity to do so within dense mixed-use station areas where amenities and services are easily accessible. This is a good sustainable model and relies on the existence of universally accessible mobility options. In the future there will be many more senior aged Pathway users, thus planning for senior aged mobility and access is critical.

Another trend witnessed over the last ten years is the reduction in automobile use and ownership by the Millennial Generation (those born between 1982 and 2004). There are many hypotheses presented to explain this trend, including the recent recession which has reduced the number of commuter trips.

Others argue that there is a structural shift occurring with regards to lifestyle, and the allure of suburban living is not as strong for a young demographic that shows preference for more compact, amenity-rich urban environments offered by city and town centers. The costs of vehicle ownership may also be affecting consumer behavior, especially in regions with viable mobility options. Whatever the cause of these trends, mobility solutions are required for those who cannot afford, cannot operate, or choose to forego vehicular ownership. The Pathway, by expanding the reach of transit and by improving the user experience, helps discretionary transit users opt into multi-modal transit solutions.

Transit users moving under their own power throughout the county have very different use characteristics and functional needs from one another, based both on the physical requirements of chosen mode and personal characteristics including age, ability and personal attitude towards risk and comfort. A healthy 17 year old skateboarder has very different mobility characteristics and needs from a 91 year old utilizing a wheeled push-walker. Pathway efforts aim to understand these differences, improve on the planning and design of existing facility options, consider how to better support a broader range of personal mobility and maximize transit integration all within a complete streets context.

Pathway – Guiding Principles

These guidelines outline an approach for planning Pathway networks at Metro Rail and BRT stations and present a toolbox of strategies that can be considered when implementing Pathway networks.

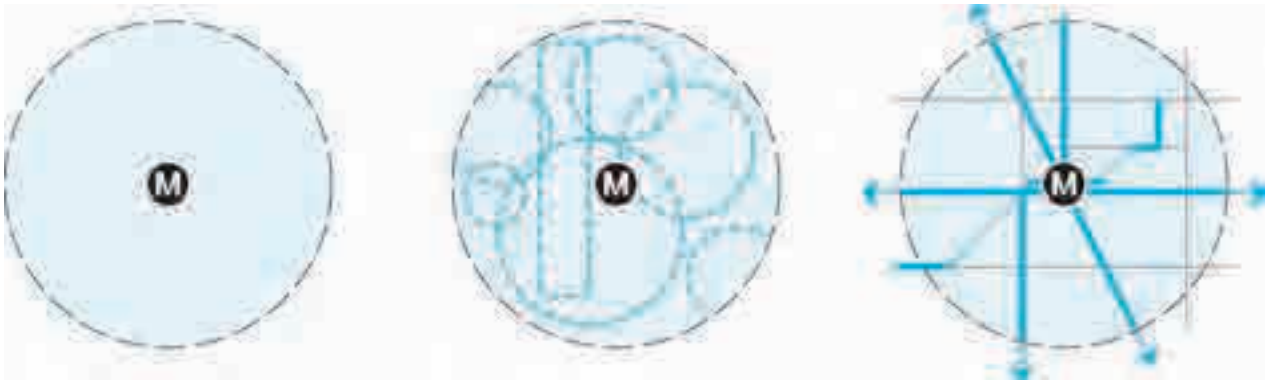
The following values define the Pathway and provide a basis for design:

1. *The Pathway is **Safe** – Safety is a key concern, and is supported by protected facilities, improved street crossings, strategic lighting and vehicular speed mitigation.*
2. *The Pathway is **Intuitive** – Traveling along the Pathway is an extension of the transit user's experience, and their ability to navigate to and from destinations is assisted by wayfinding strategies that support seamless multi-modal journeys.*
3. *The Pathway is **Universally Accessible** – The Pathway supports all modes of active transportation and remains accessible to individuals dependent on mobility support devices – from white-canes to wheeled push walkers and electric mobility scooters.*
4. *The Pathway is **Efficient** – Greater distances are traveled in a given amount of time along the Pathway. Rolling and walking surfaces are smooth and free of obstacles, routes are direct, and signals reduce wait times at street crossings.*
5. *The Pathway is **Fun** – People opt out of cars, and hop on scooters, skateboards and bikes to get to where they want to go, save money, burn calories and along the way, have fun.*

To see how Jeff and three others use the Pathway to complete their trips, refer to the appendix...

4 NETWORK IDENTIFICATION, DESIGN & IMPLEMENTION

This chapter outlines a methodology for planning Pathway networks at transit stations. The three steps include:



1 **Site Area Definition**

2 **Analyze Existing Conditions**

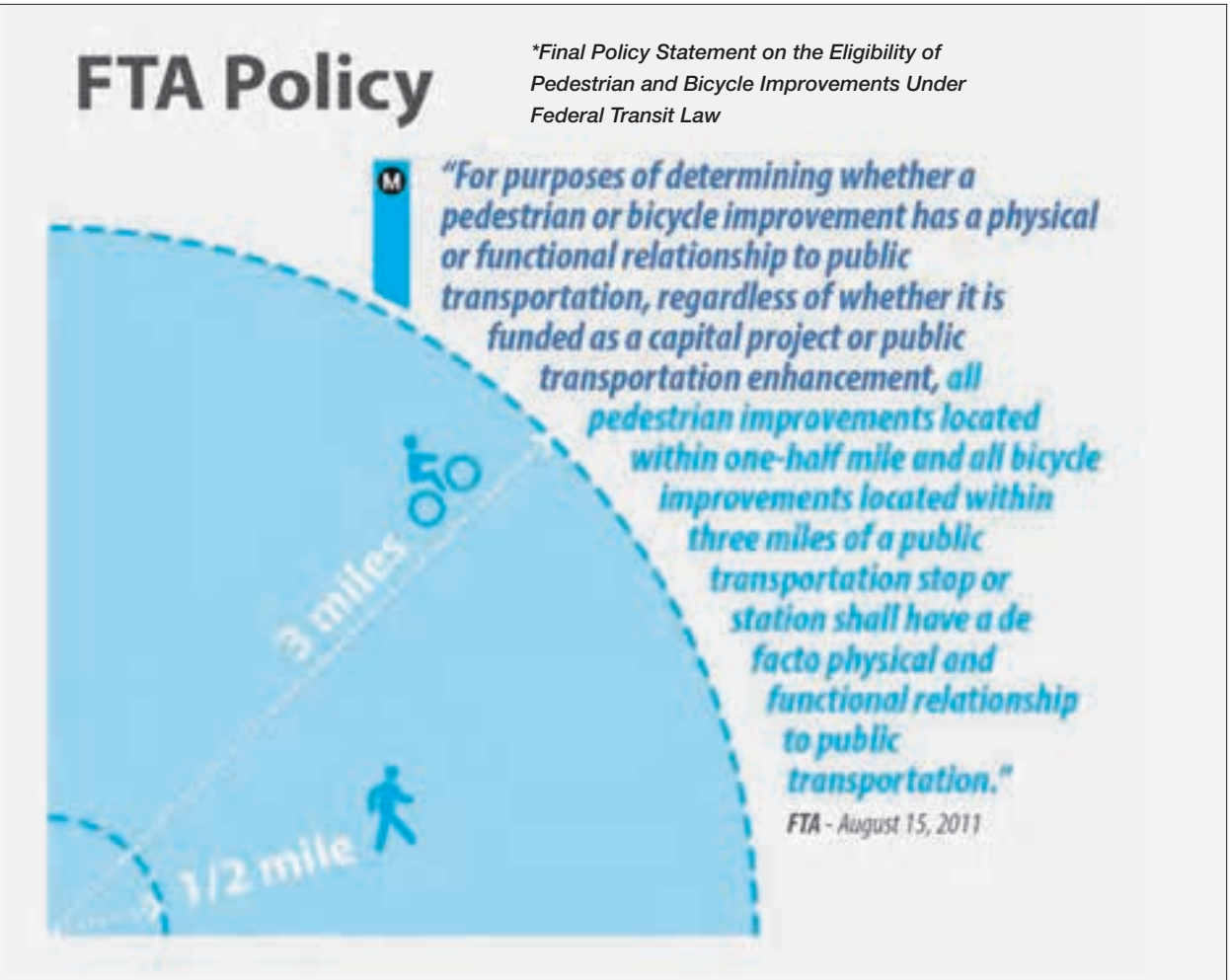
3 **Layout Pathway Network**

* As stated in the introduction, the Pathway aims to extend the reach of transit in a number of ways. The Pathway consists of physical active transportation network improvements that allow the bundling of a broad range of first last mile strategic efforts. At its core, the Pathway aims to address the challenge of the vast majority of transit users accessing the station, namely their ability to physically do so in an efficient and safe manner. The vast majority of transit users are either rolling or walking themselves to stations, and they are limited by the distance they can realistically walk or roll. Furthermore, many make discretionary choices based on qualitative decisions, such as comfort and safety. The Pathway aims to expand the transit access shed, and to improve the quality of access within the shed.

Site Area Definition (Step 1)

The first step in planning for the Pathway in any given station area is to determine the location and limits of the network. There are current active transportation networks throughout the county, comprised of sidewalks, roadways, street lights, signage, stripping, signals and a number of other elements. The Pathway can build upon these existing conditions within pre-determined zones and along specifc routes, which emanate from Metro Rail and BRT stations.

The focus of the site area where the Pathway network will be located is the transit station itself, Metro Rail or BRT. Maintaining consistency with FTA policy, one-half-mile and three-mile (pedestrian and bicycle) circles can be drawn around the station which will correspond to important potential thresholds of the Pathway. The first threshold occurs at the half mile mark, measured as the crow flies, and corresponds to how far a person will walk to access transit. The second three mile threshold corresponds to how far an individual will bike to access transit. The three mile shed, gives a good limit for all other active transportation users (i.e. skateboarders, mobility scooter riders) as bicycles operate at the upper range of observed speeds among active transportation devices. These thresholds correspond to a number of funding mechanisms given FTA's stated policy.


FTA Policy
*Final Policy Statement on the Eligibility of Pedestrian and Bicycle Improvements Under Federal Transit Law
"For purposes of determining whether a pedestrian or bicycle improvement has a physical or functional relationship to public transportation, regardless of whether it is funded as a capital project or public transportation enhancement, all pedestrian improvements located within one-half mile and all bicycle improvements located within three miles of a public transportation stop or station shall have a de facto physical and functional relationship to public transportation."
FTA - August 15, 2011
3 miles
1/2 mile

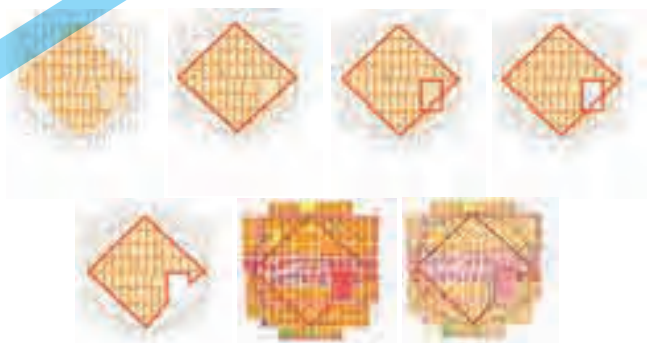

New FTA Bicycle and Pedestrian Catchement Areas for Los Angeles County MTA
Existing and Proposed BRT and Rail Facilities
Los Angeles County
Pacific Ocean
Legend

Analyze Existing Conditions (Step 2)

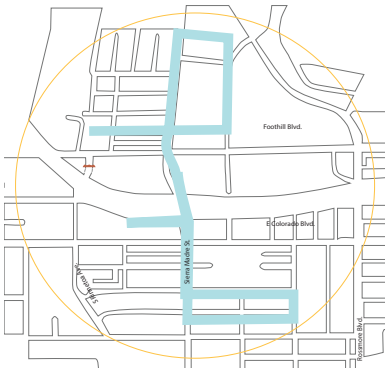
To better understand the unique challenges of an individual station area chosen for Pathway network development, the subject site should be reviewed at both a macro and micro level. The intent of the analysis is to evaluate the existing condition and characteristics of the station area, and inform the layout of Pathway network routes. The analysis includes mapping, compiling, and overlaying various layers of station-specific data that together highlight conditions within half mile of the station portal, along with regional planning context and adjacent station area improvements to three miles of the station portal. The analysis steps include:

Station Analysis A

B Overlay Maps



Walking Route C



D Site Visit (Station Survey)

A. Preliminary Station Analysis

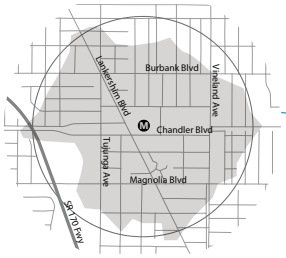
The following access-related station area characteristics can be analyzed utilizing data available to Metro:

Points of Interest

The Points of Interest map highlights key sites located within the one-half mile radius of the station and infers logical routes between the station area and these interest points. Analyzing these routes better defines potential transit users. Key points of interest included schools, event centers, public institutions, parks, and any other local attractions to the transit catchment area. These maps should also include a review of the three mile access shed.

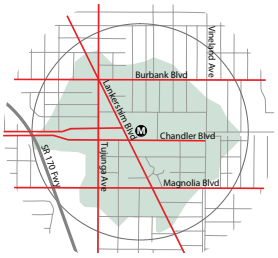
Street Grid

The Street Grid map presents the street and block network surrounding station areas. This grid shows areas that lack connectivity, logical pathways, and/or create obstacles for site navigation. The map also doubles as a base map for the station analysis that follows.



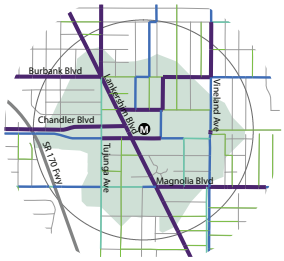
Pedestrian Shed

The Pedestrian Shed map graphically displays the level of pedestrian accessibility for each station area. With the transit station as a starting point, all one-half mile routes based on the street grid were mapped and then consolidated into a larger catchment shape. The pedestrian shed begins to reveal limitations to access as a result of each station's unique street grid.



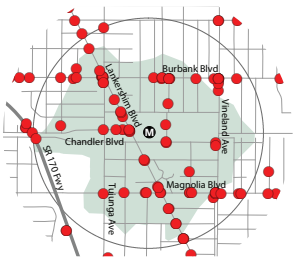
High Vehicular Speeds

The High Vehicular Speeds map shows potential areas that would cause safety concerns for pedestrians and bicyclists. Posted speeds greater than 35 mph are shown.



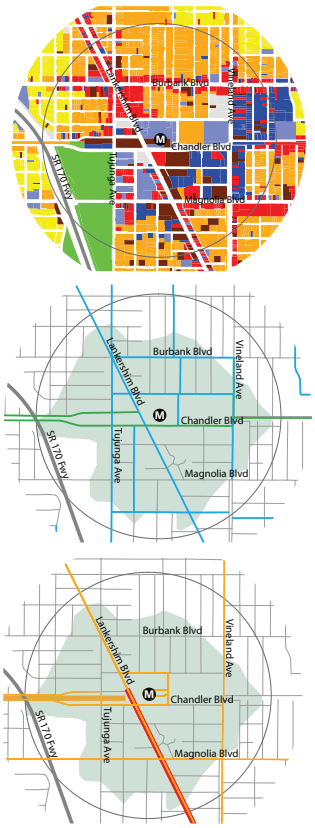
Key Transit Access Corridors

Key Transit Access Corridors are graphic depictions of Metro's Origin/Destination study. These maps graphically represent the most frequently used transit access routes.



Bike or Pedestrian Collisions with Automobiles

This map begins to show key intersections and locations where high rates of pedestrian and bicycle collisions with automobiles exist.



Land Use Map

The Land Use Map depicts concentrations of land use within each one-half mile radius. The land use map highlights the types and characteristics of users that are able to comfortably access the locations surrounding the station. Existing maps should be reviewed in conjunction with planned changes captured in associated specific/general plans or other policies guiding future land use changes.

Bicycle Connections

All infrastructure dedicated to bicycles in the roadway are shown in the Bicycle Connections map. This generally includes: existing bike lanes, sharrows, separated bike facilities, bike 'friendly streets (in some areas where cities have defined this as a category), future bike routes, etc. These maps should also include a review of the three mile access shed map.

Transit Connections

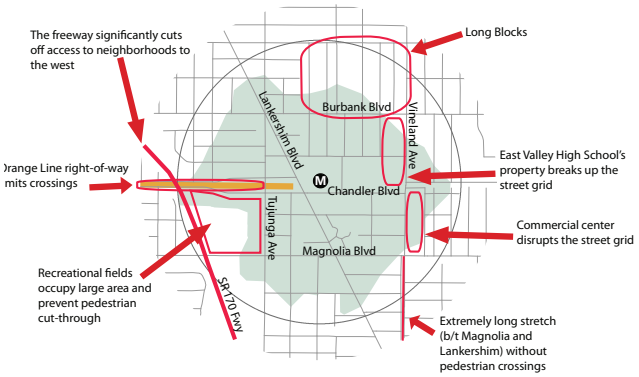
Using Metro and other transit agency data, routes of all transit modes are mapped within the one-half mile radius. This includes: all bus lines, light and heavy rail, and any other transit lines serving the station area. These maps should also include a review of the three mile access shed.

Statistics

The following statistics can be extracted from each station area to provide an overview of the site: average block length, intersection density, walk score, overlay zones, density, employment, and journey to work.

B. Access Barriers Overlay Map

After compiling the information collected during the macro-level station area analysis, the maps described above can be overlaid to show potential areas of intervention. The overlays described below provide substantial information that inform on-the-ground analysis.



Overlay of land use map with pedestrian shed map

To begin, the station land use map can be overlaid with the pedestrian shed map. Here, any holes that exist within the one-half mile radius that would provide a logical origin/destination route for potential users can be highlighted. For example, where heavy residential land uses on an area of the map do not connect to the ½ mile pedestrian shed, a note can be made, and the area highlighted.

Overlay land use map with bike connections map

The second step is to overlay the station land use map with the bicycle connections map. The holes shown in these maps are for areas that are missing connections for bike riders.

Additional Overlays

A number of other overlays should be reviewed using the approach described above to gain a better perspective of access volumes relative to safety and traffic speed, access routes relative to feeder bus services and stop locations, and access shed relative to street grids, to name a few examples.

All highlighted areas can then be synthesized. These maps inform the basis for routing site visits for on-the-ground evaluation and Pathway network layout.

C. Determine walking route

Pulling from all highlighted areas from the overlay maps described above, walking routes can be drawn that address potential improvement areas. As such, the walking route directly responds to potential problems or opportunity areas seen in the macro-level analysis and allows for a more detailed on-the-ground analysis.

D. Site Visit – Station Survey

The site visit offers the opportunity to begin micro-level analysis, and to begin to assess areas of intervention.

For station specific analysis, a set of evaluation criteria and questions can be written to consider current and future access needs and opportunities at each representative station/stop area. These questions can be written as a survey checklist form. Mainly qualitative, these checklists measure performance of each station/stop area. With the end goal of increasing transit ridership and user comfort, urban design elements that are most important for rider comfort and system function were added to the survey tool.

The sample checklist (see Station Area Checklist in the Appendix) was prepared as a guide for on-the-ground analysis at each station area. While initially prepared for the case sites selected for the First Last Mile Strategic Plan as an evaluation tool, the format of the checklist is broad, and touches upon a range of issues faced by most station areas in the study region. As such, this checklist can be used to evaluate a wide range of stations in the county.

The checklist is designed to broadly assess:1) safety elements, 2) aesthetics, and 3) accessibility within a station area. Each of these categories account for multi-modal experiences for all types of transit users. The results are keyed to a scoring tool that allows for comparison between stations. The scoring matrix below outlines the ranking system for each station area.

In addition to assessing the physical conditions of the environment, overall observations can also be made that record how people move to and from the stations themselves. This analysis is supplemented by photo documentation, and an open-answer area for additional information gathered during the site visit.

Scoring Matrix

1-1.99	Poor
2-2.99	Fair
3-3.99	Good
4-5	Excellent

Checklist (see Appendix)

Layout Pathway Network (Step 3)

Network Components

The Pathway includes a hierarchy of routes that extend out from the transit station. These routes take into consideration the existing street network, key destinations, feeder transit services, the existing and planned bike network, pedestrian/bike access volumes and surrounding land uses. These items are augmented by additional findings in the field such as opportunities to provide active transportation shortcuts, or to fill breaks in the network (physical or qualitative) not made apparent in maps. The network is defined by main branches (Pathway Arterials) and feeder routes (Pathway Collectors), each having the following characteristics;

Pathway Arterials – Pathway arterials are the main branch lines that extend from stations and support maximized throughput and efficiency for active transportation users. Pathway arterials accommodate the highest use active transportation corridors that lead to station portals, and are designed to accommodate a broad range of users. It is useful to organize Pathway users by their functional speed;

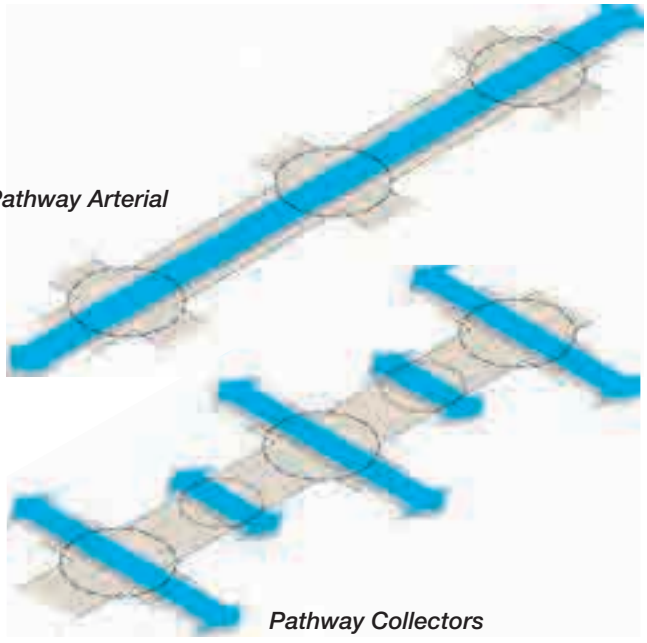
- Slow (0-5 mph) – Slow moving, predominantly pedestrian based modes, including slower moving wheelchair and cart/stroller push/pull users. Universal access is a critical concern, and accommodation of small wheeled access assist devices (i.e. wheeled push walkers) must be considered.

- Medium (5-15 mph) – Broad range of users that move faster than pedestrians but still require physical separation from vehicles. Children on push-scooters, senior citizens using mobility scooters, skateboarders, casual bike riders and joggers all fall into this group.

- Fast (15-35 mph) – Fast moving, aggressive bicyclists and drivers of neighbourhood electric vehicles (NEVs) form this user group. Bikes and NEVs can mix with vehicular traffic when supported by specific design elements and vehicular speed controls.

Pathway Arterials aim to provide improved facilities for all three of these primary groups. Phased approached may be required to realize this goal due to constrained right-of-way (ROW). Separated active transportation lanes, signal and crossing improvements, wayfinding and plug-in component (i.e. bike share) integration are important considerations in the design of Pathway Arterials.

Pathway Collectors – Pathway collectors include streets and routes within the station zone that both feed into arterials, and support crossing movements and general station area permeability. Collectors also consider the three primary active transportation groups noted above, but are more focused on supporting station area permeability on feeder routes, that will allow people access to the main arterials. Pathway Collectors work to reduce travel distances for non-motorized users by focusing on crossing movements and support Pathway Arterial function by providing efficient access to Arterial routes. Collectors frame the lesser traveled routes along the network, and help bridge gaps caused by high traveled and/or high speed vehicular roadways within station areas. Improved street crossing opportunities are essential to Collectors, including improved intersection function and the provision of mid-block crossings.



Network Layout

To plan a Pathway Network around a Metro Rail or BRT Station, the following steps should be taken;

1. **Locate Pathway Arterials** – Arterials should radiate out from the station portal in at least four directions, and should correspond to the highest volume of pedestrian and rolling access to the station. Arterials must extend out at a minimum one-half mile from the station, to an upper limit of three miles from the station. Pathway arterials should integrate into the regional bike network at opportune points beyond the one-half mile access shed. Coordination with other station Pathway networks within three-mile shed is required.

   Key Mapping Inputs
   Access Volumes, Key Destinations, Land Use, Bike Routes

2. **Locate Pathway Collectors** – Pathway collectors include streets within the one-half mile access shed that run perpendicular to station access desire lines, or feed into the main branch lines of Arterials.

   Key Mapping Inputs
   Feeder transit lines, access sheds

3. **Identify Site Specific Opportunities and Constraints** – Identify opportunities to provide 'cut-throughs' (i.e. across parking lots or through parks, where such cut-throughs shorten access routes). Also identify specific constraints that will require special attention (i.e. freeway underpasses). Focus on area within 1 mile of transit station.

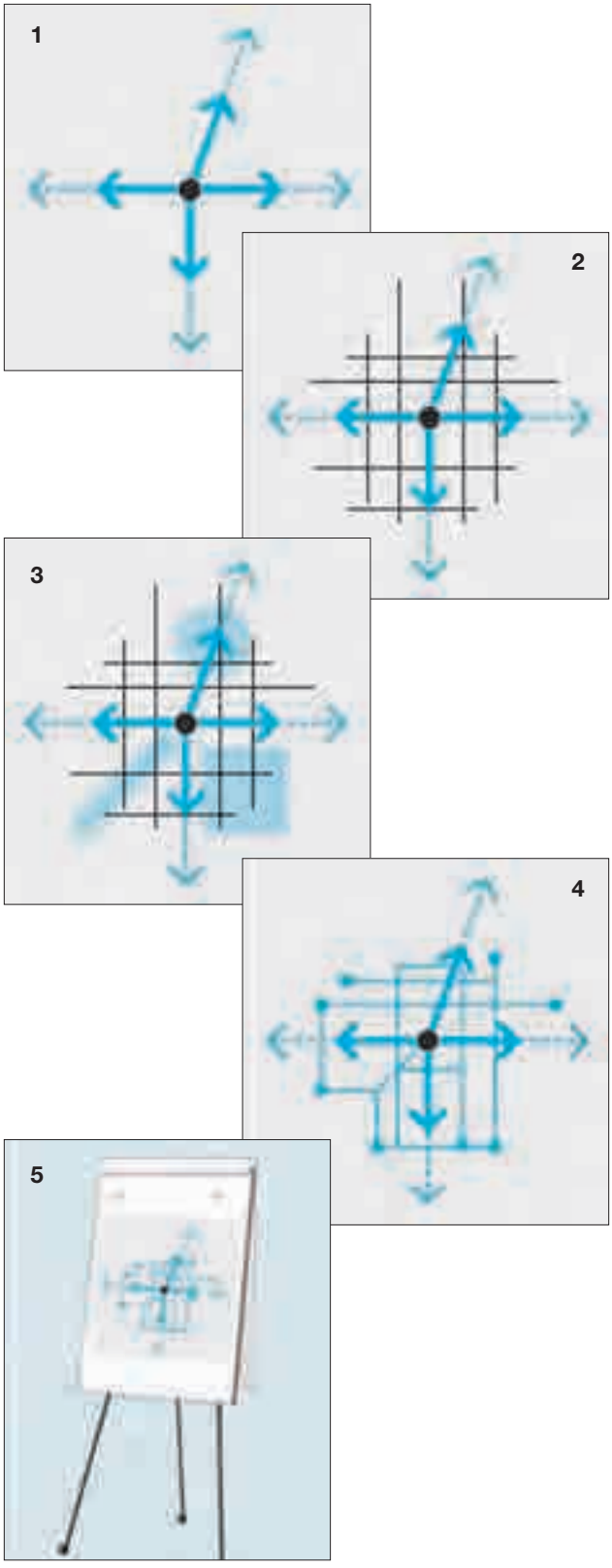
   Key Mapping Inputs
   Aerial imagery + Site Evaluation (Aesthetics, Safety, Accessibility)

4. **Evaluate Network** – Review Pathway network relative to qualitative and quantitative inputs.

   Key Mapping Inputs
   Collision data, Access Sheds, High Speed Roads + Site Evaluation (Aesthetics, Safety, Accessibility)

5. **Review and Refine Pathway Network** – Review network with key agency stakeholders and local representatives. This process will help inform design team of ongoing local efforts, strengthen knowledge of key local destinations and concerns, and inform the public of access improvement efforts.

   Stakeholder and public outreach



A Prototype Pathway Network Map...

This map illustrates a potential Pathway network at the North Hollywood Metro Station, developed utilizing the process outlined in this chapter. The fifteen minute walk equates to a one-half mile radius around the station portal. The map is depicted in the style of a transit map, to suggest that for the user, the Pathway would be understood as an extension of the transit experience. Certain access components, such as bike share, car share, parking, and location of wayfinding stations are presented to illustrate the concept that a range of access and mobility solutions could be strategically bundled around Pathway networks.

Notes:

This page intentionally left blank.

5 PATHWAY TOOLBOX

* This Chapter presents a set of components that directly relate to the development of the Pathway concept. This is not an exhaustive list of what makes for a great public realm, and more components may be added on to this list as this concept is developed. The components chosen respond to our specific challenges here and now, and how we can make a more dignified transit-to-destination link, one that is safer and better maintained, more intuitive, efficient, and inviting, effectively expanding the transit station outward.

Introduction

The planning components presented in this chapter focus on improving access to and from Metro stations, in particular Metro Rail and fixed route BRT stations throughout Los Angeles County along identified Pathway networks and within the confines of defined station areas. The Pathway aims to overcome critical access barriers through flexible deployment of a number of design components, while following the Metro Pathway Guiding Principles noted in the first chapter.

The components focus on five categories of improvements as part of the Pathway:

1. ***Crossing Enhancements and Connections***
2. ***Signage and Wayfinding***
3. ***Safety and Comfort***
4. ***Allocation of Streetspace***
5. ***Plug-in Components***

Components do not all directly relate to one another, but they work in concert to support the overall goals and guidelines of the Pathway. For example, traffic calming and curb-extensions are very different tools with respect to planning, design and implementation, but utilized together they enhance transit user safety, comfort and access ability.

Applying the Toolbox to Real Places

Components presented in this chapter aim to:

- *Expand the station's sphere of influence and improve the transit rider experience*
- *Contribute to a hierarchy of improvements that are more concentrated, visible, and frequent as transit users approach transit stations*
- *Be flexible in order to fit into diverse settings around stations*

Components presented in this chapter were developed with the recognition that Pathway Networks need to be responsive to local context and variations that exist both across and within station areas. The following ***key considerations*** are intended to support local jurisdictions in selecting treatments along Pathway networks:

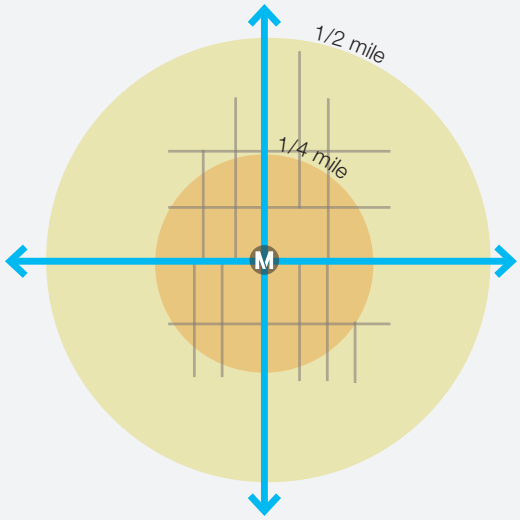
Sphere of Influence: The types and intensity of components deployed along Pathway Networks will differ depending on proximity to station. The "Extended Station Zone" is defined as roughly one-quarter mile radius from the station portal. The larger "Transit-Friendly Zone" extends out to an approximate one-half mile radius; this area would include active transportation infrastructure, but to a lesser extent than in the Extended Station Zone. Pathway Arterials may extend out farther still and link up with regional bike and pedestrian networks. The goals for these different spheres are noted in the graphic and provide guidance for prioritizing improvements.

A Hierarchy of Improvements: Paramount to a clear and navigable transit environment is a system of cues that help the transit rider intuit which direction the station is, how best to get there, and how long it will take. The frequency of access improvements should increase and be made more prominent as the transit rider approaches a station. For example, farther from the station within the Transit-Friendly Zone, crosswalks may be designed with a simpler and more traditional double stripe. In the Extended Station Zone, closer to the transit station, crosswalks should become more visible, prominent, and frequent, with continental or zebra stripes, colored paint, and increased width.

Flexibility in Design: The contextual diversity of Los Angeles warrants a place-specific approach that does not stifle the individual identity of each location, allows for a flexible approach in design of the Pathway, and simultaneously provides a legible and intuitive system-wide strategy. Each component can be applied where appropriate depending on the urban condition. Illustrative examples of how Pathway components may be realized in different locations are presented in the Illustrations chapter.

Branding and Identity Building: The Pathway, whether named or not, will be most effective if it is recognizable and visually consistent, both within station areas and across communities served by Metro. For example, some Pathway elements could use standard/consistent messages, font, style, placement, material and colors while others may be informed by the identity of community in which they are located. The intent is to support seamless system navigation for the user, while allowing for the expression of local identity. These considerations should be made as part of further design development. Development of standard components would rely both on inter-jurisdictional coordination throughout the Metro region and coordination with state and federal standards.

Expanding the Sphere of Influence



M Metro Station
Pathway Collector
Pathway Arterial

EXTENDED STATION ZONE (AREA 1)

5-Minute Walk/2-Minute Bike

- Pathways are more visible
- Enhanced safety features
- Larger, more prominent Pathway signage
- Directional markers with time-to-station signage
- Frequent crossings
- Train time arrival/departure digital displays

TRANSIT-FRIENDLY ZONE (AREA 2)

10-Minute Walk/5-Minute Bike

- Less overt, more passive wayfinding and Pathway markers
- Address the most pressing safety and access improvements, such as:
  - New crossings
  - Curb ramps
  - Maintenance
  - Lighting and landscaping

How to Use this Guide

Category Labels each Component with one of the six categories: Crossing Enhancements and Connections; Signage and Wayfinding, Safety and Comfort, Allocation of the Streetspace, and Integrated Transit Access Solutions.

Component Name of Component.

Goal Describes what the Component should aim to do and who it should serve.

Guidelines and Resources Defines the Component. Guidelines presented focus on those aspects of design and planning that are particularly transit-supportive, rather than describing the full universe of good design standards or common best practices. References are included for other design and planning guidance. See the end of this chapter for a full list of references.

Transit Integration Identifies elements that can be used to identify or brand the Component as part of the Metro System, recognizable to the transit rider.

Pathway Network Compatibility Identifies relevance of Tool by pathway type (Collector, Arterial, or Cut-Through), and by sphere of influence (Area 1, the Extended Station Zone or Area 2, the Transit Friendly Zone.).

Issues Addressed Shows how the Component responds to the six critical Station Access Barriers, that identify which problem(s) it helps solve.

CROSSINGS AND CONNECTIONS

Cut-Throughs and Shortcuts

Goals

» Provide more direct routes to and from the station

Guidelines and Resources

» Design shortcuts with special paving, lighting, furnishings, and shade so that they are inviting to pedestrians of varying ages and abilities
» Design shortcuts to accommodate bicyclists and other active transportation users with a sufficiently wide pathway and smooth surface
» Use directional signage to the stations at entrances to shortcuts
» If located in the middle of the block, design shortcut paths that lead to a mid-block crossing for easier access across streets
» Make sure that pathways are well-maintained, well-lit, and located in "people-friendly" places, i.e. places that are well-traveled, highly-visible, and pedestrian-oriented
» Maintain existing cut-throughs and add safety enhancements

Transit Integration

» Use Metro signage at entrances and decision points
» Regularly place branded Metro medallion signage for the length of the pathway, every 60-100 ft approx

Station Access Barriers Addressed:

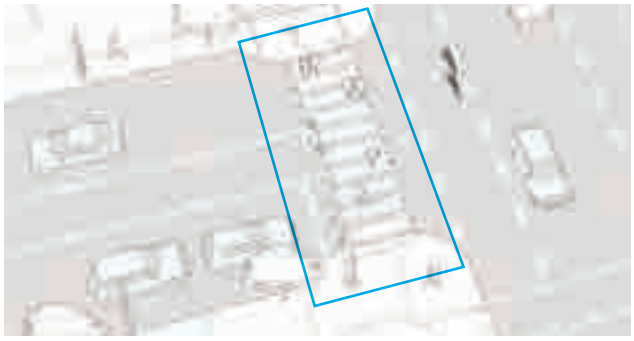
- [x] Long Blocks
- [ ] Freeways
- [x] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [ ] ROW Allocation and Design

Component Appropriate For Use On:

- [ ] Arterial 1
- [ ] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [x] Cut-Through

CROSSINGS AND CONNECTIONS

Enhance Existing Crosswalks



Goals

- Protect pedestrians and active transportation users when crossing vehicular traffic
- Enhance the visual presence of crosswalks to slow approaching vehicles

Guidelines and Resources

- Paint stripes on existing crosswalk (or use special paving or paint). Stripes may be perpendicularly- or diagonally-placed
- Incorporate advance stop bar or yield lines for on-coming vehicular traffic to give pedestrians more room to cross
- Where feasible, incorporate special paving at intersections to call further attention to the crosswalk
- Where feasible, install in-road warning lights or rectangular rapid-flashing beacons
- Use leading pedestrian intervals on transit-adjacent crossings, which give pedestrians a head start across the intersection
- Improve crosswalk lighting
- Resource: Manual on Uniform Traffic Control Devices Best Practices

Transit Integration

- Where feasible and applicable, paint stripe or edges of crosswalks to identify with Pathway network access route
- Couple crosswalks with directional signage

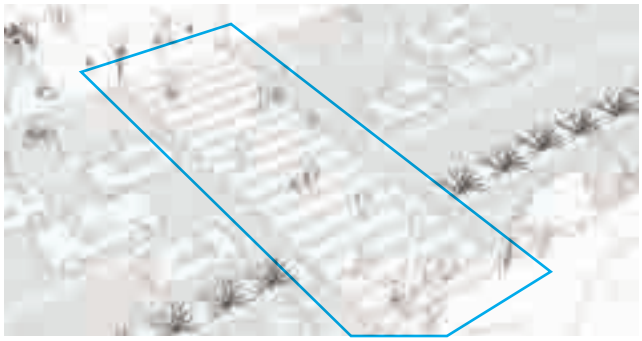
Station Access Barriers Addressed

- [x] Long Blocks
- [ ] Freeways
- [x] Maintenance
- [x] Safety and Security
- [x] Legibility
- [ ] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [x] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

Mid-Block and Additional Intersection Crossings



Goals

- Break up long blocks by allowing pedestrians to safely cross, thereby traveling shorter distances
- Provide visual cues to allow approaching motorists to anticipate pedestrian activity and stopped vehicles

Guidelines and Resources

- At mid-block crossings, or currently unsignalized intersections, introduce new crosswalks and vehicular control, such as pedestrian-oriented flashing beacons, in-road flashers, or HAWK (High-intensity activated crosswalk) signals, which are activated by a pedestrian push button
- Provide a crossing at least every 300 ft on average, as a good rule of thumb
- Add crossings around and adjacent to freeway overpasses/underpasses, so that pedestrians can navigate these areas more easily
- Resource: Safety Effectiveness of the HAWK Pedestrian Crossing Treatment

Transit Integration

- Where feasible and applicable, paint stripe or edges of crosswalks to identify with Pathway network access route.
- Couple crosswalks with directional signage
- Incorporate medallion signage or related branding on new crossing signal posts

Station Access Barriers Addressed

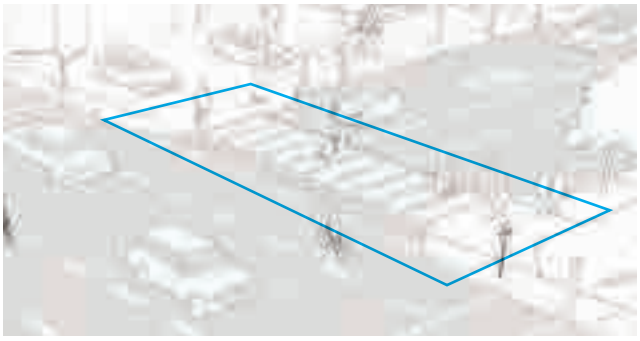
- [x] Long Blocks
- [x] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [x] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [x] Arterial 2
- [x] Collector 2
- [ ] Cut-Through

CROSSINGS AND CONNECTIONS

Raised Crossings



Goals

- Calm traffic at intersections along high-speed streets
- Visibly prioritize the pedestrian at key crossing locations

Guidelines and Resources

- Raise crossings to be flush with the sidewalk and use special paving material to differentiate them from the roadway
- Place raised crosswalks in areas with significant amounts of pedestrian traffic
- Entire intersections may also be raised
- Raised crosswalks may not be appropriate on streets with bus routes as they can slow and impede bus flow

Transit Integration

- Where feasible and applicable, paint stripe or edges of crosswalks to identify with Pathway network access route
- Key signage to intersection

Station Access Barriers Addressed

- [x] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [x] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

[Case Study] Raised Crosswalks in Boulder and Cambridge

Raised Crossings Aid in Pedestrian Safety

Boulder, Colorado[1]

In response to "poor driver compliance with crosswalk yield laws", designers in Boulder embarked on a mission to increase comprehensive crosswalk compliance. Raised crosswalks were implemented throughout the city to test driver compliance. The raised pedestrian crossings were installed at right-turn islands, and were found to "increase compliance from 69% to 91%." Accompanied by a number of other additional crossing enhancements, Boulder saw an overall increase of motorist crosswalk compliance by 43%.

Cambridge, Massachusetts[2]

Similar results were seen in Cambridge, where "raised crossings tripled the number of drivers yielding to pedestrians." Community surveys revealed that 69% of nearby residents felt that raised crossing enhancements were a better solution than the introduction of a traffic signal.

Cambridge, MA

On one street in Cambridge, MA, motorists yielding to pedestrians crossing at the raised devices went from approximately 10% before installation to 55% after.

CROSSINGS AND CONNECTIONS

Cut-Throughs and Shortcuts

Goals

» Provide more direct routes to and from the station

Guidelines and Resources

» Design shortcuts with special paving, lighting, furnishings, and shade so that they are inviting to pedestrians of varying ages and abilities
» Design shortcuts to accommodate bicyclists and other active transportation users with a sufficiently wide pathway and smooth surface
» Use directional signage to the stations at entrances to shortcuts
» If located in the middle of the block, design shortcuts that lead to a mid-block crossing for easier access across streets
» Make sure that pathways are well-maintained, well-lit, and located in people-friendly places, i.e. places that are well-traveled, highly-visible, and pedestrian-oriented
» Maintain existing cut-throughs and add safety enhancements

Transit Integration

» Use signage at entrances and decision points
» Regularly place medallion signage for the length of the pathway, every 60-100 ft approx

Station Access Barriers Addressed

- [x] Long Blocks
- [ ] Freeways
- [x] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [ ] ROW Allocation and Design

Component Appropriate For Use On:

- [ ] Arterial 1
- [ ] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [x] Cut-Through

Curb Extensions at Intersections

Goals

» Improve safety by shortening crossing distances, increasing pedestrian visibility, slowing turning vehicles, and visibly narrowing roadway for high-speed traffic
» Provide more room for walking/active transportation, along with seating areas, expanded access for transit waiting areas, and opportunities for bioswales, stormwater management, and other planted areas

Guidelines and Resources

» Place curb extensions on streets with high pedestrian volumes or pedestrian emphasis, or wide streets that are difficult to cross
» Incorporate bioswales, bollards, planters, or other objects along street edge to protect pedestrians
» Resource: Designing Sidewalks and Trails for Access, Best Practices Design Guide
» Design curb extensions at bus stops so that bus waiting areas are made larger and the bus does not have to pull out of the travel lane to pick up passengers

Transit Integration

» Couple curb extensions with established signage

Station Access Barriers Addressed

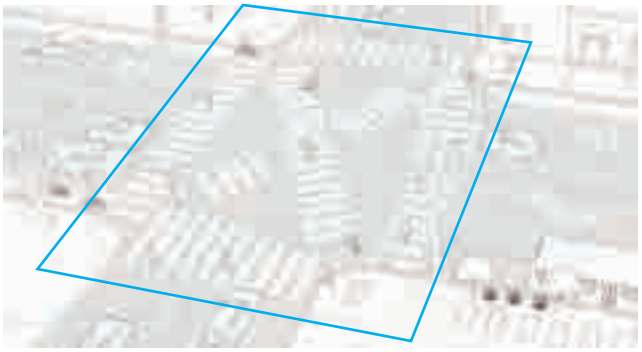
- [x] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

CROSSINGS AND CONNECTIONS

Scramble Crossings



Goals

- Prioritize the pedestrian at the intersection
- Increase safety and visibility for pedestrians
- Shorten crossing times for pedestrians

Guidelines and Resources

- Place scramble crossings in dense areas with a lot of commercial and pedestrian activity
- Paint continental striping or highly-visible pattern/ color fully across all four legs and both diagonal paths of the crosswalks
- Install informational signage that instructs pedestrians of appropriate crossing movements at scramble crossings
- Resource: Oakland Chinatown Pedestrian Scramble: An Evaluation
- Resource: Exclusive Pedestrian Phasing for the Business District Signals in Beverly Hills

Transit Integration

- Where feasible and applicable, paint stripe or edges of crosswalks to identify with Pathway network access routes
- Key signage to intersection

Station Access Barriers Addressed

- ☐ Long Blocks
- ☐ Freeways
- ☐ Maintenance
- ☑ Safety and Security
- ☑ Legibility
- ☑ ROW Allocation and Design

Component Appropriate For Use On:

- ☑ Arterial 1
- ☐ Collector 1
- ☐ Arterial 2
- ☐ Collector 2
- ☐ Cut-Through

[Case Study] Scramble Crossings in Beverly Hills[3]

In Beverly Hills' Business Triangle where daytime pedestrian activity is very high, there had been a high number of pedestrian/vehicle collisions. In the late 1980s the City modified traffic signals at eight locations to include scramble crossings. As Bijan Vaziri of the City of Beverly Hills Engineering Department notes, "after implementation, it seemed that people quickly became accustomed to the new operation. Public opinion has been very favorable..."

Safety was improved after installation of the scramble crossings as a study of collision data showed. Collision data from 10 years prior and 10 years after was compared and pedestrian/ vehicle collisions decreased significantly, by up to 63%. Furthermore, overall collisions in the Business Triangle were also reduced by 20%.

Scramble Crossings in Shabuya Crossings Tokyo, Japan

Beverly Hills saw an overall decrease in pedestrian/ vehicle collisions by as much as 63% after a series of scramble crossings were installed.

SIGNAGE AND WAYFINDING

Metro Signage and Maps

Goals

- Increase legibility of the urban landscape
- Increase visibility and awareness of proximity to transit station
- Display paths of travel to station and to local destinations

Guidelines and Resources

- Place signs on/near corners and decision points, regularly-spaced along a route approximately 200-300 ft. apart
- Use signs that relate to Metro's established family of signage
- Ensure that signs are pedestrian-scaled and oriented
- Use arrows and maps on these signs to highlight station location, common destination areas, and routes
- Consider the potential to stamp or stencil the Metro 'M' at corners on the sidewalk
- Resource: Legible London; A Wayfinding Study

Transit Integration

- Coordinate with Metro signage and branding efforts

Station Access Barriers Addressed

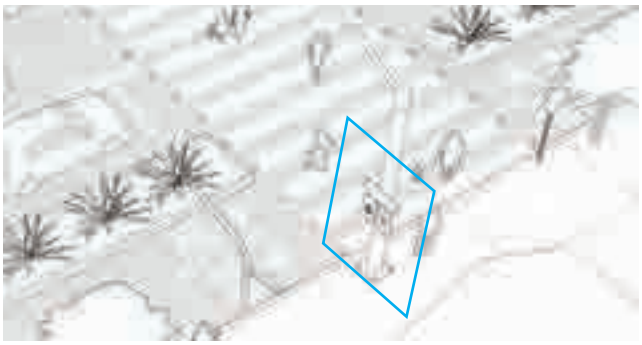
- ☐ Long Blocks
- ☐ Freeways
- ☐ Maintenance
- ☐ Safety and Security
- ☑ Legibility
- ☐ ROW Allocation and Design

Component Appropriate For Use On:

- ☑ Arterial 1
- ☐ Collector 1
- ☐ Arterial 2
- ☐ Collector 2
- ☑ Cut-Through

Medallion Signage

4



Goals

- Increase visibility and awareness of proximity to transit station
- Display paths of travel to station and to local destinations; pulls people along the Pathway
- Increase legibility of the urban landscape
- Help identify the Pathway with repetitive elements that are recognizable

Guidelines and Resources

- Place medallion signs on existing and new infrastructure such as light poles at heights that are visible to both pedestrians and active transportation users
- Place signs with a consistent rhythm down the Pathway, approximately every two or three blocks

Transit Integration

- Coordinate with Metro signage and branding efforts.
- Carry the color of the medallion sign to the ground plane where feasible

Station Access Barriers Addressed

- ☐ Long Blocks
- ☐ Freeways
- ☐ Maintenance
- ☐ Safety and Security
- ☑ Legibility
- ☐ ROW Allocation and Design

Component Appropriate For Use On:

- ☑ Arterial 1
- ☑ Collector 1
- ☑ Arterial 2
- ☐ Collector 2
- ☑ Cut-Through

SIGNAGE AND WAYFINDING

[Case Study] Legible London

Legible London is a city-wide, comprehensive, and intuitive wayfinding strategy in the city of London. Along with clear pylon signage, the program is coupled with simple navigational maps that depict average distances to and from key destinations and streets. The success of Legible London has made it an international model for wayfinding design. After an initial roll-out of the system in strategic locations in the heart of the city, a complete survey of the program has shown that it has had positive and impactful results. Select statistical findings confirm that:

- 83% of users acknowledge that the wayfinding system has helped them navigate the city
- The reported number of pedestrians getting lost on a journey fell by 65%
- 87% of users support a full roll-out of Legible London throughout the city

Legible London has also introduced new wayfinding tools that increase user legibility. Large key maps are complemented by in-road placard signage, traditional finger-posts, and taller, narrow posts that are placed in heavily congested areas.

Rather than orienting north to the top, Legible London uses heads-up mapping, a system that orients maps to face the same way the user is facing.

Simple and intuitive, the Legible London mapping and wayfinding program has reduced peak hour congestion on the tube by helping pedetrians navigate the street network.

SIGNAGE AND WAYFINDING

Time-to-Station Signage

Goals

- Increase awareness of active transportation, transit, and transit-proximity
- Encourage people to use active transportation modes
- Provide helpful navigation and information on distance and time to get to the station via alternative transportation

Guidelines and Resources

- Include pedestrian and bicycle times with directional arrows
- Consider the travel times for other active transportation users

Transit Integration

- Place notation on or adjacent to Pathway medallion signage

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [ ] Safety and Security
- [x] Legibility
- [ ] ROW Allocation and Design

Component Appropriate For Use On:

- [ ] Arterial 1
- [ ] Collector 1
- [x] Arterial 2
- [x] Collector 2
- [ ] Cut-Through

Real-Time Signage Adjacent to Station

Goals

- Facilitate a bus to rail transfer and allow active transportation users to pick the best transit option in real-time
- Warn user of expected delays
- Encourage use for first-time transit users

Guidelines and Resources

- Introduce dynamic signage that shows expected arrival times for buses, trains, etc.
- Place signs at or immediately adjacent to bus stops and subway portals (above ground)
- Maintain and update real-time signage as technological capabilities improve

Transit Integration

- Place real-time signage on or adjacent to Pathway medallion signage or other Pathway components, using consistent Pathway logo and design

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [ ] Safety and Security
- [x] Legibility
- [ ] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

SIGNAGE AND WAYFINDING

Smart Technologies

Goals

- » Increase the ease of use of alternative transportation modes
- » Encourage first-time users
- » Integrate with Metro Nextrip service
- » Integrate with on-demand ride-share and carpool services (i.e. Uber, Lyft and Sidecar)

Guidelines and Resources

- » Provide real-time information and expected transit arrival times on mobile devices
- » Provide detailed service advisories for delayed transit, and safety issues
- » Assist new users in finding stations using geospacial software
- » Run marketing campaign for initial launch
- » Design smart technologies to be used on all platforms
- » Resource: Smart Cities Applications and Requirements White Paper

Transit Integration

- » Integrate transit access into existing and planned smart technologies

Station Access Barriers Addressed

- ☐ Long Blocks
- ☐ Freeways
- ☐ Maintenance
- ☑ Safety and Security
- ☑ Legibility
- ☐ ROW Allocation and Design

Component Appropriate For Use On:

- ☐ Arterial 1
- ☐ Collector 1
- ☐ Arterial 2
- ☐ Collector 2
- ☐ Cut-Through

N/A

[Case Studies] Non-Signage Wayfinding

In-Pavement Trails and Markings

Wayfinding and signage are not always synonymous. Wayfinding can take the shape of any sort of consistent clue that helps someone understand where they are going. These clues can be more or less literal and are usually accommodated through a change in materials such as pavement or ground plane differentiation, lines and graphics imbedded in the pavement, raised symbols, changes in lighting, or a coordinated family of streetscape amenities.

The Freedom Trail in Boston, MA

Boston's Freedom Trail is a red path through downtown that leads pedestrians to key sites. The design of the path material changes as it passes through different areas, but the family of materials used remain consistent.

Melbourne

Decades ago, Melbourne installed pavement markers along various pedestrian walks around the City. The trail includes red granite and brass pavement inlays to demarcate it.

Freedom Trail, Boston, MA

Melbourne's Pedestrian Trail System

SAFETY AND COMFORT

Street Furniture

Goals

- Provide amenities to make active transportation users comfortable while travelling
- Increase number of eyes-on-the-street by providing places for people to sit comfortably

Guidelines and Resources

- Along streets with heavy pedestrian traffic, place street furniture and pedestrian amenities, such as benches, bike parking, skateboard parking, charging stations, etc.
- Place street furniture regularly and rhythmically
- Maintain clear paths of travel around furniture with enough clearance to accommodate active transportation users along the sidewalk
- Maintain and clean existing street furniture along Pathway networks
- Install parking areas for bikes, scooters, and other active transportation mobility devices along Pathways, near destinations and front doors
- Where feasible, use environmentally sustainable materials

Transit Integration

- Street furniture may respond to the street furniture family already in place at that particular location

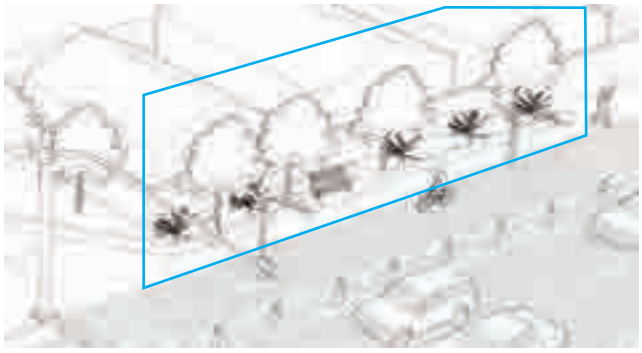
Station Access Barriers Addressed

- ☐ Long Blocks
- ☐ Freeways
- ☑ Maintenance
- ☑ Safety and Security
- ☐ Legibility
- ☑ ROW Allocation and Design

Component Appropriate For Use On:

- ☑ Arterial 1
- ☑ Collector 1
- ☑ Arterial 2
- ☐ Collector 2
- ☑ Cut-Through

Landscaping and Shade



Goals

- Provide refuge from the sun
- Provide pleasant and safe pathways and resting spaces for transit users

Guidelines and Resources

- Plant shrubs, trees, etc. along sidewalks edges of pathways with heavy vehicular traffic, to buffer active transportation users and filter the air
- Maintain and enhance existing landscaping
- Provide shade structures in areas where pedestrians gather and along pathways

Transit Integration

- Landscaping along Pathway networks may respond to the landscape identity already in place at that particular location.

Station Access Barriers Addressed

- ☐ Long Blocks
- ☐ Freeways
- ☑ Maintenance
- ☑ Safety and Security
- ☐ Legibility
- ☑ ROW Allocation and Design

Component Appropriate For Use On:

- ☑ Arterial 1
- ☑ Collector 1
- ☑ Arterial 2
- ☑ Collector 2
- ☑ Cut-Through

SAFETY AND COMFORT

Lighting

Goals

» Increase safety and aid in night navigation for active transportation users along Pathway routes

Guidelines and Resources

» Provide pedestrian-oriented light fixtures along sidewalks, spaced as needed, approximately every 30 feet on center
» Install lighting rhythmically and consistently, in coordination with existing street light pattern
» Assure that lights are not located within tree canopies, which may block the light
» Maintain existing light fixtures on street
» Consider installing lights that are efficient and/or motion activated/self powered in areas where constant light is not needed
» Provide uniform light levels along the sidewalk and assure that other paths of travel for active transportation users are also well-lit
» Install lighting around bus stops and bus to rail transfer routes

Transit Integration

» Closer to the station, wrap pedestrian light poles with stripes and/or Metro color palette so that visually the poles guide the active transportation user to or from stations

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [x] Legibility
- [ ] ROW Allocation and Design

Component Appropriate For Use On:

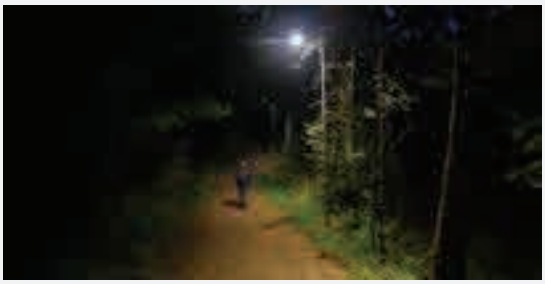
- [x] Arterial 1
- [x] Collector 1
- [x] Arterial 2
- [x] Collector 2
- [x] Cut-Through

[Case Study] Active Lights[10]

Motion Activated, Solar Pedestrian Lighting

Quality pedestrian lighting ensures a safe environment for pedestrians and active transportation users alike. With regularly spaced pedestrian lighting comes increased visibility, perception of safety, and eyes-on-the-street.

New pedestrian lighting strategies involve creative ways to light up active transportation networks. For example, a number of cities in Sweden have been using Active Lights. The design incorporates an LED lighting system that is motion activated to provide security and lighting for those who pass by. Using solar energy, this system is self-powered and extremely cost effective.



Active Lights in Sweden

Active Lights Illustration

Studies of the Active Lights show a 65% reduction in nighttime fatal accidents, a 30% reduction in nighttime injury accidents, and a 15% reduction in nighttime property-damage-only accidents.

SAFETY AND COMFORT

Freeway Underpass & Overpass Enhancements

Goals

- Increase pedestrian, bicycle and personal mobility safety and comfort
- Incorporate visually-enagaging elements at freeway crossings that make for a more friendly street and pull active transportation users along the Pathway, by giving them compelling things to look at

Guidelines and Resources

- Provide lighting that illuminates the overpass/ underpass at all hours of the day and night
- Where feasible incorporate public art in the tunnel or on the overpass
- Maintain existing overpasses/underpasses
- Improve the experience and perception of safety along the sidewalk with special paving and bollards along the curb edge. On overpasses, introduce trees in planters where space permits along curb edges or growing vines along edge fences
- Take advantage of underutilized space in the roadway to expand the sidewalk where feasible

Transit Integration

- Incorporate Metro elements such as lighting, signage, and paving treatments along the sidewalk to direct pedestrians and active transportation users across the freeway

Station Access Barriers Addressed

- [ ] Long Blocks
- [x] Freeways
- [x] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [x] Cut-Through

Enhanced Bus Waiting Areas

Goals

- Enhance transit riders' level of comfort
- Improve safety for users at night by improving facility visibility

Guidelines and Resources

- Increase seating options and provide bus shelters at bus stops where space permits
- Provide shading, lighting, and public art where space permits
- Couple street furniture (e.g. lighting, trash cans, and parking for varying mobility devices) with enhanced bus stops
- Add real-time transit signage that displays next bus and train estimated arrival/departure time
- Incorporate informational wayfinding signage, route maps, and a push-to-talk assistance button
- Maintain existing bus waiting area facilities
- Introduce a transit boarding island or bulb-outs to allocate more space for bus boarding, where feasible

Transit Integration

- Use signage at bus waiting areas

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [x] Maintenance
- [x] Safety and Security
- [x] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

SAFETY AND COMFORT

Traffic Calming

Goals

- Decrease speeds along heavily trafficked streets to protect multi-modal users on Pathway networks
- Reduce collisions and conflicts between modes
- Increase awareness of transit stations
- Begin to establish safe transit-zones around Metro transit areas
- Allow for NEV integration within Transit Friendly Zone

Guidelines and Resources

- Paint reduced speed MPH signs in and along roadway for vehicular travellers
- Use narrow travel lanes that naturally cause motorists to slow. Use 11feet as a good maximum width for outside lanes and 10 feet as a good average width for inside lanes
- Use physical measures such as curb extensions to narrow the roadway
- Promote police enforcement of new 'transit-zone' friendly speeds
- When calming traffic, consider impact on bus service; while the goal is to increase safety for active transportation users, the usability and convenience of the Metro bus service should not be comprimised

Transit Integration

- N/A

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [ ] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

Sidewalk Paving & Surface Enhancements

Goals

- Make it easier and smoother to walk and roll along the sidewalk
- Make areas for different modes on the sidewalk, apparent and obvious, for improved safety

Guidelines and Resources

- In areas were multiple modes are converging, consider using paving, pavers, and other ground plane treatment differentiation in linear zones along the sidewalk to help people understand where they should be walking or rolling, so that conflicts are avoided
- Use enhanced paving to highlight pedestrian facilities, edges, and sidewalk amenities, for example along curb edges, around tree wells, in seating areas, or at corners or crossings. These treatments make the sidewalk a nicer place to be and an easier place to navigate.
- Use appropriate, slip resistent paving and surfaces. If people are expected to roll or bike across the surface, make sure that it is smooth, without bumps.

Transit Integration

- Consider coordinating the color and style of the surface treatment with bundled improvements
- Use color, pattern, or texture to provide cues to transit riders that they are approaching a station or stop

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [x] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

ALLOCATION OF STREETSPACE

Reduced Lane Width

Goals

» Narrow vehicular lane widths, were possible, to help promote slower driving speeds, reduce the severity of vehicular crashes, and reduce crossing distances
» Gain under utilized space that can be used for more transit-friendly uses, such as bus access, extended sidewalks, buffer-zones, protected bicycle lanes, and bulb-outs

Guidelines and Resources

» In urban areas where traffic volumes and bus usage permits, do not use lanes that are wider than 11 feet, ideally 10 feet
» Use striping to channelize traffic, and create buffer zones or delineate parking from travel lanes (pictured)

Transit Integration

» Confirm Lane width requirements for efficient bus operations

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [x] Arterial 2
- [x] Collector 2
- [ ] Cut-Through

Enhanced Bike Facilities

Goals

» Provide bike facilities that are separated and/or protected from vehicular traffic

Guidelines and Resources

» Convert existing standard bike lanes or sharrows into protected facilities where feasible
» On streets that have heavy traffic, multiple lanes, lots of parking turnover, and existing or potential high bicycle ridership, consider installing separated cycle tracks to protect cyclists and make cycling more comfortable and inviting to all users
» On streets with high speeds, few driveways or cross streets, and high demand for bicycle access, consider installing raised cycle tracks
» On streets where cyclists are already riding the wrong way, where direct access is very difficult for cyclists, where two way connections are needed, and where traffic is low-speed and low volume, consider installing contraflow bike lanes or bike routes that cut-through blocks
» Other protected facilities and bike enhancements recommended for transit zones include: buffered bike lanes, bike boxes, bike signal heads, and bike signal detection

Transit Integration

» For separated facilities use paint on the street surface to conform with bundled improvements
» Consider signage, both directional and wayfinding

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [x] Arterial 2
- [x] Collector 2
- [x] Cut-Through

ALLOCATION OF STREETSPACE

Bus Enhancements

Goals

» Provide dedicated space and more direct access for buses, which facilitates travel by bus and makes transfers easier for bus riders.

Guidelines and Resources

» Use bus-only lanes and design lights for buses, along long transit corridors
» Consider the application of contra-flow bus lanes where streets are one-way, but short, efficient connections could be made for buses
» Consider the use of dedicated bus lanes and bus stops bulbs that make it easier for bus operators to pick up passengers and re-enter traffic
» Consider the application of far-side bus stops - stops that are past the intersection rather than before it, which are safer in terms of pedestrian crossing and easier in terms of bus traffic flow
» See Enhanced Bus Waiting Area Tool

Transit Integration

» Integrate these improvements into the Metro brand, in terms of signage, wayfinding, and any special treatments to the ground plane

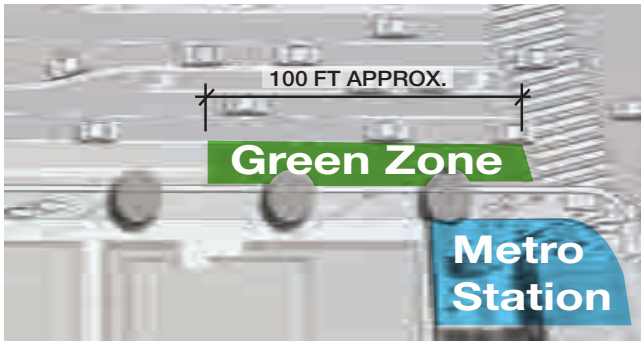
Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

The Green Zone



Goals

» Prioritize green vehicles and active transportation uses at or very near the station area

Guidelines and Resources

» Dedicate a Green Zone within the parking lane, parking area, or outside travel lane adjacent to station areas, which is marked with paint and identity/safety signage and which allows area for green transportation such as pick up/drop off for shared rides, parking for electric vehicles, bus stops, car share parking, etc.
» Configure the Green Zone as space allows in each particular condition; sometimes the Zone may best serve as a bus waiting area or a kiss-and-ride location, while in others, car share or electric vehicle parking might be most appropriate

Transit Integration

» Use eye-catching paint and graphics on the street pavement and on signage to help brand the Green Zone as part of the Metro system

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [x] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

ALLOCATION OF STREETSPACE

[Case Study] Rolling Lanes

The idea of Rolling Lanes is to reorganize the streetspace to accommodate a wide spectrum of active transportation users, giving both more and better space and safer facilities. Internationally, cities are introducing their own versions of Rolling Lanes. Read below for precedents.

Copenhagen[11]

In 2010, the City of Copenhagen introduced the Conversation Lane, a throughway that aims to solve conflicts that arise as a result of varying mobility speeds. Citing the increase in electric bicycle sales and the ever-expanding range of mobility rolling options, designers have called the Conversation Lane a social cycle path, which will allocate more space for alternative transit modes.

Given the natural, self-organizing tendency of bicycle movements (faster traffic moves to the left while slower traffic shifts to the right), designers chose to allow "unusually wide social cycle paths" to accommodate a wider range of users. Additionally, the proposed program utilizes advancements in information technology by incorporating speed detecting signs that direct users to shift lanes depending on their independent speeds.

Conversation lanes are designed to give cyclists room to travel comfortably beside each other and will be designed alongside a fast lane; a separated bicycle facility for cyclists wishing to pass or move faster than 'normal' speed cyclists.

Conversation Lanes, Copenhagen

The Netherlands[12]

Similarly, in the Netherlands, the Dutch Ministry for Infrastructure and the Environment allocated €21million to build wide, high-capacity cycle routes to reduce overall cycling trip time. Named Fiets Filevrig (Queue-Free Cycling), the program is aimed to attract cyclists that experience congestion on cycle routes.

Queue-Free Cycling in the Netherlands

Copenhagen has committed to the goal of providing conversation lanes alongside 80% of their already established cycle routes, ultimately encouraging riders of all speeds and levels to embrace the city's cycling culture.

ALLOCATION OF STREETSPACE

United States [13,14]

In the United States, a number of cities are implementing their own versions of a Rolling Lane.

Portland and Chicago have both introduced passing lanes for cyclists at key conflict points. In Portland the new markings expand the bike lane to 10 feet, and include side-by-side bike lane symbols that separate slow and fast lanes. New striping was completed to allow easier and safer passing on an uphill segment of one of Portland's heavily congested bikeways.

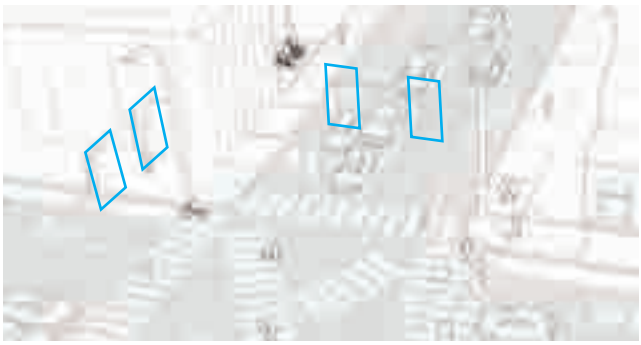
The Park Slope neighborhood of Brooklyn is also gearing up for some proposed changes in response to an increase in collisions between pedestrians and bicyclists. The plan introduces a new Ped/Child Cyclist lane, a widened slow bike lane, and a sharrow lane for faster cyclists. Vehicular traffic is shifted into one lane.

In March 2010, San Diego State University opened a dual skateboard/bike lane.

Portland, Oregon's Passing Lanes

Proposed Configuration of Prospect Park Loop, Park Slope, Brooklyn

Signal Modifications



Goals

- Slow vehicular speeds within transit zones
- Give crossing priorities to pedestrians and active transportation users
- Time signals to ease traffic and minimize conflicts between pedestrians and vehicles
- Begin to establish safe transit-zones around Metro transit areas

Guidelines and Resources

- Set vehicular signal timing for moderate progressive speeds, rather than aggressive speeds along Pathway routes
- Time signals to provide pedestrians and other active transportation users lead time for crossing before vehicular travel
- Use bus and bike detection at traffic signals for prioritization of active transportation devices
- Add pedestrian-actuated signals for crossings

Transit Integration

- N/A

Station Access Barriers Addressed

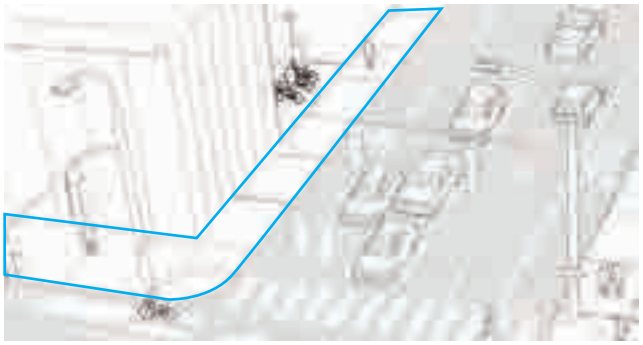
- ☐ Long Blocks
- ☐ Freeways
- ☐ Maintenance
- ☑ Safety and Security
- ☐ Legibility
- ☐ ROW Allocation and Design

Component Appropriate For Use On:

- ☑ Arterial 1
- ☑ Collector 1
- ☐ Arterial 2
- ☐ Collector 2
- ☐ Cut-Through

ALLOCATION OF STREETSPACE

Sidewalk Widening



Goals

- Shift the balance of the roadway so that it caters more to active transportation users of all types within station areas and transit zones
- Increase safety and comfort on the sidewalk for active transportation users
- Provide enough room on the sidewalk for active transportation users of varying speeds, ages, abilities, using varying mobility device types

Guidelines and Resources

- Couple sidewalk widening with the provision of amenities such as street furniture, lighting, and landscaping
- Maintain existing sidewalks, fix buckling sidewalks, pick up trash, etc.
- Assure that utility boxes and other auxiliary infrastructure is placed secondarily to through movement and does not impede access of pedestrians and other active transportation users
- Where space permits, introduce parklets in underutilized right of way
- If more permanent solutions are untenable, consider using temporary installations to test sidewalk improvements. Examples of these may include temporary extensions of the pedestrian realm into the right-of-way, through parklets and temporary plazas.

Transit Integration

- Consider identifiable paving treatments

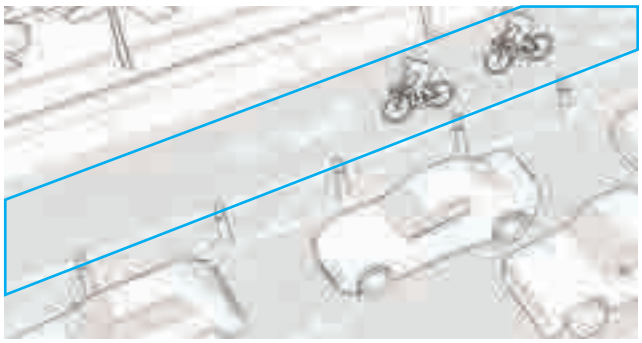
Station Access Barriers Addressed

- [x] Long Blocks
- [x] Freeways
- [x] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

Rolling Lane



Goals

- Shift the balance of the roadway so that it caters more to active transportation users of all types within station areas and transit zones
- Increase safety and comfort in the roadway for active transportation users
- Provide a passing lane for faster riders

Guidelines and Resources

- Convert existing bike lanes into Rolling Lanes and add new Rolling Lanes within a 1/4 or 1/2 mile radius of the station, where feasible. Rolling lanes are dedicated lanes, wider than standard bike lanes, which welcome users of varying speeds beyond bicyclists such as scooter riders, electric bicycles, skateboarders, etc.
- Paint fast/slow indicators in the Lane, giving ample room for passing at conflict points such as crosswalks and hills.
- Ideally provide buffer (painted or raised, e.g. planter, parking, or bollards) to separate active transportation users comfortably from vehicular traffic.
- Couple with informational signage, traffic markings, and dedicated signalization through intersections
- Allow cyclists to also travel outside of the Rolling Lane, contrary to current regulation regarding bike lanes.
- Coordinate Rolling Lane design/placement with bus operations needs and stop locations; the bus/bike interface should be coordinated for maximum impact
- Resource: Urban Bikeway Design Guide

Transit Integration

- At conflict zones, apply paint on street

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [x] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [x] Arterial 2
- [x] Collector 2
- [ ] Cut-Through

PLUG-IN COMPONENTS

Car Share

Goals

- Increase connectivity to Metro stations
- Encourage multi-modal options and modal transfers
- Increase transportation flexibility
- Expand modal opportunities for those that are transit dependent
- Reduce Vehicle Miles of Travel (VMT) and Greenhouse Gas (GHG) emissions
- Provide direct connections to major destinations (i.e. LAX, Union Station, Regional Universities)

Guidelines and Resources

- Locate pick-up/drop-off spaces for car share in the Green Zone or in another highly-visible and convenient location
- Incorporate signage near station areas that informs the transit rider of car share options
- Contract with private company to begin car share program
- Resource: See Zip Car, LAX Car Share, City Carshare, Philly Carshare, Lyft, Uber and Sidecar

Transit Integration

- Use signage at car share stations and as directional indicators to the stations

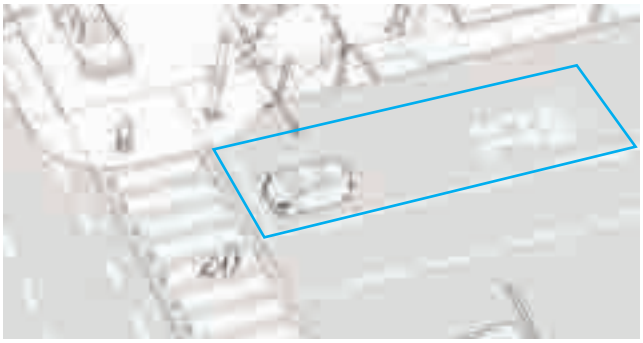
Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [ ] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

Neighborhood Electric Vehicles (NEVs)



Goals

- Increase connectivity to Metro stations
- Encourage the use of electric and alternative mobility devices that are zero emissions
- Increase transportation flexibility
- Integrate multi-modal serviece offerings

Guidelines and Resources

- Introduce NEV charging stations within designated Green Zone
- Provide NEVs (and other low-speed, electric vehicles) priority parking stalls in micro park-and-ride facilities, which are closer to the entrances/exits
- Allow compact NEVs to travel in Rolling Lanes, when traveling at reduced speeds

Transit Integration

- Use signage at NEV parking locations and to and from these areas as directional indicators to the stations

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [ ] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [x] Arterial 2
- [x] Collector 2
- [x] Cut-Through

PLUG-IN COMPONENTS

Bike Share and Bike Station

Goals

- Increase connectivity to Metro stations
- Increase low-cost public transportation options
- Reduce Vehicle Miles of Travel (VMT) and Greenhouse Gas (GHG) emissions
- Reduce traffic by decreasing the number of cars on the road
- Encourage physical activity
- Increase retail exposure and enhance nearby commercial areas

Guidelines and Resources

- Locate bike share/bike stations in highly-visible areas near or at Metro transit stations
- Strategically locate bike share/bike stations along transit corridors, existing or proposed bikeways, popular destinations, and retail/job centers, to ensure that users can pick-up/drop-off bikes conveniently
- Couple bike share with smart technologies that help active transportation users navigate the system

Transit Integration

- Use signage at bike share stations and as directional indicators to the stations

Station Access Barriers Addressed

- ☐ Long Blocks
- ☐ Freeways
- ☐ Maintenance
- ☐ Safety and Security
- ☐ Legibility
- ☑ ROW Allocation and Design

Component Appropriate For Use On:

- ☑ Arterial 1
- ☑ Collector 1
- ☐ Arterial 2
- ☐ Collector 2
- ☑ Cut-Through

[Precedents] Bike Share

Paris, France

Paris, France, is home to Velib – one of the largest bike share programs in the world. Boasting 20,000 bicycles and more than 1,800 bike-stations, Velib is available 24/7, with stations located every 1000 feet, allowing for convenient pick-up and drop-off. Station density typically increases around transit hubs, and stations vary in size depending on demand. Interactive maps and competitive rates have made the program one of the most accessible bike share programs in the world. Velib was one piece of Paris' city-wide strategy to dramatically increase active transportation specific infrastructure, prioritizing the expansion of alternative modes over vehicular modes.

United States

Bike share programs are becoming increasingly popular in the United States. In 2013, New York City introduced CitiBikes, adding to the growing list of U.S. cities that are implementing comprehensive bike share programs. Other bike share programs include Washington D.C.'s Capital Bike Share, Boston's Hubway, Denver's B-cycle, Miami Beach's Deco Bike and Minneapolis' Nice Ride.

Paris Velib Bike Share

New York City Citibike Share

PLUG-IN COMPONENTS

Van Pool and Feeder Bus

Goals

- Increase connectivity to Metro stations
- Increase low-cost public transportation options, especially for commuters
- Reduce Vehicle Miles of Travel (VMT) and Greenhouse Gas (GHG) emissions
- Reduce traffic by decreasing the number of cars on the road

Guidelines and Resources

- Locate pick-up/drop-off areas for van pool and feeder bus in the Green Zone or in another highly-visible and convenient location
- Retrofit existing feeder bus stops and van pools with Pathway signage
- Resource: See Emery Go-Round or LA DASH

Transit Integration

- Use signage at van pool/feeder bus pick up/drop off locations and to and from these ares as directional indicators to the station

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [ ] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

[Precedents] Integrated Access Solutions

Philly CarShare, Philadelphia, PA

Curbside electric Vehicle charging station, Portland, OR

Feeder Bus: Emery Go-Round, Emeryville, CA

PLUG-IN COMPONENTS

High-Visibility Bicycle Parking

Goals

» Provide easy-to-access and easy-to-see bicycle parking (may be located on-street), adjacent to building front doors, sidewalks, and crossings.

Guidelines and Resources

» Locate bike parking within easy walking distance to main building entrances, and in highly visible locations that are well-lit and secure
» Where sidewalk space is limited and where cycling demand is high, consider installing bike corrals (pictured above) on the street
» Bike corrals need not remove existing parking stalls if placed creatively, for example immediately adjacent to crosswalks where the curb is already painted red
» Protect bike corrals from vehicular traffic at edges
» Regularly maintain existing bike corrals and bike parking areas
» Typical bike corrals that replace a parking space accommodate parking for 16 bicycles

Transit Integration

» Include signage at bike parking locations and at decision making points, which points riders to the parking areas

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [x] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [ ] Collector 1
- [x] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

Electronic Bicycle & Pedestrian Counters

Goals

» Gather information on bicycle and pedestrian usage, pre- and post-improvement to understand usage patterns, help justify investments, assess impacts, rank sites, and plan maintenance

Guidelines and Resources

» Use electronic counters to sense both pedestrians and bicyclists at critical locations along transit routes
» Show counts and locations online to raise awareness and so that people can participate in the data gathering
» Coordinate with local groups to publicize counters and strategically use the data that is collected

Transit Integration

» Use signage on counters and in related publicity materials

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [ ] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [ ] Collector 1
- [x] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

PLUG-IN COMPONENTS

[Case Studies] Electronic Bicycle and Pedestrian Counters

Make the Need Visible with Electronic Bicycle Counters

Popularized in Copenhagen and brought to the US first in Portland, OR, electronic bicycle counters help to gather data and improve measurements of progress toward increasing bike ridership.

Seattle, WA

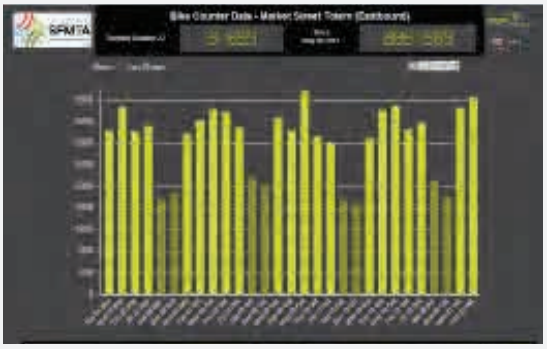
In 2013, Seattle's City Council voted to install seven additional bike counters (added to the two they already have).

San Francisco, CA

In 2013, San Francisco started using California's first bike traffic counter on Market Street.

Arlington, VA

Arlington County has set up a system of permanent automatic counters that monitor both bicycle and pedestrian numbers, 24 hours a day at selected locations.



Findings from the bike counter in San Francisco are shared online

One of Seattle's bike counters

Reward System – Zap Readers

The Minneapolis and St. Paul Transportation Management Organizations promote sustainable transit and transportation systems and work directly with employers to encourage the use of active transportation.

The Organizations installed a Zap system that detects bikes as they pass and then reports the data received at each station. The system uses RFID tags on the front wheel of registered bikes and 20 meters on major bicycle routes in a ring around downtown Minneapolis and St. Paul. Any commuter can participate in the program and putting an RFID tag on their bike and the program is free to use. People who participate receive rewards and information tailored to them.

Pedestrian Counting in Melbourne

The City of Melbourne has a website that depicts the information gathered from 18 pedestrian counting sensors located around the central business district. The system is giving the City a better understanding of how people use the streets and how they can be better managed to cater to pedestrian needs.

Pedestrians in downtown Melbourne are monitored by the pedestrian counter (upper right corner of image)

Installing the RFID tag in the bike wheel, for tracking and counting purposes; Zap Minneapolis and St. Paul.

PLUG-IN COMPONENTS

Kiss and Ride

Goals

- Increase connectivity to Metro stations
- Provide drop off areas that are safe and convenient to the station in order to encourage shared rides
- Reduce Vehicle Miles of Travel (VMT) and Greenhouse Gas (GHG) emissions
- Reduce traffic by decreasing the number of cars on the road

Guidelines and Resources

- Designate pick-up/drop-off areas within the Green Zone or in another highly-visible and convenient location
- Coordinate design and placement of drop off faciltiies with bus operations and bus stop locations

Transit Integration

- Use signage at pick-up/drop-off locations and as directional indicators between this area and the station

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [x] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

Micro Park-and-Ride

Goals

- Provide parking areas for transit users that are uncoupled from the station area, thereby freeing up valuable land immediately at the station for development potential and joint-use. Concept requires furhter study.

Guidelines and Resources

- Design micro park-and-ride areas within three blocks (or 1/4 mile) from the transit station, linked by wayfinding and possibly bike-share access solutions
- Choose compact parking typologies, from parking structures with retail integrated into the ground floor, to smaller surface lots and automated parking facilities
- Include waiting and parking areas for green vehicles such as shared ride vans, car shares, etc.
- Generate revenue from existing park-and-ride facilities by charging for parking
- Further review this concept relative to Metro parking utilization studies

Transit Integration

- Use wayfinding signage and colors throughout parking area

Station Access Barriers Addressed

- [ ] Long Blocks
- [ ] Freeways
- [ ] Maintenance
- [ ] Safety and Security
- [ ] Legibility
- [x] ROW Allocation and Design

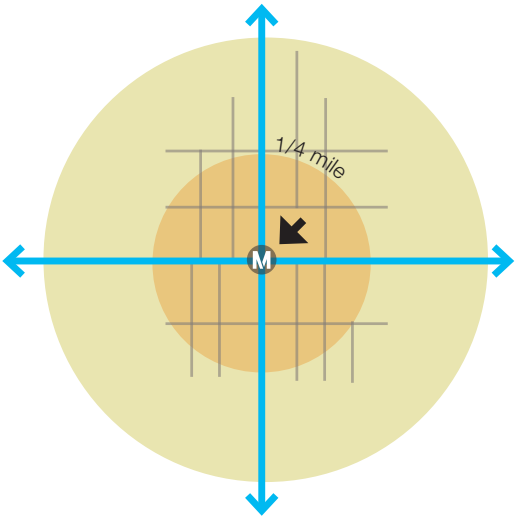
Component Appropriate For Use On:

- [x] Arterial 1
- [x] Collector 1
- [ ] Arterial 2
- [ ] Collector 2
- [ ] Cut-Through

PUTTING IT TOGETHER - ILLUSTRATION

Extended Station Zone

» Typical application in regional centers, with the region's largest concentration of housing and jobs. Refer to CSPP Place-types D. - *http://media.metro.net/projects_studies/sustainability/images/countywide_sustainability_planning_policy.pdf*

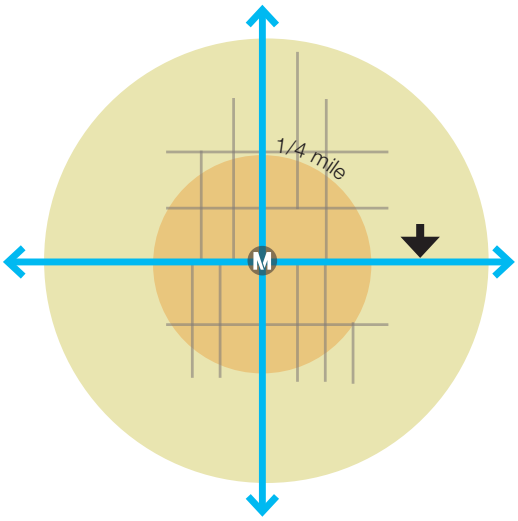


1. Metro Station Portal and Plaza
2. Signage with Real-Time Transit Information
3. Medallion Signage and Curb-Edge Banding
4. Colored Scramble Crossings
5. Advisory Bike Lane (see Rolling Lane)
6. Green Zone and Kiss-and-Ride
7. Bike Share/Bike Station
8. Bulb-Outs at Intersections
9. Traffic Calming
10. Enhanced Bus Facilities
11. Sidewalk Widening

PUTTING IT TOGETHER - ILLUSTRATION

Mid-Block Crossing

» Typical application in urban neighborhoods, with large concentrations of housing and mostly neighborhood serving retail. Refer to CSPP Place-types C. - *http://media.metro.net/projects_studies/sustainability/images/countywide_sustainability_planning_policy.pdf*

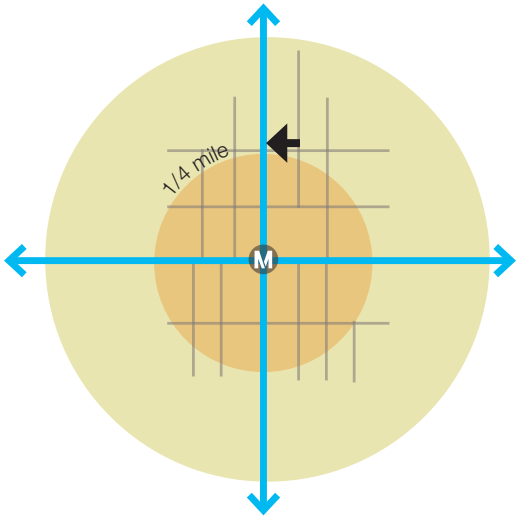


1. Added Mid-Block Crossing
2. Cut-Through/Shortcut
3. Signage with Directional Arrows
4. Medallion Signage and Paved Treatments
5. Street Furniture
6. Landscaping
7. Lighting
8. Rolling Lane/Protected Bike Lane
9. Signal Modifications
10. Bike Share

PUTTING IT TOGETHER - ILLUSTRATION

Transit-Friendly Zone

» Typical application in sub-regional centers that act as activity and transit hubs for surrounding suburban neighborhoods or lower density employment/industrial parks. Refer to CSPP Place-types A & B - *http://media.metro.net/projects_studies/sustainability/images/countywide_sustainability_planning_policy.pdf*



1. Medallion Signage
2. Continental Crosswalks
3. Rolling Lane
4. Car Share
5. Micro Park-and-Ride
6. Van Pool
7. Dual Curb Ramps
8. Signal Modifications
9. Pedestrian Lighting
10. Landscaping

RESOURCES

General and Best Practices

- Active Design Guidelines: Promoting Physical Activity and Health in Design, City of New York, 2010: http://www.nyc.gov/html/ddc/html/design/active_design.shtml
- Are We There Yet? Creating Complete Communities for 21st Century America, Reconnecting America, 2012: http://www.reconnectingamerica.org/resource-center/books-and-reports/2012/reconnecting-america-releases-are-we-there-yet-creating-complete-communities-for-21st-century-america/
- Beautiful Places: The Role of Perceived Aesthetic Beauty in Community Satisfaction, Working Paper Series, Martin Prosperity Research, Richard Florida, University of Toronto; Charlotta Mellander, Jönköping International Business School; Kevin Stolarick, University of Toronto, 2009: http://www.creativeclass.com/rfcgdb/articles/Beautiful%20places.pdf
- Boston Complete Streets: http://bostoncompletestreets.org
- Case Study Compendium, Pedestrian and Bicycle Information Center, 2009: http://www.bicyclinginfo.org/case_studies/
- Complete Street Design Guidelines, Tennessee Department of Transportation, 2009: http://www.tdot.state.tn.us/bikeped/CompleteStreets.pdf
- Complete Streets Chicago, Department of Transportation, 2013: http://www.cityofchicago.org/content/dam/city/depts/cdot/Complete%20Streets/CompleteStreetsGuidelines.pdf
- Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, Institute of Transportation Engineers, 2006: http://www.ite.org/bookstore/RP036.pdf
- Designing Sidewalks and Trails for Access, Best Practices Design Guide, Federal Highway Administration, Part II of II, 2001: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/contents.cfm
- Good Design: The Fundamentals, Commission for Architecture and the Built Environment, 2008: http://www.rudi.net/files/paper/optional_file/good-design.pdf
- Inclusion by Design: Equality, diversity, and the built environment, Commission for Architecture and the Built Environment, 2008: http://www.humancentereddesign.org/sites/default/files/ABX2012/CABE_inclusion_by_design.pdfManual for Streets, Department for Transport, London, 2007
- Manual on Uniform Traffic Control Devices, Best Practices, 2012
- Measuring the Street: New Metrics for 21st Century Streets, New York Department of Transportation, 2012: http://www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf
- Paved with Gold: The real value of good street design, Design Better Streets, Commission for Architecture and the Built Environment, 2007: http://webarchive.nationalarchives.gov.uk/20110118095356/http:/www.cabe.org.uk/publications/paved-with-gold
- Paving the Way: How we achieve clean, safe and attractive streets, Commission for Architecture and the Built Environment, 2002: http://webarchive.nationalarchives.gov.uk/20110118095356/http:/www.cabe.org.uk/files/paving-the-way.pdf
- San Francisco Better Streets Plan, City of San Francisco, 2011: http://www.sf-planning.org/ftp/BetterStreets/index.htm
- Street Design Manual, New York City Department of Transportation, 2009: http://www.nyc.gov/html/dot/html/pedestrians/streetdesignmanual.shtml
- Smart Growth America, Complete Streets Resources, http://www.smartgrowthamerica.org/complete-streets/complete-streets-fundamentals/resources
- The Value of Urban Design, Commission for Architecture and the Built Environment, Department of the Environment, Transport and the Regions, 2001: http://www.designcouncil.org.uk/Documents/Documents/Publications/CABE/the-value-of-urban-design.pdf
- Urban Street Design Guide, National Association of City Transportation Officials (NACTO), forthcoming in summer 2013: http://nacto.org/wp-content/uploads/2012/10/NACTOUrbanStreetDesignGuide_Highrez.pdf
- Walking the Walk: How Walkability Raises Home Values in U.S. Cities, CEO for Cities, 2009: http://www.ceosforcities.org/research/walking-the-walk/

First Last Mile Best Practices

- Mobility Hub Guidelines: For the Greater Toronto and Hamilton Area, Metrolinx, Ontario, 2011: http://www.metrolinx.com/en/projectsandprograms/mobilityhubs/mobility_hub_guidelines.aspx

Los Angeles-Specific Resources

- Downtown Design Guide, City of Los Angeles, 2009: http://urbandesignla.com/downtown_guidelines.htm
- Final Report: Recommended TDM Strategies and Actions for the City of Los Angeles, Transportation Demand Strategies, Southern California Association of Governments and Los Angeles Department of Transportation, 2011: http://www.scag.ca.gov/publications/pdf/2011/cityofla_tdmstrategies_finalreport.pdf
- Maximizing Mobility in Los Angeles- First and Last Mile Strategies Final Report, City of Los Angeles and Southern California Association of Governments, 2009: http://www.scag.ca.gov/nonmotorized/pdfs/LA-Maximizing-Mobility-Final-Vol1.pdf

- » Model Design Manual for Living Streets, University of California Los Angeles, Luskin Center for Innovation, 2011: *http://www.modelstreetdesignmanual.com/*
- » Short Range Transportation Plan for Los Angeles County, Los Angeles County Metropolitan Transportation Authority, 2003: *http://ebb.metro.net/projects_studies/images/2003_SRTP.pdf*
- » System-Wide On-Board Origin-Destination Study, Final Report, Los Angeles County Metropolitan Transportation Authority, 2011
- » Walkability Checklist, City of Los Angeles Department of City Planning, 2008: *http://urbandesignla.com/walkability.htm*

Branding, Signage, and Wayfinding

- » Legible London Wayfinding Study Report - Transport for London, AIG, Central London Partnership, 2006: *http://www.tfl.gov.uk/assets/downloads/businessandpartners/Legible_London_report.pdf*
- » See New York City Wayfinding Program designed by Pentragram

Smart Technologies in the City

- » Smart Cities Applications and Requirements White Paper, Net!Works European Technology Platform, 2011: *http://www.networks-etp.eu/fileadmin/user_upload/Publications/Position_White_Papers/White_Paper_Smart_Cities_Applications.pdf*
- » See TextMyBus App from Detroit, SF Live Bus, Chicago Transit Authority App Center, LA Metro Home Nextrip Service

Bike Share Programs

- » The Case for Bike Share in NYC, 2009: *http://www.nyc.gov/html/dcp/pdf/transportation/bike_share_part2.pdf*

Bikeways

- » Fundamentals of Bicycle Boulevard Planning and Design, Initiative for Bicycle and Pedestrian Innovation, 2009: *http://ashlandtsp.com/system/datas/51/original/BicycleBoulevardGuidebook.pdf*
- » Urban Bikeway Design Guide, National Association of City Transportation Officials (NACTO), 2011: *http://nacto.org/cities-for-cycling/design-guide/*

Crossings

- » Analyzing Raised Crosswalks Dimensions Influence on Speed Reduction in Urban Streets, 3rd Urban Street Symposium, June 2007: *http://trid.trb.org/view.aspx?id=850990*
- » Oakland Chinatown Pedestrian Scramble: An Evaluation, Safe Transportation Research & Education Center, Institute of Transportation Studies, UC Berkeley, 2003: *http://www.escholarship.org/uc/item/3fh5q4dk*
- » Safety Effectiveness of the HAWK Pedestrian Crossing Treatment, Federal Highway Administration, HRT-10-042, 2010
- » Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations, Final Report and, Recommended Guidelines, Federal Highway Administration, HRT-04-100, 2005: *http://www.fhwa.dot.gov/publications/research/safety/10042/10042.pdf*

Universal Design

- » Universal Design and Visitability from Accessibility to Zoning, the John Glenn School of Public Affairs, National Endowment for the Arts, 2007: *https://kb.osu.edu/dspace/bitstream/1811/24833/2/*

End Notes

1. Tuttle, Steve. City of Boulder Crosswalk Compliance Studies & Treatment Implementation. PBIC, n.d. Web. 25 July 2013
2. Watkins, Katherine. Cambridge's Traffic Calming Program Pedestrians are the Focus: Institute of Transportation Engineers, 2006. Web. 25 July 2013
3. Vaziri, Bijan. "Exclusive Pedestrian Phase for the Business District Signals in Beverly Hills, 10 Years Later: City of Beverly Hills, California", 1996
4. Central London Partnership. Legible London: A Wayfinding Study. London N.p., 2006. Web. 25 July 2013
5. Net!Works European Technology Platform. "Smart Cities Applications and Requirements White Paper", 2011. Web. 25 July 2013
6. SF Live Bus. Live map of SF MUNI. N.p., n.d. Web. 25 July 2013
7. Chicago Transit Authority. "App Center." Chicago Transit Authority. N.p., n.d. Web. 30 July 2013
8. City of Detroit. City of Detroit | Official City of Detroit Web site | www.detroitmi.gov. N.p., n.d. Web. 19 July 2013
9. "LA Metro Home | Nextrip Service." LA Metro Home | Getting Started. N.p. Web. 25 July 2013
10. Active Lights - Leading the way. N.p., Web. 25 July 2013
11. Bendiks, Stefan, Aglaée Degros, Marie Goyens, and Nick Lakides. Fietsinfrastructuur: Cycle Infrastructure. Rotterdam: nai010 uitgevers/publishers, 2013. Print
12. Shahan, Zachary. "Dutch Improving Cycle Networks, Building Fast Cycle Lanes." EcoLocalizer. N.p., 31 Jan. 2011. Web. 25 July 2013
13. Masoner, Richard. "Cyclelicious » Bike lane passing lane." Cyclelicious. N.p., 6 Sept. 2000. Web. 25 July 2013
14. Goodman, David. "Changes Planned for Prospect Park Loop - NYTimes.com." The New York Times - Breaking News, World News & Multimedia. N.p., 27 Feb. 2012. Web. 25 July 2013
15. NYC Dept. of City Planning. "Bike Share Opportunities in New York City." New York N.p., 2009. Web. 25 July 2013

Notes:

This page intentionally left blank.

6 ILLUSTRATIONS

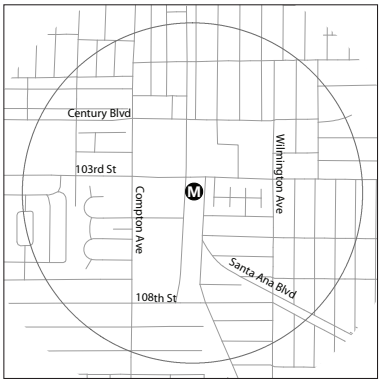
* This section applies the Pathway concept to three case study sites, Wilshire/Normandie (Metro Purple Line), North Hollywood (Metro Red Line/Orange Line), and 103rd/Watts (Metro Blue Line). The intent of this section is to explain from a planning perspective, how Pathway networks can be developed and how components can be selected and applied in different urban settings. Final route maps and images are meant for illustrative purposes only.

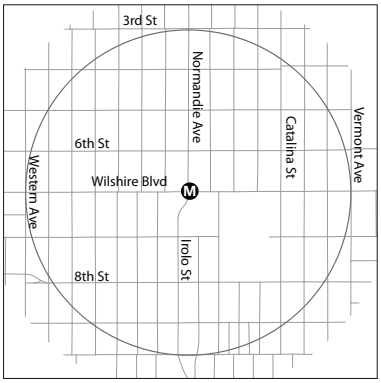
The Case Study Sites

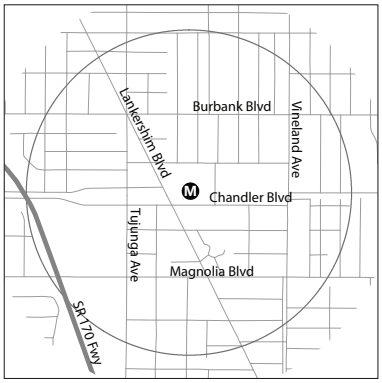
The 103rd/Watts station area is characterized by low to mid-residential density, wide arterials, and long blocks, with minimal pedestrian or multi-modal amenities. The Watts Towers is located within walking distance from the station. There is a substantial number of modal-transfers in the station area, along with a transit-dependent population, and an underutilized park-and-ride lot.

The Wilshire/Normandie station area is the closest of the three to downtown Los Angeles and is characterized by high density residential, mixed-use, commercial, and civic land uses. Taller mixed-use and commercial buildings along Wilshire Boulevard step down to shorter structures, mainly residential, on the streets behind it. There is a significant amount of multi-modal and transfer activity in the area.

The North Hollywood station area is a dense urbanized and mixed-use transit node, adjacent to the NoHo Arts District, an active commercial area to the south of the station, and mid-to high-density residential areas closer to the station with residential density decreasing away from the station. Long blocks without crossings, an at-grade bus transit way, and an adjacent freeway pose challenges for active transportation users' station access. There is a significant amount of multi-modal and transfer activity in the area.







103rd/Watts Blue Line Station

The Watts/103rd Station is surrounded by a large residential population. The station, which directly connects residents in South L.A. to the Downtown 7th/ Metro terminus station, creates potential for first last mile commuters originating in Watts. The 103rd/Watts station is located adjacent to the Watts Towers, which attract approximately 300,000 visitors annually, and are designated as a U.S. National Historic Landmark and a Los Angeles Historic-Cultural monument.

Station Access Barriers

Safety

- Buckling sidewalks and minimally maintained pathways
- Unsafe traffic speeds, wide arterials
- Lack of pedestrian lighting
- Lack of pedestrian buffers along sidewalk edge
- Limited safety signage

Aesthetics

- Lack of pedestrian amenities like shade and landscaping
- Lack of maintenance–trash is abundant

Accessibility

- Unclear transit mode transfer
- Lack of bicycle facilities
- Shortcuts are not maintained, unmarked, and feel unsafe

Overview of Proposed Pathway Network

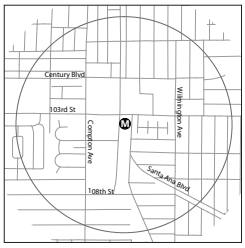
The case study location, 103rd Place and Wilmington Avenue, is located mid-block on a wide arterial. The Pathway design proposal for this area would entail: signage and curb-edge banding to direct transit users through the shortcut and along the street. A new mid-block crossing splits up the long block and is signalized for safety. The wide street right-of-way is divided into a Rolling Lane, which caters to active transportation users. Two alternate studies are shown: the first uses a painted buffer to differentiate between the travel lanes and the Rolling Lane, while the second takes it a step further with a vertical separation between the two, showing how the Pathway network can grow and change over time.

Wide arterials prioritize the vehicle

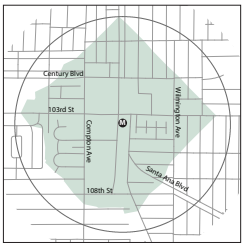
Park and Ride Station is underutilized

Narrow sidewalks with few pedestrian amenities

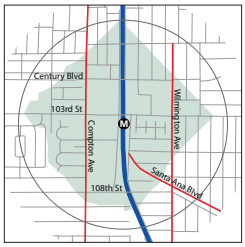
Points of Interest



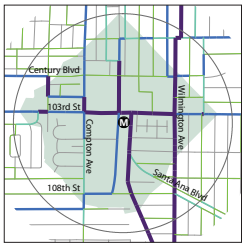
Street Grid



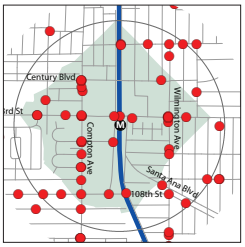
Pedestrian Shed



High Vehicular Speeds



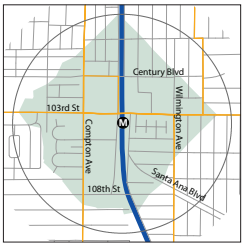
Key Transit Access Corridors



Collision Severity and Location

Land-Use Map

Bicycle Connections



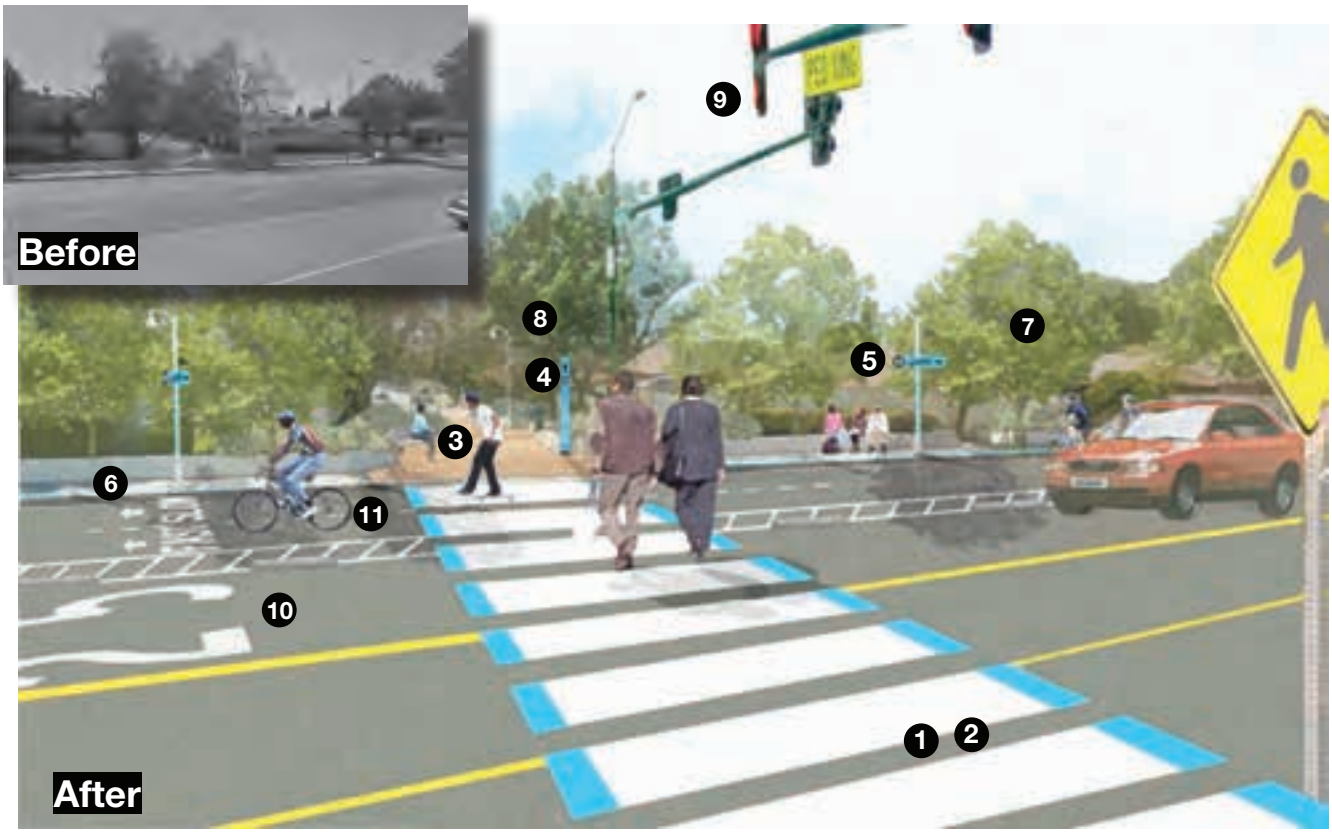
Transit Connections

103rd/Watts Station Network Design

Utilizing the approach outlined in Chapter 3 of these guidelines, a Pathway network design was developed for the 103rd/ Watts station area. The Metro Blue Line runs north–south along this corridor at grade, thus running one Pathway Arterial north–south is not effective, as it would only service half the corridor catchment. In this case two north–south arterials are required, and have been proposed along Compton Ave and Wilmington Ave. An additional Arterial is proposed connecting the station to Watts Towers, a major regional destination within the station area. An east–west Arterial is proposed along 103rd. Two existing cut-throughs are enhanced and provide a short-cut for pedestrians accessing the station from Wilmington Ave.

103rd/Watts Station, Location 1

103rd Place and Wilmington Avenue – Less intensive variation, non-seperated Rolling Lane



Components Used at Case Study Site

Crossings Enhancements and Connections

1. Continental crosswalks
2. Mid-block and additional crossings
3. Cut-throughs (multi-modal pathway through pedestrian paseo)

Signage and Wayfinding

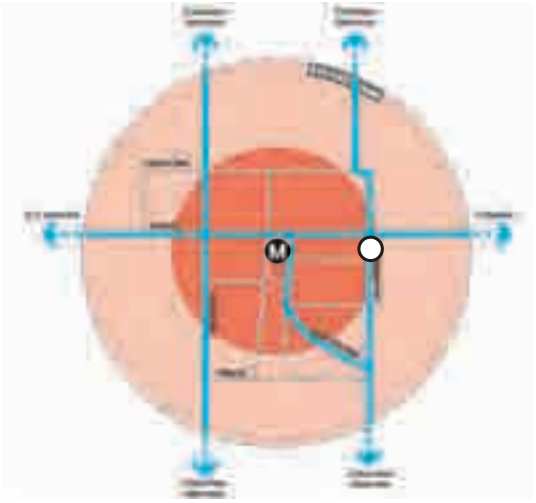
4. Signage
5. Medallion signage
6. Curb-edge banding

Safety and Comfort

7. Landscaping/Shade
8. Lighting

Allocation of the Streetspace

9. Signal modification
10. Traffic calming
11. Rolling Lane (Buffered)



Metro Station Location

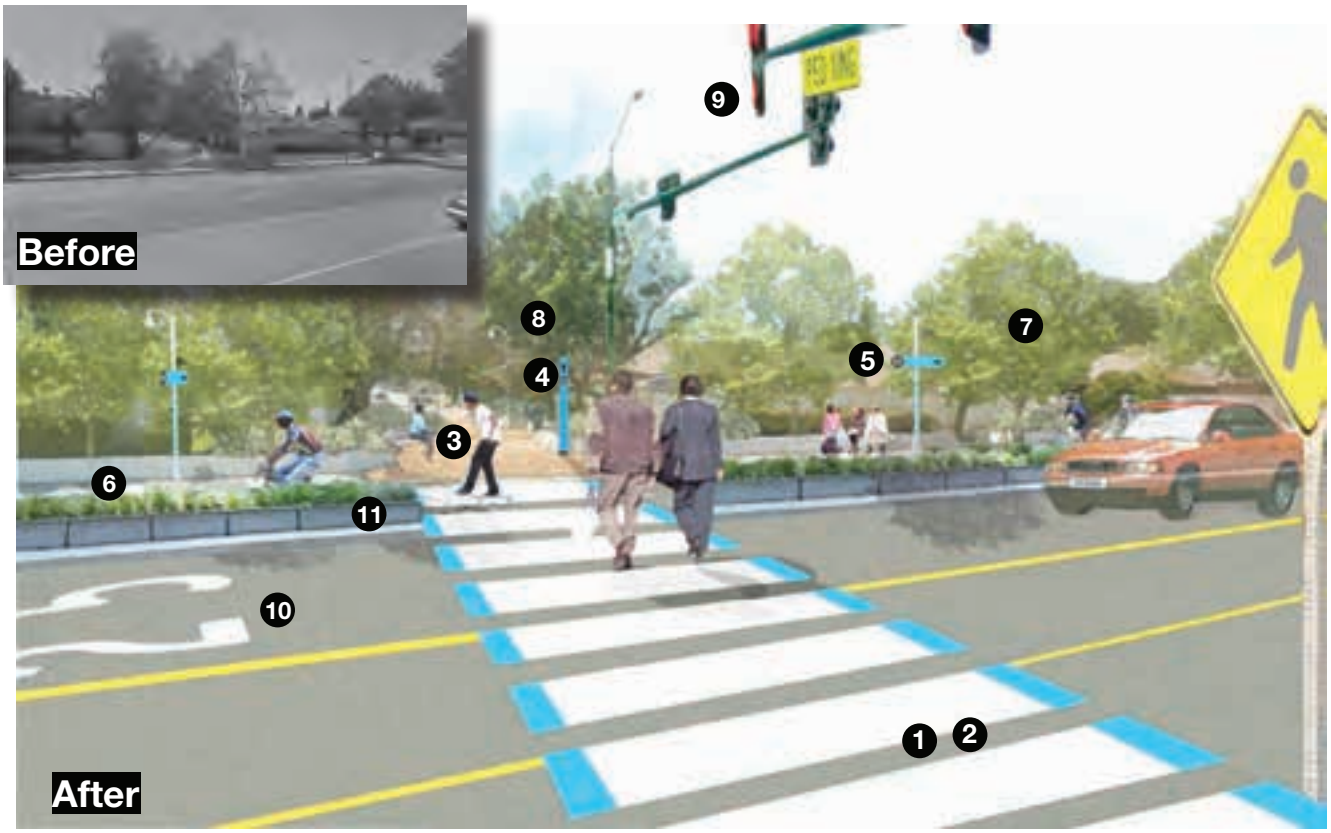
Visualization Location

EXTENDED STATION ZONE (Area 1)
5-Minute Walk / 2-Minute Bike

TRANSIT-FRIENDLY ZONE (Area 2)
10-Minute Walk / 5-Minute Bike

103rd/Watts Station, Location 1 (enhanced)

103rd Place and Wilmington Avenue – More intensive variation, vertical seperation along Rolling Lane



Components Used at Case Study Site

Crossings Enhancements and Connections

1. Continental crosswalks
2. Mid-block and additional crossings
3. Cut-throughs (multi-modal pathway through pedestrian paseo)

Signage and Wayfinding

4. Signage
5. Medallion signage
6. Curb-edge banding

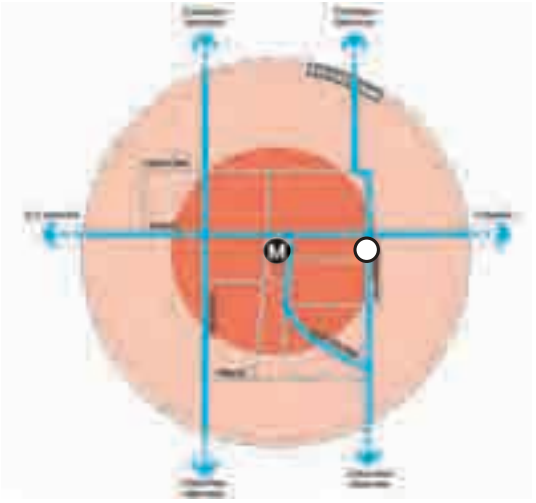
Safety and Comfort

7. Landscaping/Shade
8. Lighting

Allocation of the Streetspace

9. Signal modification
10. Traffic calming
11. Rolling Lane (vertical seperation)

*Note: Components dipicted are the same as previous visualization with the exception of the added vertical seperation between the Rolling Lane and vehicular path of travel.



Metro Station Location

Visualization Location

EXTENDED STATION ZONE (Area 1)
5-Minute Walk/2-Minute Bike

TRANSIT-FRIENDLY ZONE (Area 2)
10-Minute Walk/5-Minute Bike

Wilshire/Normandie Station

Located along the Wilshire Corridor (a key connector throughout Los Angeles County) the Wilshire/ Normandie Station is situated in the midst of an active commercial zone and a regular street grid. Additionally, adjacent to the site are a number of educational facilities, including Robert F. Kennedy Community Schools, a 26-acre facility that hosts six independent public schools. Serving over 4,200 students at this campus alone, the site hosts students of all ages within a 9-block radius.

Wilshire's commercial corridor is surrounded by a dense residential population. Bicycle-friendly streets parallel Wilshire Boulevard and allow ample room for non-vehicular traffic to the north of the station, but Wilshire itself is less friendly to active transportation users. Metro has proposed a regional Bus Rapid Transit that will run along Wilshire Boulevard, connecting regional and local users to the Wilshire/ Normandie Station.

Station Access Barriers

Safety

- Located along a high-speed traffic corridor
- Lack of pedestrian lighting within one-half mile radius
- Unmarked crossings

Aesthetics

- Sparse landscaping along residential connector streets
- Trash strewn along streets/lack of overall maintenance

Accessibility

- Crowded sidewalks
- Long crossing wait time and long distances between crossings
- Unclear transit transfer/directional signage
- Lack of bicycle lanes—bicyclists riding on crowded sidewalks
- Lack of secure bike parking

Overview of Proposed Pathway Network

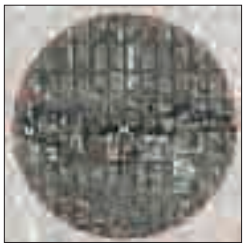
Two case study sites are presented at Wilshire/ Normandie. Location 1 is immediately adjacent to the station on the southeast corner of Wilshire Boulevard and Normandie Avenue. Location 2 is farther from the station at 8th Street and Fedora Street.

Location 1 shows how transit infrastructure can be retrofitted to include Pathway elements, including static identification signage and real-time signage with next-bus/next-train information on the existing Metro Rapid bus shelter. Bike share facilities are added along the Pathway along with seating and amenities for transit riders. The intersection is painted with an all-way, scramble crossing for enhanced access. All of these more intensive Pathway components are appropriate for the Extended Station Zone, Area 1.

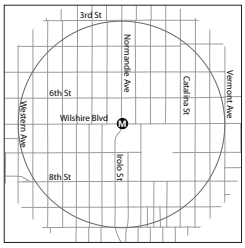
Location 2 includes prominent Pathway signage showing time-to-station, along with sidewalk enhancements for transit-user comfort, including new street trees and lighting. A Rolling Lane is added to the street with room for multiple speeds of active transportation users. Crossings are enhanced with Continental stripes.

Lack of bicycle facilities

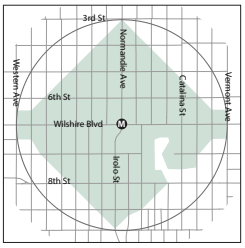
Narrow sidewalks



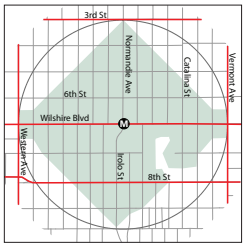
Points of Interest



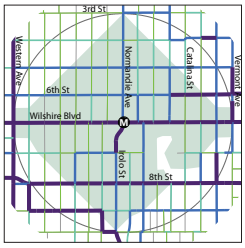
Street Grid



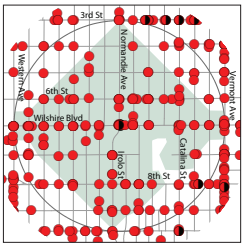
Pedestrian Shed



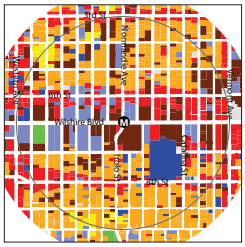
High Vehicular Speeds



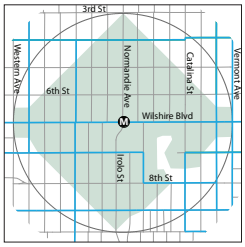
Key Transit Access Corridors



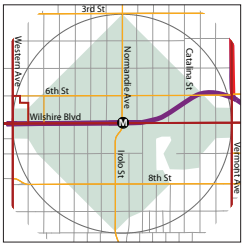
Collision Severity and Location



Land-Use Map



Bicycle Connections



Transit Connections

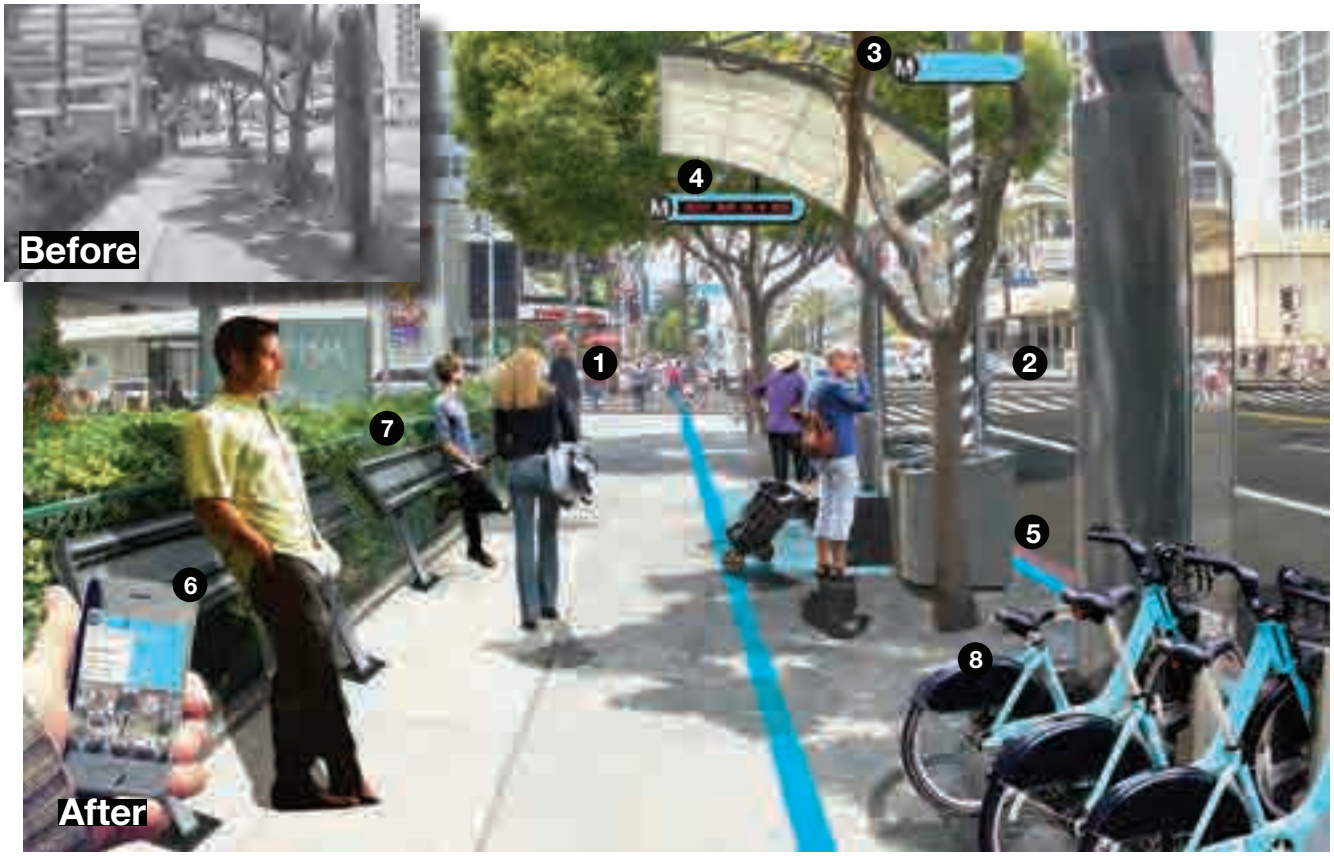
Wilshire/Normandie Station Network Design

Utilizing the approach outlined in Chapter 3 of these guidelines, a Pathway network design was developed for the Wilshire/ Normandie Station Area. The Metro Red Line runs east–west along this corridor underground, thus it is beneficial to run a Pathway Arterial north–south along Normandie. To the south, the Arterial jogs over to Harvard Blvd, to coordinate with the current bikeway planned along that street. The major east–west Arterial runs along Wilshire, given the high level of bike and pedestrian access volume along this major street. Vehicular volumes are also very high along this corridor, requiring careful consideration of how best to utilize available ROW.

A dense network of Collectors is provided within the station area as extensive mitigation is required given the high incidence of pedestrian collisions and overall access volumes.

Wilshire Normandie Station, Location 1

Wilshire Blvd. and S. Normandie Ave.



Components Used at Case Study Site

Crossings Enhancements and Connections

1. Continental crosswalks
2. Scramble crossings

Signage and Wayfinding

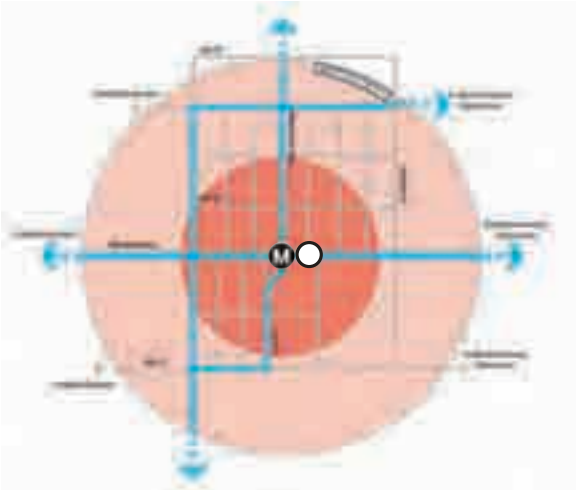
3. Medallion signage
4. Real-time signage, next train/bus
5. Curb-edge banding
6. Smart technologies

Safety and Comfort

7. Street furniture

Integrated Transit Access Solutions

8. Bike Share



Metro Station Location

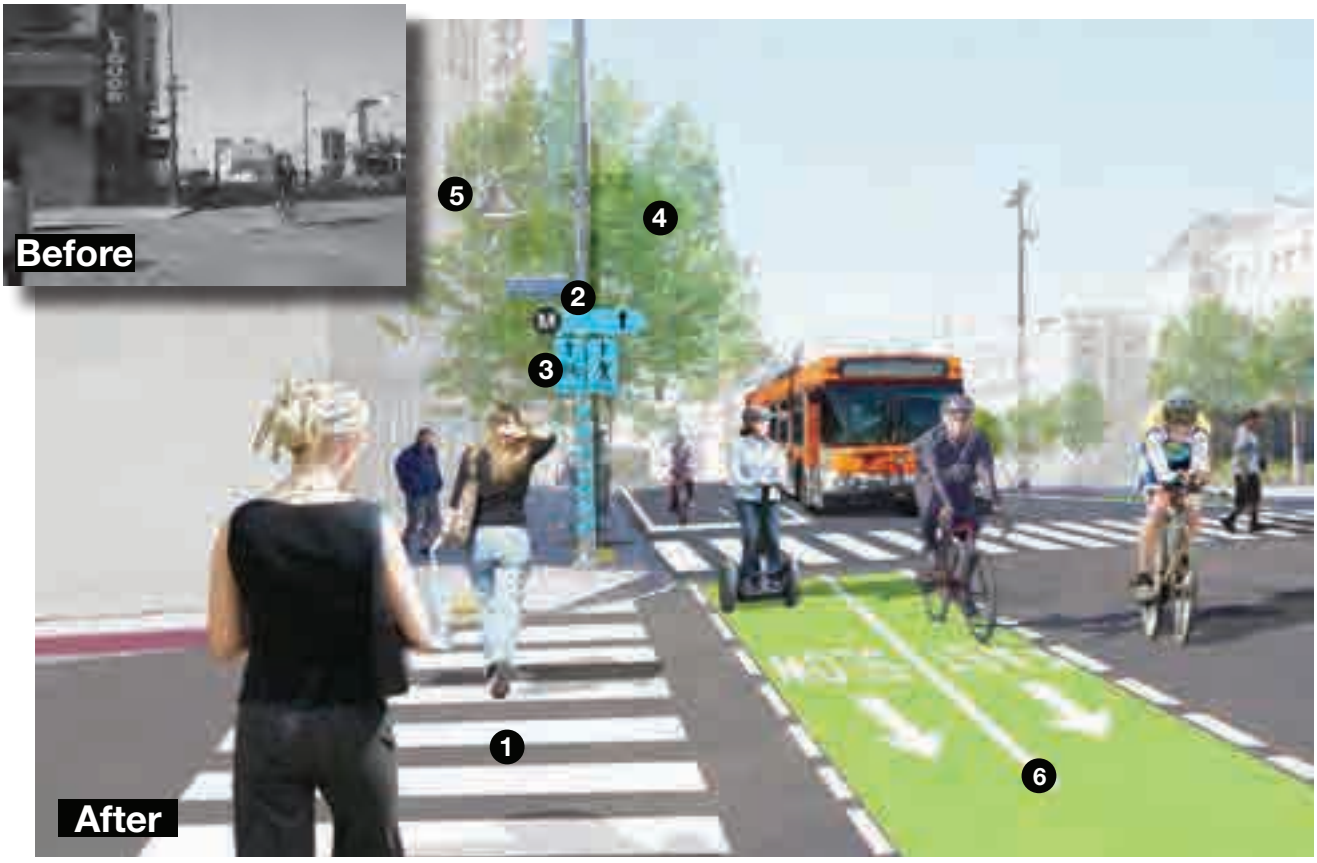
Visualization Location

EXTENDED STATION ZONE (Area 1)
5-Minute Walk/2-Minute Bike

TRANSIT-FRIENDLY ZONE (Area 2)
10-Minute Walk/5-Minute Bike

Wilshire Normandie Station, Location 2

8th St. and Fedora St.



Components Used at Case Study Site

Crossings Enhancements and Connections

1. Continental crosswalks

Signage and Wayfinding

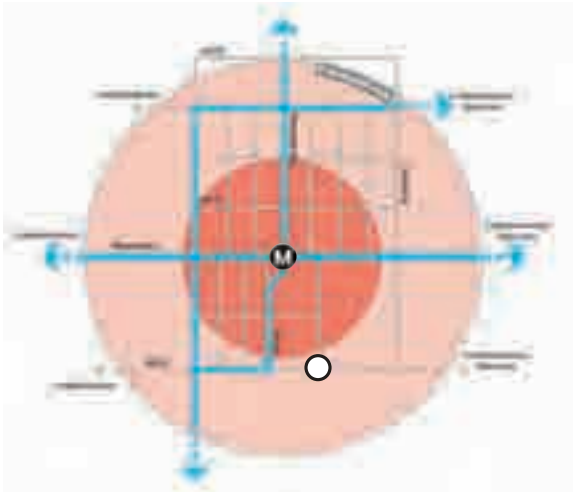
2. Medallion signage
3. Time-to-station notation

Safety and Comfort

4. Landscaping/Shade
5. Lighting

Allocation of the Streetspace

6. Rolling Lane



Metro Station Location

Visualization Location

EXTENDED STATION ZONE (Area 1)
5-Minute Walk/2-Minute Bike

TRANSIT-FRIENDLY ZONE (Area 2)
10-Minute Walk/5-Minute Bike

North Hollywood Station

The North Hollywood Station serves as a critical connector for the Metro Red Line and the Orange Line Bus. The Red Line directly connects to the Downtown Los Angeles terminus, while the Orange Line Bus Terminal connects directly east to Ventura. The station lies in the center of the North Hollywood (NoHo) Arts District.

Additionally, the station is adjacent to the Hollywood Art Institute campus and a lively retail and housing district. The North Hollywood Station serves a vast demographic and has significant catchment potential within the surrounding region. Also located within the one-half mile pedestrian shed is NoHo Park, which draws daily visitors. Currently, the park does not offer enough seating and does not have a welcoming street-edge nor clear pathways through it.

No cut through/direct access to station from adjacent neighborhoods

Station Access Barriers

Safety

- Lack of separated bicycle infrastructure along main roads
- Superblocks with minimal pedestrian crossings

Aesthetics

- Sometimes unpleasant pedestrian environment

Accessibility

- Orange and Red Lines stops face different directions and connections between the two are unclear
- There is potential for alternative mode enhancement: bicycle racks and Park-and-Rides are often full
- Limited station signage or directional signage
- Large park and ride facility is hard to get through on foot, bike, or via other active transportation mode
- Lack of secure bike parking

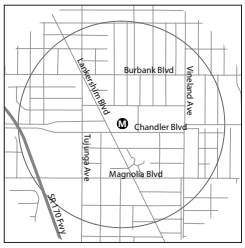
Lack of crossings along superblocks and bike facility without special markings or enhancements

Overview of Proposed Pathway Network

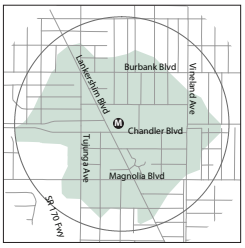
Four case study locations are depicted for the North Hollywood station. Location 1 depicts enhancements to the park-and-ride lot at the station. Location 2 depicts the intersection of Klump Avenue and Burbank Boulevard, which is located in the Transit Friendly Zone, along the intersection of a Pathway Collector and a Pathway Arterial. Location 3 depicts the Pathway in an underpass condition at Magnolia Avenue and Location 4 includes a Pathway shortcut at NoHo Park, also along Magnolia.

No station signage or directional cues

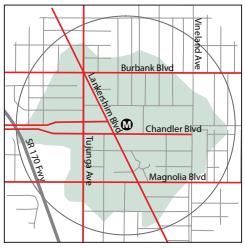
Points of Interest



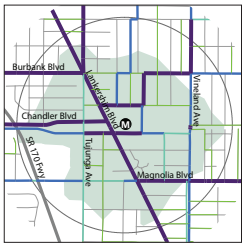
Street Grid



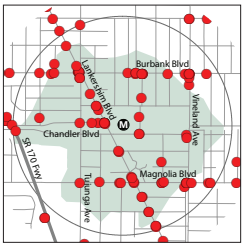
Pedestrian Shed



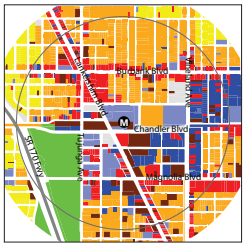
High Vehicular Speeds



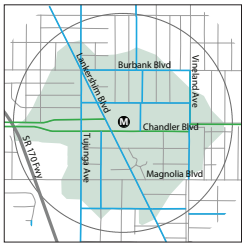
Key Transit Access Corridors



Collision Severity and Location



Land-Use Map

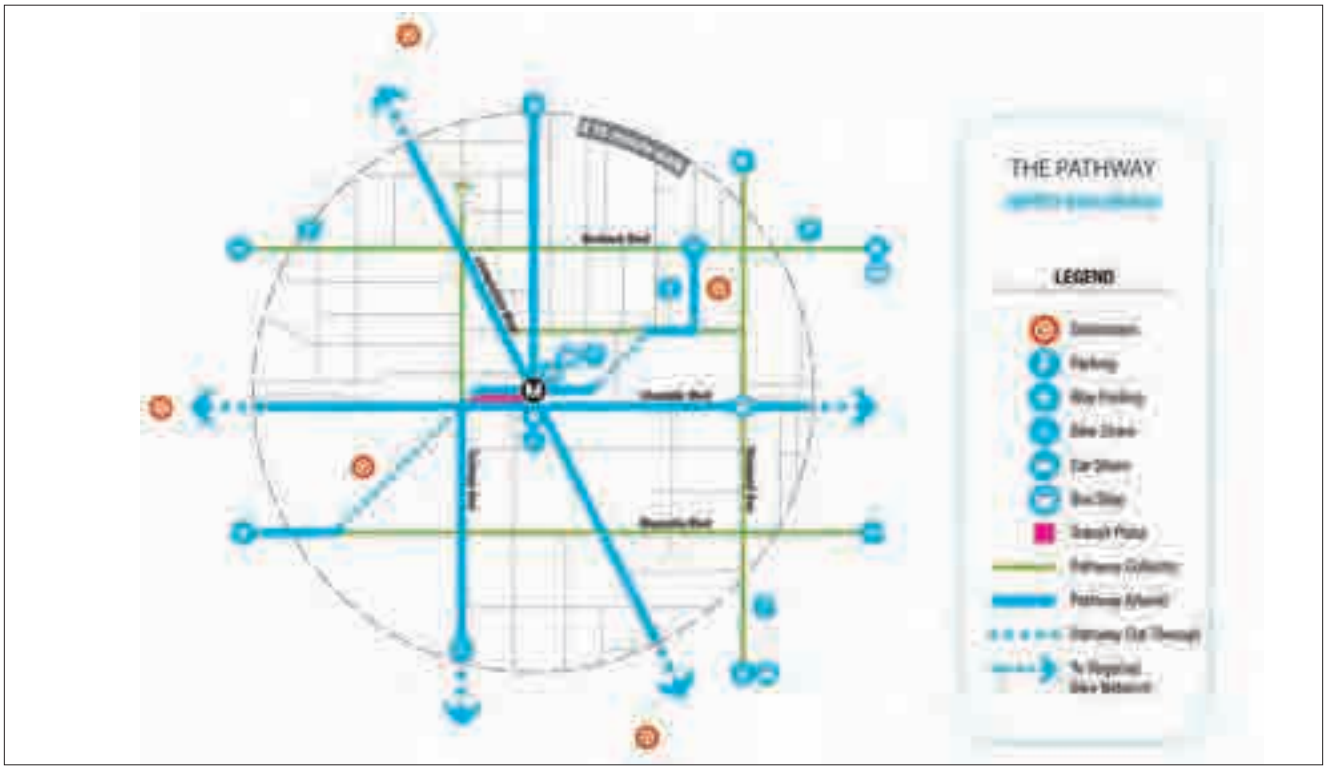


Bicycle Connections

Transit Connections

North Hollywood Station Network Design

Utilizing the approach outlined in Chapter 3 of these guidelines, a Pathway network design was developed for the North Hollywood Station Area. The Metro Red Line comes in from the east and terminates at this station underground; the Orange line also terminates here, arriving at grade from the west. Pathway arterials run east – west along Chandler, north through the Metro parking lot linking to Elmer, south along Tujunga, and cutting through North Hollywood Park to the southwest and the Metro Parking lot to the northeast. Cut-throughs (refer to p. 32) provide critical time saving improvements for these heavily utilized stations.

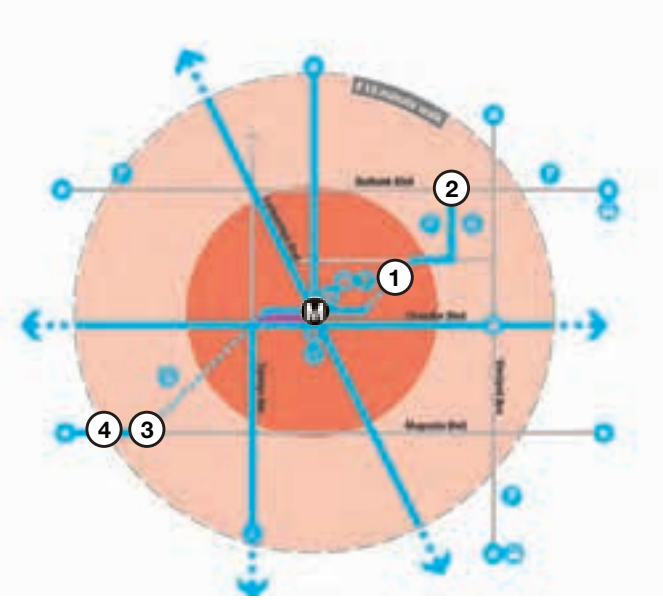


Location 1 is the closest to the station itself and illustrates how an existing Park-and-Ride lot can be made more friendly to active transportation users, with the addition of pedestrian and active transportation cut-throughs that allow people to come in to the facility at multiple entrances, whereas currently access is limited to the vehicular entrance on the north and east sides only. The cut-throughs are designed with trees and lighting for safety and comfort, and special paving to demarcate the active transportation space. A new crossing at Klump Avenue facilitates pedestrian movement into the station from the neighborhood.

Location 2 along Burbank Boulevard illustrates an enhanced intersection with bulb-outs at corners and new signalized crossing. Currently the space between crossings along this stretch of Burbank Boulevard is over 1,700 feet while a comfortable distance between crossings is around 300 feet. Adding crossings in this area will help to expand the reach of transit for the neighborhoods immediately to the north. Pathway signage directs transit riders down Klump Avenue, which connects directly to the station.

At Location 3, the freeway underpass is fairly typical of current conditions around Los Angeles; narrow sidewalks and a wide street are dimly-lit and no pedestrian amenities are provided. The Pathway would improve this situation, providing a widened sidewalk and bollards along the curb edge for an enhanced perception of safety. Public art, new lighting, and special paving are also added, along with Pathway signage with time-to-station notation.

Location 4 depicts an area of NoHo Park that has a short-cut to the Metro station, which is currently un-signed. The Pathway enhancements chosen for this area include easily-visible signage directing people through the park toward the station, new lighting for nighttime safety, and repairs to the sidewalk.



Visualization Locations:

1. Park-and-Ride Lot
2. Burbank Blvd and Klump Ave
3. NoHo Park
4. Magnolia Ave

North Hollywood Station, Location 1

Park-and-Ride Lot

Components Used at Case Study Site

Crossings and Connections

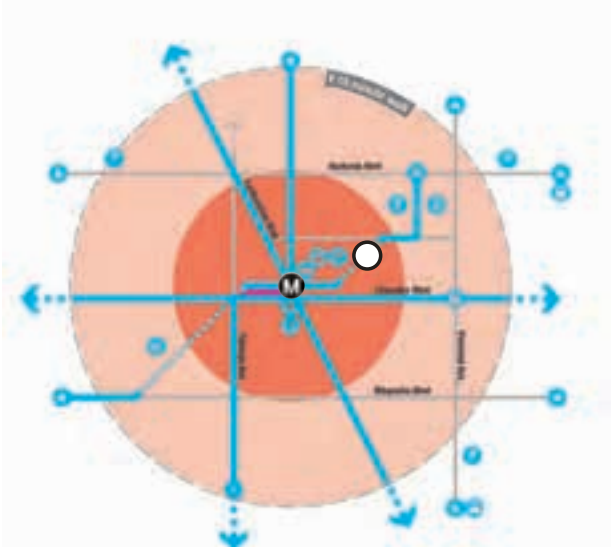
1. Continental crosswalks
2. Mid-block and additional crossings
3. Cut-throughs (multi-modal pathways through existing parking lot)

Safety and Comfort

4. Landscaping/Shade
5. Lighting

Allocation of the Streetspace

6. Sidewalk widening (through parking lot)



Metro Station Location

Visualization Location

EXTENDED STATION ZONE (Area 1)
5-Minute Walk/2-Minute Bike

TRANSIT-FRIENDLY ZONE (Area 2)
10-Minute Walk/5-Minute Bike

North Hollywood Station, Location 2

Burbank Blvd. and Klump Ave.

Components Used at Case Study Site

Crossings and Connections

1. Continental crosswalks
2. Bulb-Outs

Signage and Wayfinding

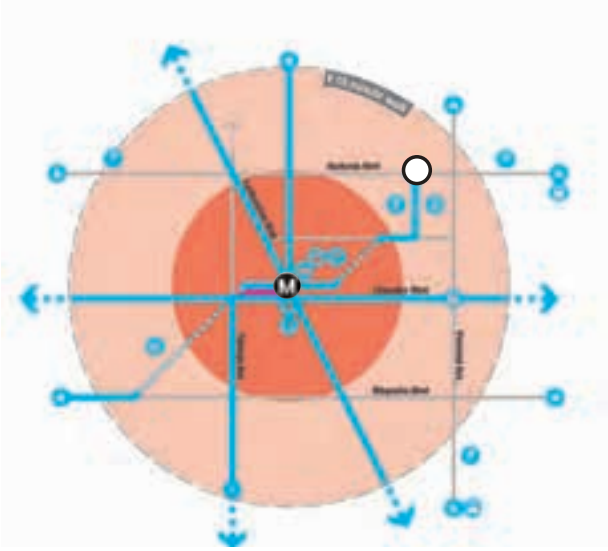
3. Medallion signage

Safety and Comfort

4. Landscaping/Shade
5. Dual curb ramps

Integrated Transit Access Solutions

6. Car share
7. Signal modification



Metro Station Location

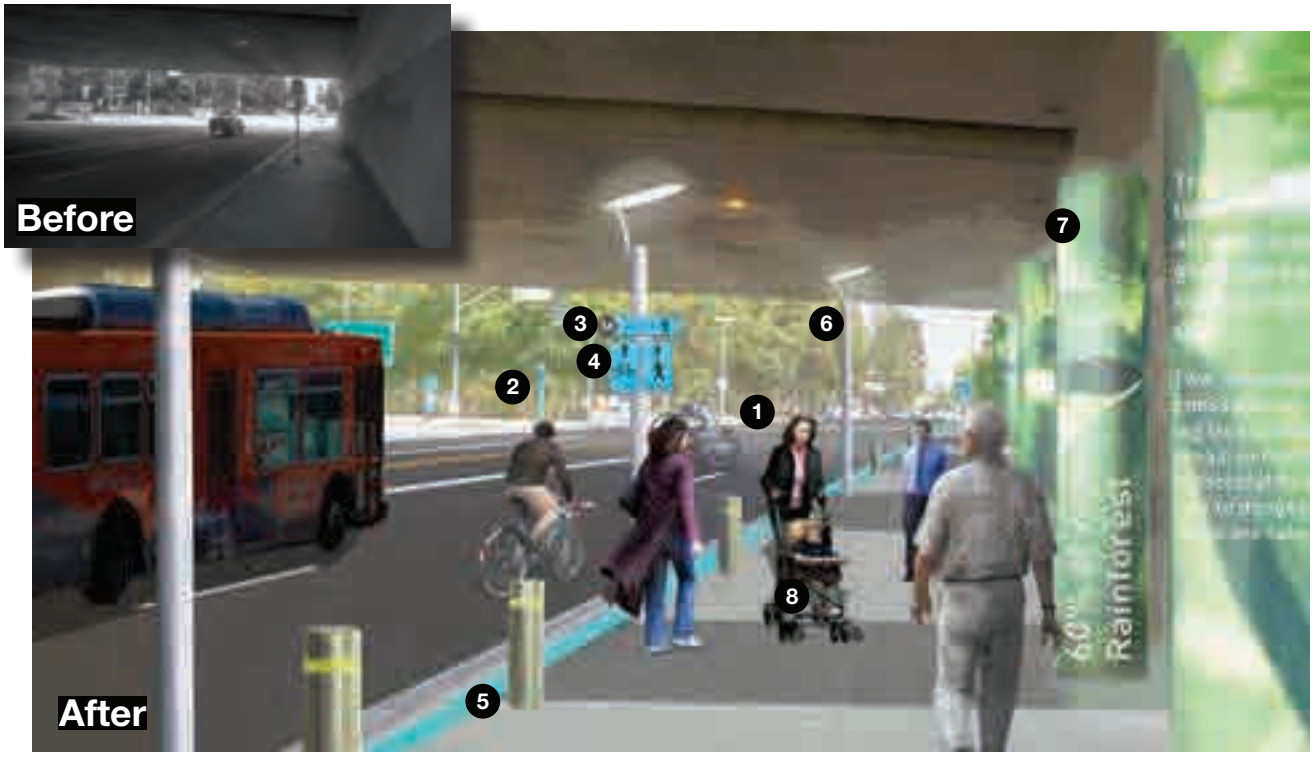
Visualization Location

EXTENDED STATION ZONE (Area 1)
5-Minute Walk/2-Minute Bike

TRANSIT-FRIENDLY ZONE (Area 2)
10-Minute Walk/5-Minute Bike

North Hollywood Station, Location 3

Magnolia Ave. Underpass



Components Used at Case Study Site

Crossings and Connections

1. Continental crosswalks

Signage and Wayfinding

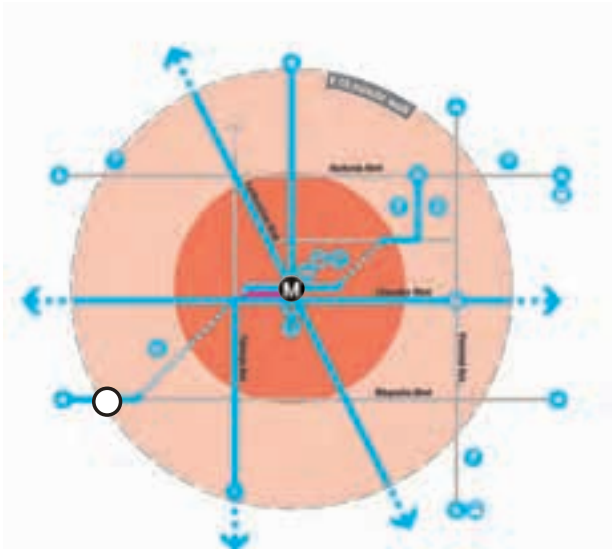
2. Signage
3. Medallion signage
4. Time to station notation
5. Curb-edge banding

Safety and Comfort

6. Lighting
7. Enhanced freeway underpass

Allocation of the Streetscape

8. Sidewalk widening



Metro Station Location

Visualization Location

EXTENDED STATION ZONE (Area 1)
5-Minute Walk/2-Minute Bike

TRANSIT-FRIENDLY ZONE (Area 2)
10-Minute Walk/5-Minute Bike

North Hollywood Station, Location 4

NoHo Park at Magnolia Avenue

Components Used at Case Study Site

Crossings and Connections

1. Continental crosswalks
2. Cut-through and shortcuts

Signage and Wayfinding

3. Signage
4. Medallion signage
5. Time-to-station notation

Safety and comfort

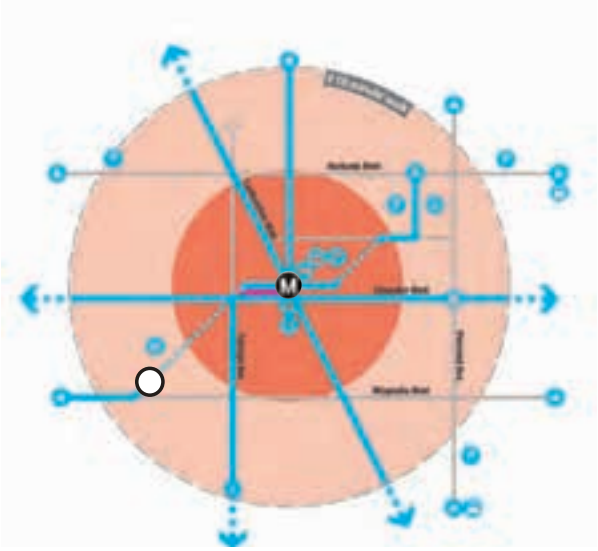
6. Street furniture
7. Landscaping
8. Lighting

Allocation of the Streetspace

9. Sidewalk widening

Integrated Transit Access Solutions

10. Car share
11. Park-and-Ride



Metro Station Location

Visualization Location

EXTENDED STATION ZONE (Area 1)
5-Minute Walk/2-Minute Bike

TRANSIT-FRIENDLY ZONE (Area 2)
10-Minute Walk/5-Minute Bike

Notes:

This page intentionally left blank.

7 STRATEGIES FOR PLAN APPLICATION

* Sustainability is a core business value of Metro and touches all transportation efforts undertaken by the agency. Metro's sustainability policy has been formally articulated and adopted as part of the *Metro Countywide Sustainability Policy & Implementation Plan* (CSPP). This First Last Mile Strategy has been developed in conformance with that policy, and furthers implementation efforts outlined as part of that document. This chapter includes an Implementation Table that outlines next-step efforts that will foster collaboration among Metro and partner agencies in furthering stated plan goals and objectives. Also included are Pathway targets that can be used to evaluate the effectiveness of strategies as they are considered, designed and implemented.

Implementation Table:

LOS ANGELES METRO FIRST LAST MILE STRATEGIC PLAN	INITIATION TIMEFRAME	PARTICIPANTS
1. Concept Refinement & Technical Assistance		
1.1 Review and respond to comments collected during Nov 2013 - Feb 2014 public review period.	Apr-14	Metro / SCAG
1.2 Per Metro Board regarding Gold Line Foothill 2A and Expo 2 : "[identify] two stations for each line which would benefit from implementation of First/Last Mile improvements based on recommendations outlined in Metro's First/Last Mile Study."	Apr-14	Metro
1.3 Temporary Improvements - Prepare temporary Pathway improvements as part of Bike to Work week to assess efficacy.	0-2 Years	Metro / SCAG / Local Jurisdiction(s)
1.4 Pursue additional analysis and testing of non-standard components included in the strategy for example; Micro Park & Ride, Green Zone, Rolling Lanes.	0-2 Years	Metro/SCAG
2. Coordination & Outreach		
2.1 Encourage local jurisdictions to incorporate planning concepts in first-last mile and TOD planning or capital programs funded by Metro and SCAG.	Annual	Metro
2.2 Complete draft Pathway maps for all current and planned Metro Rail and BRT Stations to meet the board directive to; "Coordinate and further develop design concepts to prototype a seamless regional First/Last Mile vision for potential implementation at other transit line stations including Crenshaw, Regional Connector and the Westside Subway."	0-2 Years	Metro
2.3 Proactively seek countywide and statewide legislative support for plan goals.	0-2 Years	SCAG/Metro
3. Plan Integration		
3.1 Coordinate with General Plan and Mobility Element renewals.	Ongoing	Local Jurisdictions / Metro
3.2 Integrate Plan with Metro SRTP and LRTP.	0-5 Years	Metro
4. Funding		
4.1 Identify potential funding (i.e. ATP, Cap and Trade, TIGER, etc.) to implement Plan improvements and by working with jurisdictions.	Ongoing	Metro
5. Measurement and Monitoring		
5.1 Develop pre-project baseline indicators for access mode splits, station ridership, demographics, and access sheds.	0-3 Years	SCAG/Metro
5.2 Review on-going Metro survey activities and on-board passenger survey questionnaires to improve data collection efforts relative to first-last mile planning efforts.	Ongoing	Metro
5.3 Review available transit access monitoring technology.	0-1 Years	Metro
5.4 Prepare post-improvement ridership report, study relationships between first-last mile improvements and ridership characteristics, health, safety and local economic indicators.	2-5 Years	Metro

Evaluating Goals

The setting of evaluation targets helps guide resource allocation with respect to meeting strategic goals, and provides a rationalized benchmark against which improvements can be evaluated. This Strategic Plan states a set of specific goals which include:

1. Expand the reach of transit through infrastructure improvements.

2. Maximize multi-modal benefits and efficiencies.

3. Build on the RTP/SCS and Countywide Sustainable Planning Policy (multi-modal, green, equitable and smart).

Realization of the first goal noted above can be evaluated based on changes to metrics related to ridership. This data is tracked by Metro on a monthly basis, is readily available, and easy to comprehend, making it an ideal data-set for measuring improvement performance.

The second strategic goal reinforces the use of ridership as a key metric. Trips in the county are inherently multi-modal in nature, focusing too carefully on singular modes (i.e. bike/pedestrian/bus mode splits) discounts the fact that most Metro riders are using multiple modes to complete their journeys.

The third goal helps focus strategies relative to broader policy efforts. Implementation strategies have third party affects, referred to as externalities. These externalities may be positive or negative in nature relative to regional and state policy goals, of which Metro is a custodian.

Metro Ridership

The Pathway aims to increase ridership by improving access conditions, and uses strategies that also support the development of transit supportive land uses (through the place making attributes of improvements), quality of service (through better multi-modal integration), human health and wellness (by focusing on active transportation improvements strategies) and equitable investment (by focusing on improvements that support the transit dependant population). As noted in Chapter 3, the Pathway does so by expanding access user sheds, and by improving the transit user experience. Implementation of Pathway networks in Metro Rail and BRT station areas will directly and indirectly increase ridership both at individual stations and system-wide.

Setting targets for ridership can be based in part on predictive modeling; however, travel behavior affected by qualitative environmental changes are much more difficult to predict using quantitative tools. For example, though it logically follows that pedestrians may be more willing to walk along a sidewalk that feels safe at night, there are no tools available to transportation planners that allow for the accurate prediction of just how many more potential transit riders in a given neighborhood will walk to stations past dark if pedestrian lights are installed along primary access routes. Pilot project programming should include a process for pre and post project evaluation of such improvements to provide planners better predictive modeling tools for qualitative improvements.

Targets

A detailed mapping and modeling exercise was undertaken for the three case study sites presented in this report. The process included the modeling of existing active transportation network routes in the station areas, including sidewalks and street crossings. The limits of existing access sheds based on how far people could walk in a given time frame were mapped. Proposed Pathway improvements including new sidewalks, cut-through routes, mid-block or new crossings and pedestrian prioritized signals were modeled providing a larger revised access shed. A multiplier was factored with the population falling within the added shed areas thus providing a rational prediction of ridership changes. Predictive ridership increases associated with these improvements ranged from 1.5 to 4% at the stations reviewed. ***Target 3%***

Predictive modeling is not sufficient on its own to analyze critical factors that would each play an important role in increasing ridership. These additional considerations include:

• The estimation of transit use by discretionary riders within transit access sheds resultant from qualitative environmental access improvements. This could potentially equal or even surpass those ridership increases suggested by the quantitative modeling. ***Target 3%***

• The capture of ridership increases resultant from the support of much more geographically significant non-pedestrian active transportation users (i.e. bicyclists, skateboarders, scooter riders, electric assisted devices). Currently the mode share of such users remains small, but the concerted effort to provide facilities that support the use of these devices could dramatically extend the access shed's geographic reach due to the relative high speeds of these mobility devices. ***Target 1%***

• Increases in ridership due to the improvements made to multi-modal transfer operations and efficiencies. The provision of Pathway routes that would allow for plug-in mobility solutions (i.e. mobility hubs) and increased efficiencies of bus to rail transfers, would contribute to measurable ridership increases. ***Target 1%***

• Finally, long term increases to ridership resultant from additional development that would naturally occur around Pathway networks. Pathway networks suggested in these planning guidelines are by their nature place-making, and would improve conditions for development wherever implemented. These marginal place-making improvements would build on regional efforts that aim to support development within station areas. ***Target 4% (20 Year)***

A preliminary Metro Rail and BRT ridership increase target resultant from Pathway improvements for the short term (3-5 years) and the long term (20 year) time horizons can be developed by adding together the above noted targets:

Metro First Last Mile Strategic Plan Goals

3- to 5-year target – 8% increase in Rail and BRT ridership

20-year target – 12% increase in Rail and BRT ridership

For perspective, the Expo Line which cost approximately $800 million has increased system Rail and BRT ridership by approximately 2.5%. A high level review of potential costs of Pathway improvements at the case study sites indicated costs of implementation ranging from $5 to $12 million per station. From a dollar/rider perspective, implementation of this plan represents a cost effective means to increase the reach of transit as measured by ridership. Of further note, these increases would largely come from active transportation modes that by their nature support human health and wellness, clean air, place-making and equitable access.

Notes:

This page intentionally left blank.

APPENDIX

FIRST LAST MILE STRATEGIC PLAN

CONTENTS:

STATION AREA CHECKLIST

For each of the quality criteria, rank the station area based on how adequately or poorly it provides amenities, connections, and a transit-supportive environment for riders.

- Multiple modes
- Multiple constituencies (gender, age, abilities, etc.)

Name of station: _____

Date/Time/Weather conditions during visit: _____

Station Typology: _____

1. SAFETY

	Disagree/ Lacking		Somewhat/ Adequate		Strongly Agree/Ample
1.1 Adequate lighting. (Night survey required) Regularly spaced and frequent lighting that is directed towards the sidewalk and any bikeways, which provides sufficient illumination. Potential obstacles marked with reflectors or lighting.	1	2	3	4	5
1.2 Eyes-on-the-street. Presence of highly transparent groundfloors, windows, and entries.	1	2	3	4	5
1.3 Well maintained public realm. Sidewalks are smooth and without cracks, vegetation is trimmed, etc.	1	2	3	4	5
1.4 Safety buffer for bikes. Bikes are adequately set back from vehicles. Consider type and quality of buffer – sufficient width, painted material, vertical separation, such as bollards.	1	2	3	4	5
1.5 Safety buffer for pedestrians. Pedestrians set back from travel lanes via ample sidewalk width, landscaping, and street furniture.	1	2	3	4	5
1.6 People-friendly traffic speeds and manners. Drivers yield to pedestrians and traffic is slowed via narrow roadways, markings, no turn on red lights, etc.	1	2	3	4	5
1.7 Clear safety signage. Pedestrians set back from travel lanes via ample sidewalk width, landscaping, and street furniture.	1	2	3	4	5
1.8 Overall, the station area feels safe. Overall, there is a feeling of safety as you walk through the station area. Consider the safety of all users – especially **women, children, and the elderly**. Consider both day and nighttime safety.	1	2	3	4	5

TOTAL SCORE

_____ / # questions answered

=

_____

(Average score on safety)

STATION AREA CHECKLIST

For each of the quality criteria, rank the station area based on how adequately or poorly it provides amenities, connections, and a transit-supportive environment for riders.

- Multiple modes
- Multiple constituencies (gender, age, abilities, etc.)

2. AESTHETICS

	Disagree/ Lacking		Somewhat/ Adequate		Strongly Agree/Ample
2.1 Sense of place. Inclusion of unique street characteristic, landmarks, striping or a navigable streetscape hierarchy that sets this space apart from other areas.	1	2	3	4	5
2.2 Pleasant landscaping. Consistent landscaping that provides ample shade. Trees are well maintained and all tree wells are planted with street trees.	1	2	3	4	5
2.3 Strategically placed pedestrian amenities. There are a variety and sufficiently provided pedestrian amenities (seating, trash cans, water fountains) that are well maintained and inviting. Kiosks and vendors are present on pedestrian paths, are visually pleasing and are located in areas that do not interfere with foot traffic.	1	2	3	4	5
2.4 Pedestrian unfriendly elements are limited. There are a general lack of the following: unpleasant smells, blank walls, vacant lots, fences, noise pollution, unfriendly street conditions, trash.	1	2	3	4	5
2.5 Pleasant experience. Overall, there is a pleasant ambiance as you walk, bike, or use alternative transit throughout the station area. Consider the experience of all users – especially **women, children, and the elderly**. Consider both day and nighttime amenities. Care has been taken to make a nice environment for all users.	1	2	3	4	5

TOTAL SCORE

_____ / # of questions answered

=

_____

(Average score in section)

STATION AREA CHECKLIST

For each of the quality criteria, rank the station area based on how adequately or poorly it provides amenities, connections, and a transit-supportive environment for riders:

- Multiple modes
- Multiple constituencies (gender, age, abilities, etc.)

3. ACCESSIBILITY

	Disagree/ Lacking		Somewhat/ Adequate		Strongly Agree/Ample
3.1 High quality sidewalks Sidewalks are large enough for pedestrians to walk, pass, and jog comfortably in opposing directions. There are very few disruptions to the sidewalk quality (e.g. smooth surface paving, signage and poles are set back from the pedestrian right-of-way)	1	2	3	4	5
3.2 Clear, safe crossings. Signalized intersections allow ample time to cross, frequently allow passage, are a walkable distance (or provide a pedestrian refuge or median), are supplied with functioning push buttons, have minimal street crowns and are painted for safety	1	2	3	4	5
3.3 Seamless transit mode transfer. Transferring to alternate modes of transit is streamlined through the presence of well-marked, nearby, and obvious pathways.	1	2	3	4	5
3.4 Operating and sufficient bicycle facilities. Bicycle facilities allow sufficient room, have a smooth surface, and provide riders with bike lanes, routes, pathways; adequate marking, parking, separated push buttons, bike stations and bike boxes	1	2	3	4	5
3.5 High quality signage. Signage is located in clear view for pedestrians, bicyclists, and other transit modes. Signage provides clear directional and locational information, regulatory warnings, and station area identity	1	2	3	4	5
3.6 Parking and drop-off is streamlined. Adequate number of parking spaces (in park-and-ride if applicable), room for drop-off (kiss-and-ride) on street parking serves as a buffer for pedestrians, parking time restrictions are in effect where necessary, and vehicles are prohibited from blocking the pedestrian right-of-way	1	2	3	4	5
3.7 Curbs and curb ramps are provided. Curbs and curb ramps are present at all crossings and have a gentle slope	1	2	3	4	5
3.8 Navigating the public realm is intuitive and easy. Overall, there are a series of passageways that are frequent and well marked as you walk through the station area. Consider the experience of all users – especially **women, children, and the elderly**. Consider both day and nighttime linkages.	1	2	3	4	5

TOTAL SCORE

_____ /# of questions answered

=

_____

(Average score on accessibility)

STATION AREA CHECKLIST

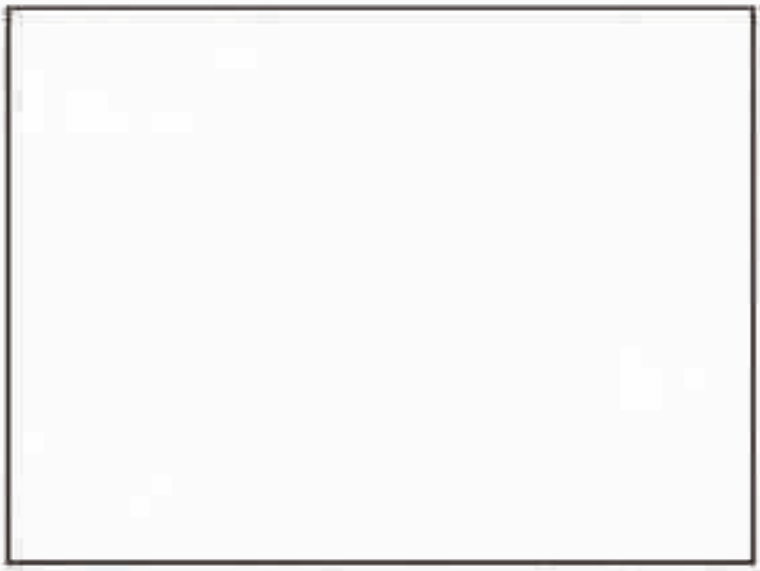
ROUTE TAKEN

Include a blank map and note route taken during site visit

Additional observations & comments

Insert additional material from site findings

PHOTO DOCUMENTATION



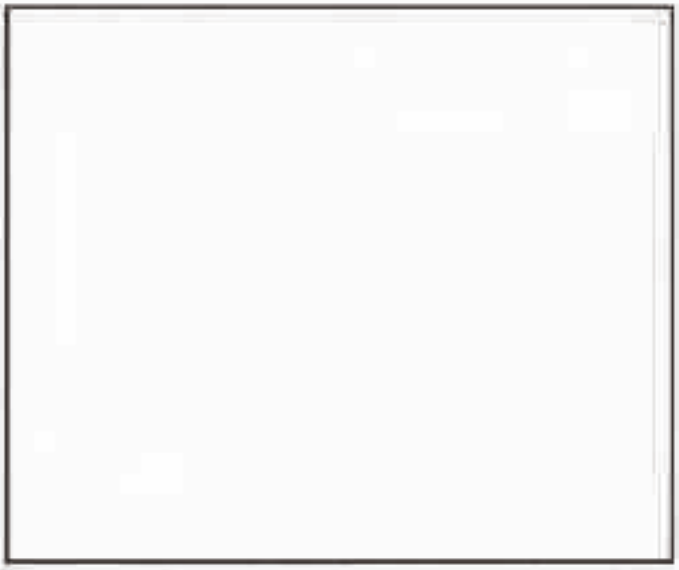
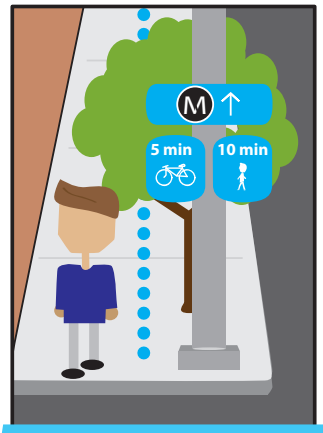
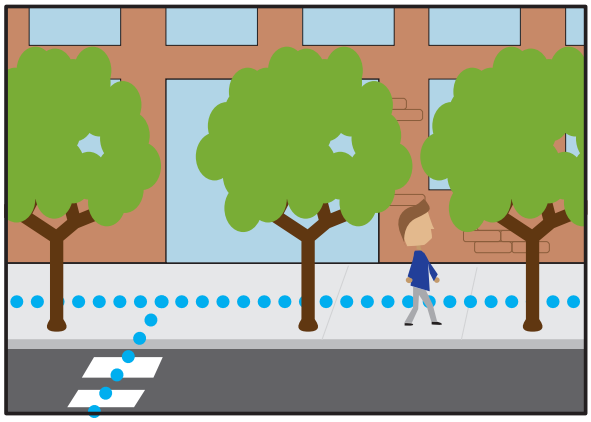
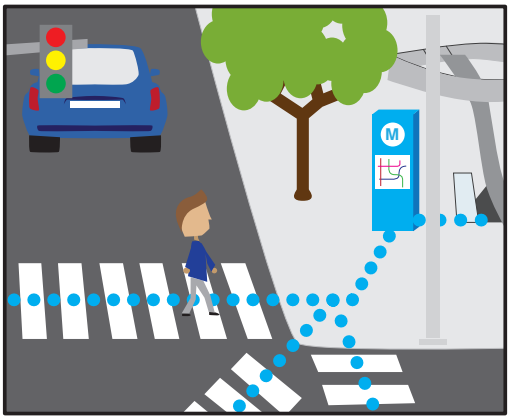


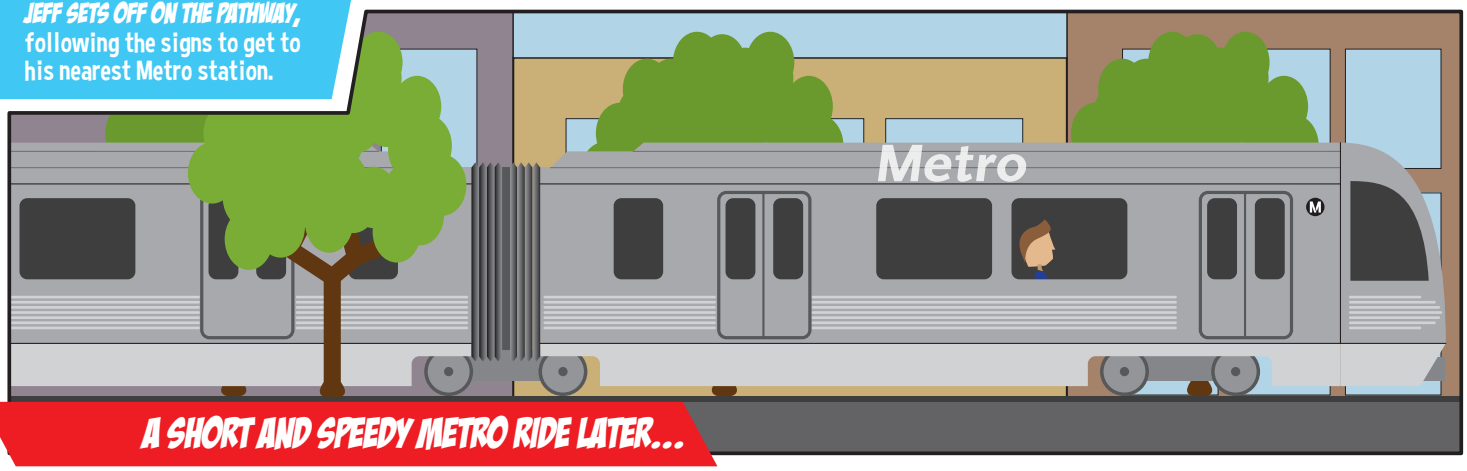
PHOTO DOCUMENTATION CONTNUED



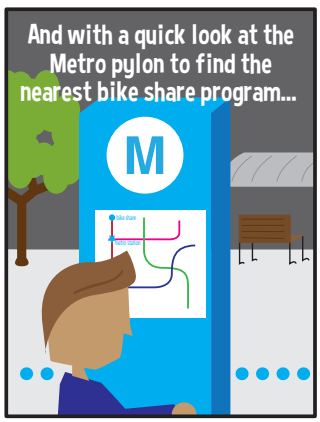


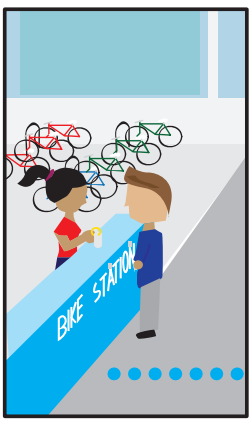


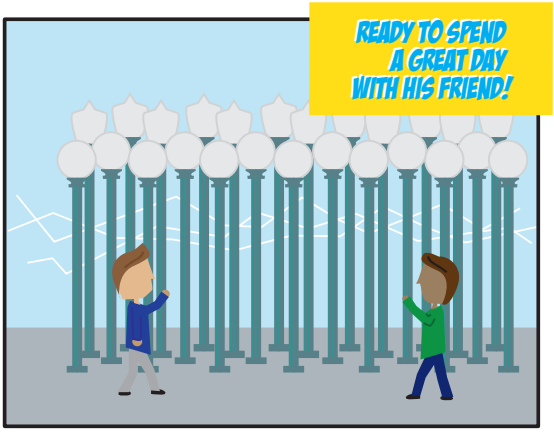
JEFF SETS OFF ON THE PATHWAY, following the signs to get to his nearest Metro station.



A SHORT AND SPEEDY METRO RIDE LATER...

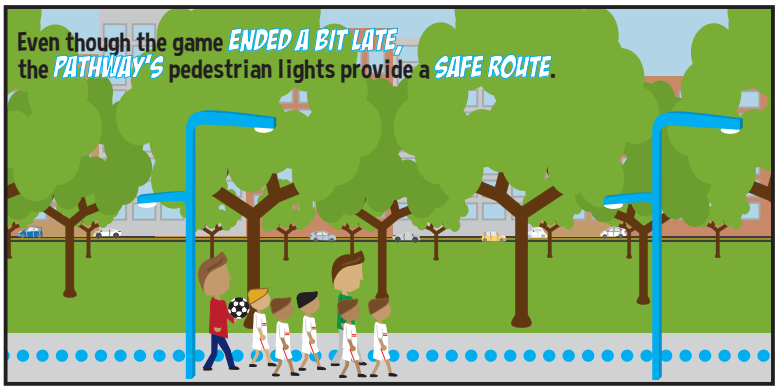


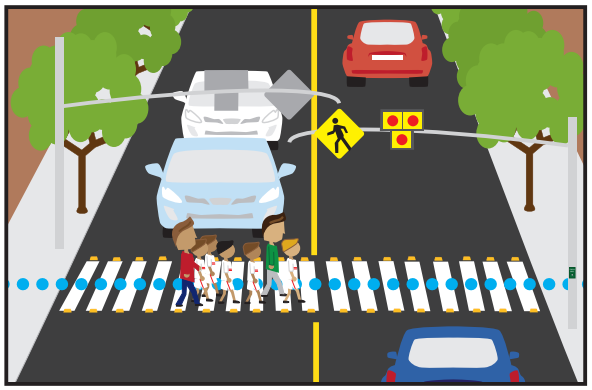


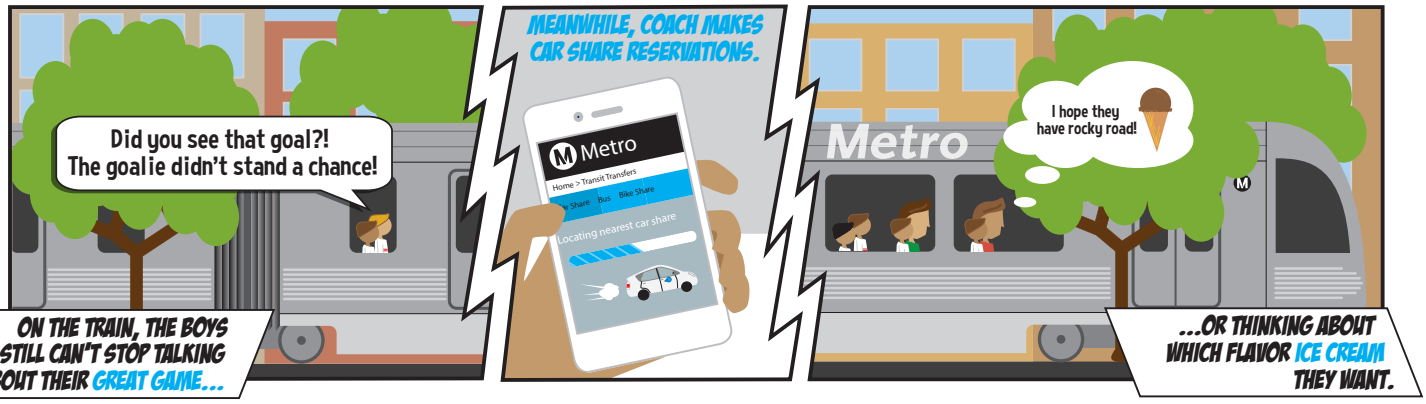


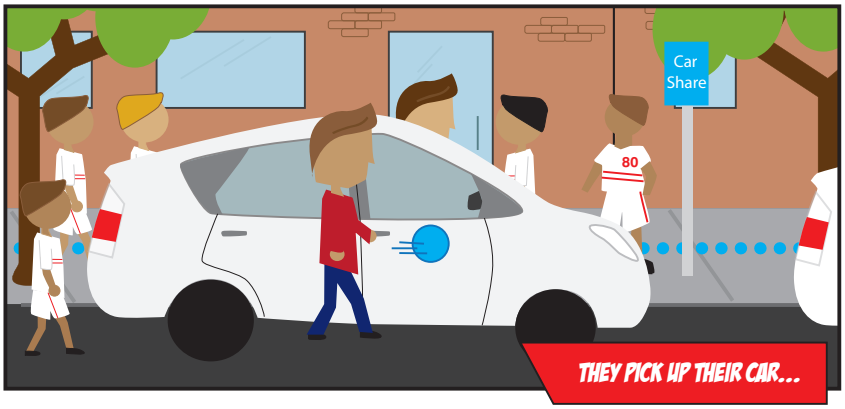
THE TEAM TRIP!

After being named the new junior soccer league champions,the team decides to celebrate with a treat - ice cream!

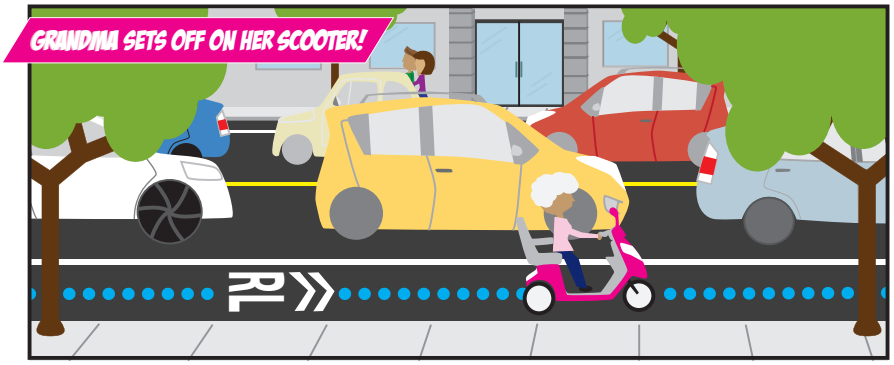


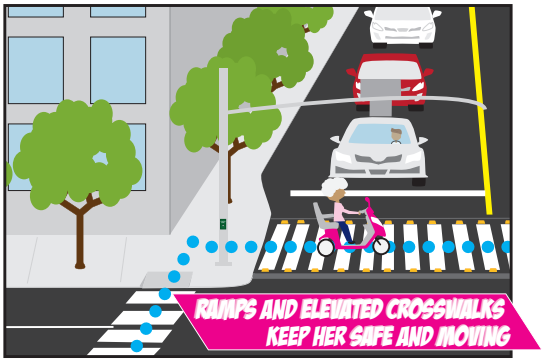


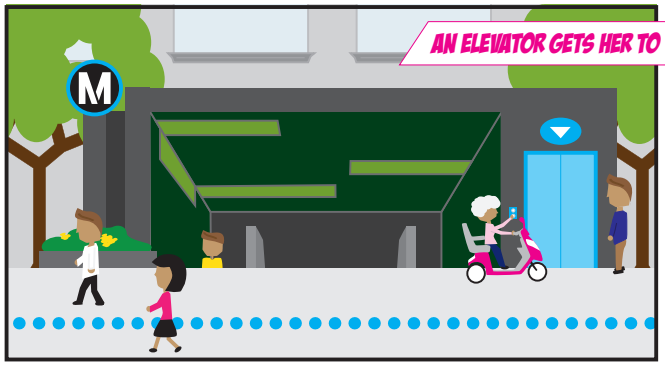


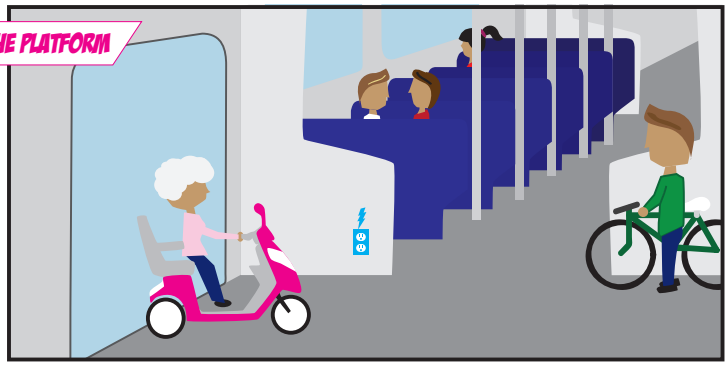


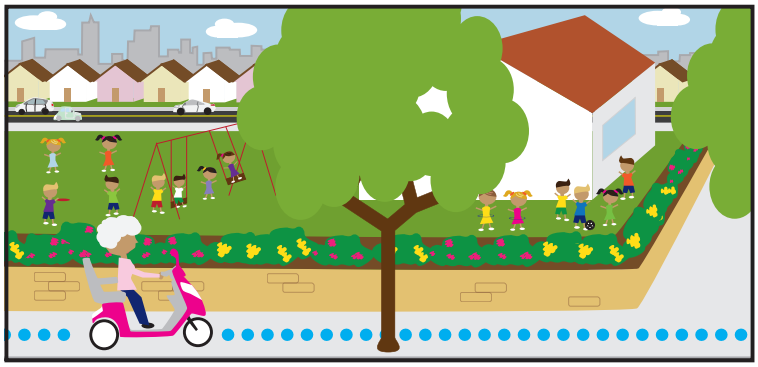

GRANDMA TO THE RESCUE!
A HARD-HITTING STORY has just been recieved at LA Weekly, and Julia won't be able to pick up her kids on time.
Mom! Can you pick up the kids?
I'm on my way!
But she knows WHO TO CALL...

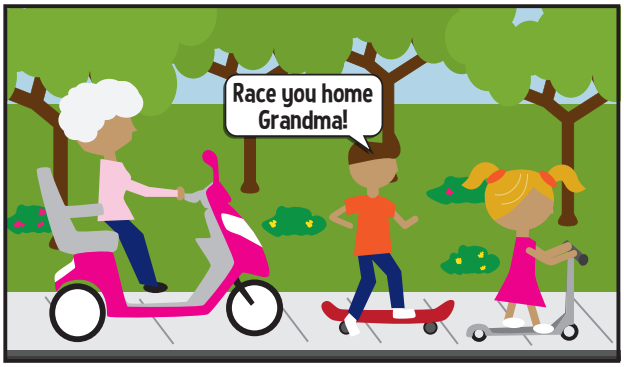

GRANDMA SETS OFF ON HER SCOOTER!


RAMPS AND ELEVATED CROSSWALKS KEEP HER SAFE AND MOVING

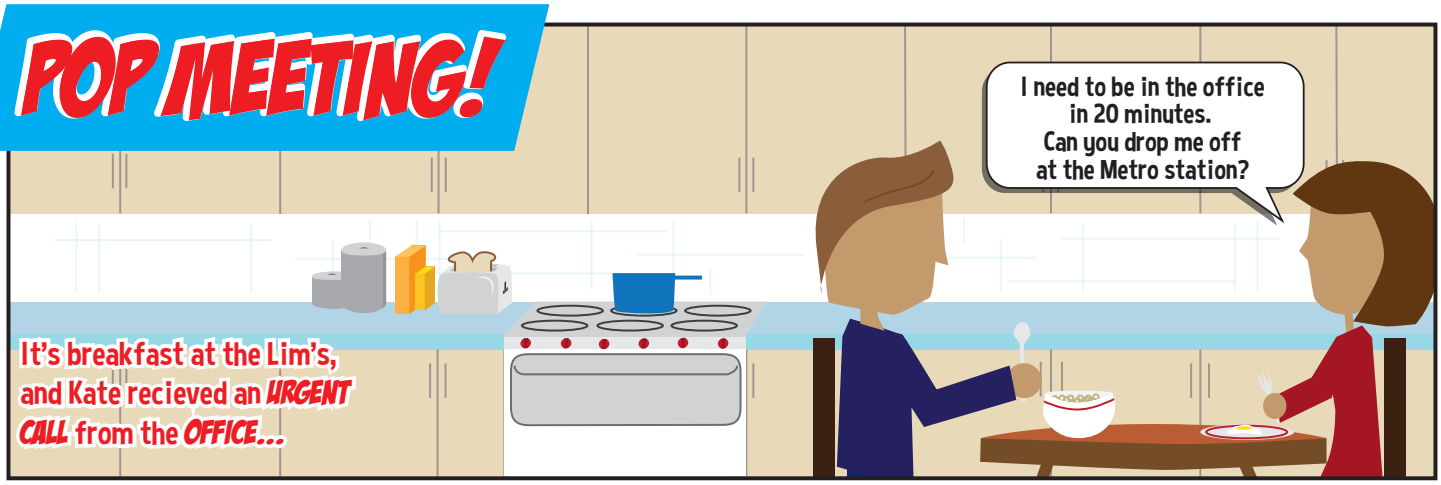

M
AN ELEVATOR GETS HER TO THE PLATFORM

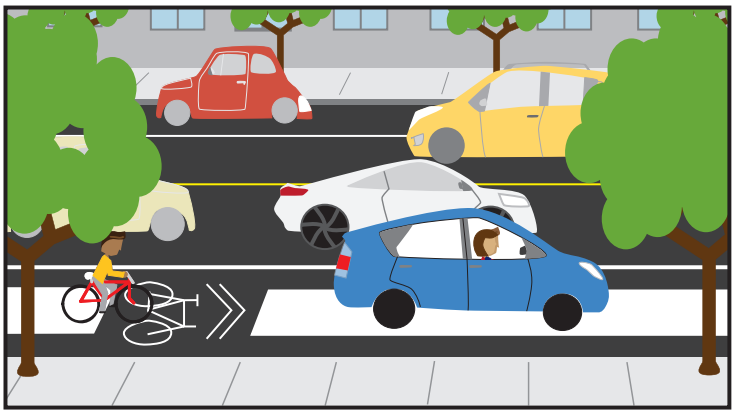





Race you home Grandma!

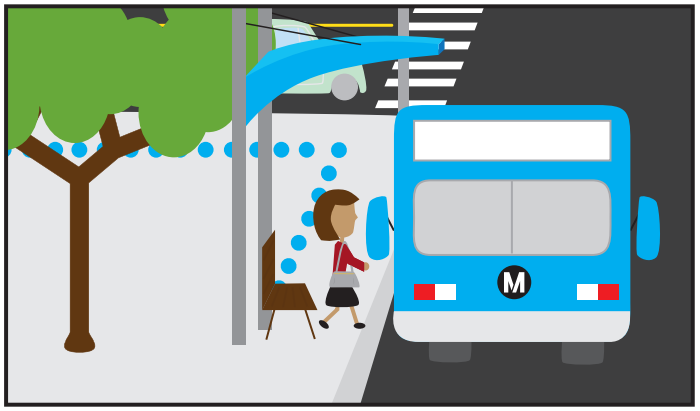
POP MEETING!

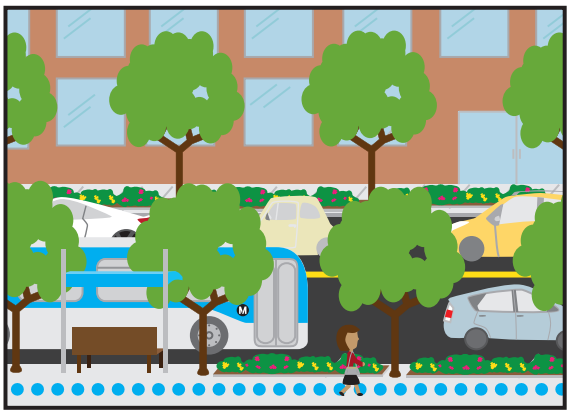

I need to be in the office in 20 minutes. Can you drop me off at the Metro station?
It's breakfast at the Lim's, and Kate recieved an URGENT CALL from the OFFICE...

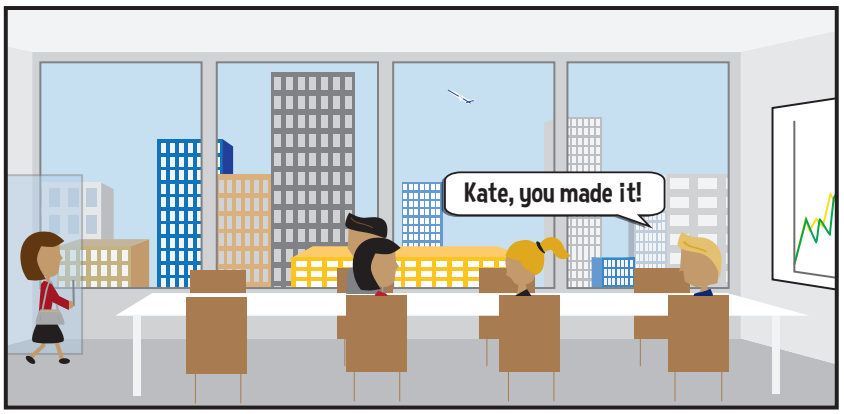



M


KATE HAS EXTRA TIME TO PREPARE FOR HER MEETING.


M




Kate, you made it!

FIRST LAST MILE

STRATEGIC PLAN

Planning Context Review

Task 3.1 – Review RTP/SCS
Task 4.2 - Best Practices Compilation & Review

Metro

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

IBI Group January 2013

Contents

FIRST LAST MILE
STRATEGIC PLAN

Planning Context Review

Executive Summary

State-Wide Policy Context

California's Assembly Bill 32, The Global Warming Solutions Act of 2006, was the first statewide plan enacted to mandate reductions of greenhouse gas emissions. The legislation requires the State to reduce greenhouse gas emissions to 1990 levels by or before 2020. It also directs the California Air Resources Board (CARB), which establishes targets for 2020 and 2035 for each region covered by one of the State's 18 metropolitan planning organizations (MPOs), to develop discrete early actions to reduce greenhouse gases and to prepare a scoping plan to identify how best to reach the 2020 target.

Senate Bill 375, California's Sustainable Communities and Climate Protection Act, was enacted in 2008 in response to AB 32 as the legal mechanism to achieve greenhouse gas emission reduction targets. SB 75 is a state law that requires the metropolitan regions of the state to reduce greenhouse gas emissions through their planning process and enhances California's ability to reach its AB 32 goals by promoting sustainable community planning, most notably by making explicit the link between land use and transportation planning policies.

Regional Policy Context- 2012 RTP/SCS

The Southern California Association of Governments (SCAG) is the planning authority for six counties: Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura; and is the lead agency in facilitating the development of the Regional Transportation Plan (RTP). SCAG's RTP is a comprehensive long-range transportation plan that identifies transportation strategies to address the mobility needs of Southern California. The RTP must be updated every four years in order to qualify the region's transportation projects for federal and state funding. In 2012 SCAG updated the RTP and included a Sustainable Community Strategy (SCS) to facilitate the requirements of SB 375. Combined with the RTP, the SCS is a vision for growth based on mobility, economy, and sustainability.

The 2012 RTP/SCS provides the foundation for an effective First Last Mile Strategy. Chapter 01 outlines a vision for the region and includes a clear definition of mobility:

> A successful transportation plan allows the residents of the region to access daily needs, including work, school, shopping, and recreation, without undue burdens of cost, time, or physical danger. This includes the pressing need to preserve and maintain our infrastructure at adequate levels. Residents should be able to rely on their ability to get from one place in the region to another in a safe and timely manner. They should be able to choose from a variety of transportation modes that suit their preferences and needs, including active, non-motorized modes such as biking and walking that allow for physical activity and greater health.
>
> 2012 Regional Transportation Plan, p.12

Future Context

The regions daily access needs will become even more pressing, as Los Angeles County expands over the next 30 years. As Southern California pulls out of the recession, and the economy is on the mend, we are reminded how critical a functional transit system is to allow residents access to a wide range of job markets. The region is expected to grow by 4 million people in the next 30 years, and with it will bring a growing demand to move both people and goods. There are a number of factors that will contribute to Los Angeles County's ability to address the new demand, as it relates to demographic changes, economy, mobility, and a sustainable future.

Not only will the region see a significant increase in the population in the next 30 years, but the aging Baby Boomer generation will increase the share of the 65+ population from 11% to 18% by 2035, and the working-age population will decrease. These shifts will increase the labor forces' dependency on transit, and increase the demand for development types such as multifamily and infill housing in centralized locations. The region plans to add over 1.5 million households, of which over 50% will be within High-Quality Transit Zones (HQTAs); this development pattern will rely on the addition of jobs near transit to balance the job-housing ratio, and provide complete communities with access to transit to all segments of the population.

Transportation Investments and Measure R

Investing in transportation infrastructure throughout Southern California in the coming years is a strategy to improve the regions mobility while re-invigorating its economic vitality. According to the 2012 RTP/SCS, over 174,500 new jobs will be generated by construction and operations, and an additional 354,000 jobs will be created annually in the broad cross-section of industries that will result from increased competitiveness throughout the region. This expansion, utilizing Measure R funding, will include dozens of critical transit and highway projects, Metro Link and Metro Rail Line extensions, and larger intercity rail service increases to support the region's growing transportation demand while infusing an estimated $32 billion back into the local economy.

Metro Expansion and Sustainabilitly

Los Angeles County Transportation Authority (Metro) is taking an active role in responding the greenhouse gas emission reduction targets with the approval of the Health and Active Transportation Motion (April 2011) and the development of the Active Transportation Agenda (November 2011). These efforts represent first steps in creating a standard of excellence for design across the agency that will ensure that all types of transportation investments contribute to a future urban form that encourages walking, biking, and transit use. The Agenda includes eight objectives to advance active transportation which are addressed by the advancement of new short and longer-term strategies. The Health and Active Transportation Motion recognizes the goals of the Sustainable Communities Strategy, a component of SCAG's Regional Transportation Plan, as opportunities to establish transit-supportive land-use patterns and improve regional accessibility with low-cost, non-polluting alternatives. Metro, through this motion, supports creating healthier and more sustainable communities with alternatives to driving that incorporate physical activity into daily life.

The First Last Mile Strategic Plan advances the objectives established by Metro's Board to promote active transportation, and implements Metro's Active Transportation Agenda by providing technical analysis to support the development of an Active Transportation and Design Policy by May 2013. The Plan will provide a framework for strategically investing Metro resources and the basis for seeking additional funds to extend the station area and expand the reach of transit in communities. The underlying land use, socioeconomic, and transportation data provided in existing documents are key components to the technical analysis that support the expansion of the transportation network and design policies that improve first mile/last mile connectivity. Developed by regional players, such as institutions, government agencies, and metropolitan planning organizations, the reviewed documents include policy, process, implementation, funding, and reference design guidelines.

Following this introduction are summaries of a number of important planning documents starting with a more detailed look at the 2012 RTP/SCS. The First Last Mile Strategy exists in a context of on-going planning efforts; the ability to build on the ideas and efforts of regional and national planners and designers will only strengthen the work.

Regional Transportation Plan (RTP)/Sustainable Community Strategy (SCS)

April 2012

The Regional Transportation Plan (RTP) is a long-range transportation plan that is developed and updated by the Southern California Association of Governments (SCAG) every four years. The RTP provides a vision for transportation investments throughout the region. The Sustainable Communities Strategy (SCS) is a newly required element of the Regional Transportation Plan (RTP). The SCS will integrate land use and transportation strategies that will achieve CARB emissions reduction targets.

The region wastes over [3 million] hours each year sitting in traffic

[21%] of all traffic-related fatalities involve pedestrians

State and federal gas taxes have not change in nearly [20] years

Yet, highway construction costs have grown by [82%]

Rail operating costs have increased by over [40%] in the past decade

Intercity transit operators have been forced to cut service by up to [20%]

The Regional Transportation Plan provides the framework for land use, socioeconomic data, and transportation analysis that are key components to the technical analysis of the existing and future transportation network. The success of land-use and transportation changes, outlined in the RTP/SCS, will be largely driven by respective actions of local governments and transportation commission's such as Metro. Engagement with a larger scope of strategies will be critical in order for the region to experience long-term benefits. SCAG performed a careful analysis of the transportation network, including outreach with stakeholder agencies and planning sessions with residents, which culminated into a shared vision for the region's sustainable future. The vision has been shaped by many entities, and is addressed Southern California's mobility, economy, and sustainability. Southern California is currently home to 18 million people, and is considered by some to be crowded, congested, and expensive. Over the next 25 years Southern California is expected to accommodate an additional 4 million people, putting additional pressure on the already congested transportation system, communities and neighborhoods, and the environment. The economic downturn (with the loss of 800,000 jobs in the region) will continue to impact housing options for Southern California residents, effecting their commute choices and frequency. Exacerbating this increase in commuter trips, projected population growth for the region will occur primarily in suburban counties, furthering the imbalance of the jobs to housing ratio in those areas.

The Southern California Association of Governments (SCAG) has prepared Regional Transportation Plans (RTPS) for the past three decades, increasing mobility for the region has always been the primary goal; however, the regions current challenges require the accommodation of additional growth, while providing improved quality of life, a resilient economy, and a healthy environment. The challenges facing the region are expansive; the region's roadways are the most congested in the nation, multi-modal fatality rates are high, the air quality is poor, and the costs provide major obstacles. To address these challenges, SCAG has worked with the key regional players to create a vision of growth based on mobility, livability, prosperity, and sustainability. This vision is included in the RTP as the Sustainable Communities Strategy (SCS); the SCS considers the transportation needs of the growing region and the planned transportation network to set forth a future land use pattern that will help meet GHG emission reduction targets in compliance with federal law for developing an RTP. The RTP/SCS builds on the backbone of the region's economic well-being, the multimodal transportation system that the region has invested in over the past few decades.

THE SYSTEM AT A GLANCE

[21,690] miles of highways and arterials
[470] miles of passenger rail
[6] air carrier airports

THE REGION IN MOTION

[446 million] miles driven each day
[81 million] air passengers each year
[45%] more urban rail riders between 2000-2006
[34%] of our jobs depend on the goods movement industry

The SCS takes an integrated approach to addressing the regions challenges, with strategies that respond to projected growth, housing needs, changing demographics, and transportation demands. The goals of the SCS reach beyond the reduction of GHG emissions by building on and refining the regional blueprint that SCAG began in 2000, addressing ongoing issues such as placemaking, the cost of living, the environment, health, responsiveness to the marketplace, and mobility. The proposed transportation network expansion is supported by the land use development pattern, which focuses new housing and job growth in high-quality transit areas, and the transportation demand management measures in the SCS.

The SCS addresses the needs of the region, by utilizing broader definitions of mobility, economy, and sustainability; where the integration of land use planning and transportation provide improved access, create jobs, and reduces GHG emissions through not only the expansion of the transportation network, but the redistribution of residencies, commercial corridors, and industry clusters and the efficiency of movement of goods and people throughout the region. Offering a variety of transportation modes to suit all preferences and needs, the plan proposes over $524 billion of investment in the next 25 years, constituting the largest infrastructure jobs program in Southern California's history. To guide these investments through projects, programs, and strategies, the SCS has specific goals that carry out the vision that reflect the wide range of challenges identified. The following goals have been approved by the RTP Subcommittee, and will adopted by the Regional Council as part of the 2012-2035 RTP/SCS:

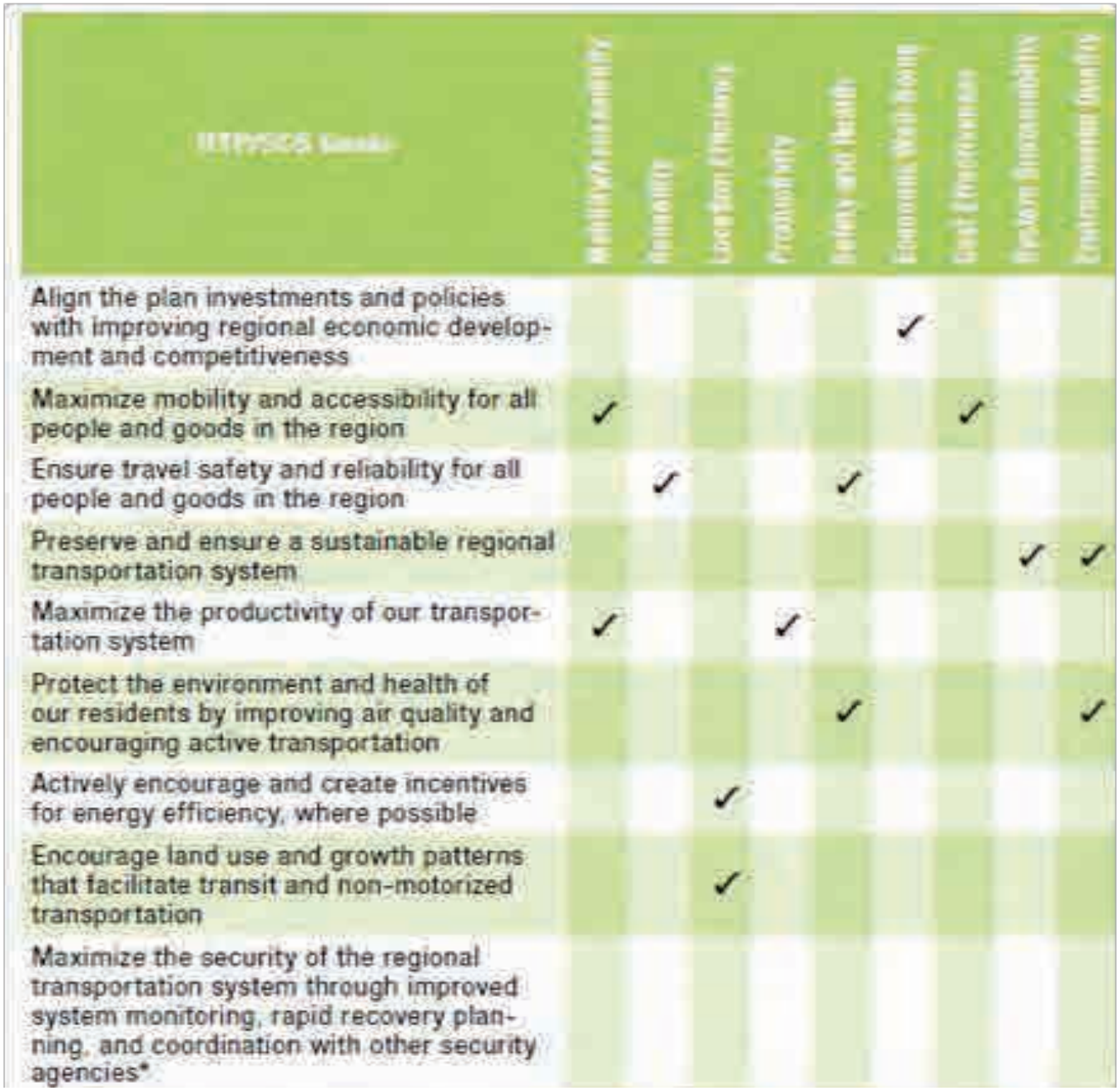
We will reduce greenhouse gas emissions by [9%] by 2020, and by [16%] by 2035

We will generate [500,000] jobs per year

Over [twice] as many households will live near high-quality transit

We will get [$2.90] back for evey $1 spent

The RTP/SCS is a performance-based plan that allows the regional goals to be quantified and investment impacts to be estimated, and re-evaluated over time. The performance measurements are based on previous successes and will be refined and expanded upon to meet policy objectives, as needed.



RTP/SCS Goals:	Mobility/Accessibility	Reliability	Location Efficiency	Productivity	Safety and Health	Economic Well-Being	Cost Effectiveness	System Sustainability	Environmental Quality
Align the plan investments and policies with improving regional economic development and competitiveness						✓			
Maximize mobility and accessibility for all people and goods in the region	✓						✓		
Ensure travel safety and reliability for all people and goods in the region		✓			✓				
Preserve and ensure a sustainable regional transportation system								✓	✓
Maximize the productivity of our transportation system	✓			✓					
Protect the environment and health of our residents by improving air quality and encouraging active transportation					✓				✓
Actively encourage and create incentives for energy efficiency, where possible			✓						
Encourage land use and growth patterns that facilitate transit and non-motorized transportation			✓						
Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies*									

Utilizing local general plans, recent planning assumptions, and the two sub-regional Sustainable Communities Strategies prepared by the Gateway Cities Council of Governments (GCCOG) and Orange County Council of Governments (OCCOG), the SCS was developed around four key building blocks: land use, transportation networks, transportation demand management, and transportation system management programs and policies.

The Land Use Pattern accommodates the region's future employment and housing needs and protects sensitive habitat and resource areas while planning for additional housing and jobs near transit. The land use pattern was developed using five community types and Transportation Analysis Zones (TAZs) to identify localized effects of the interaction of land use and transportation. The resulting policies consider density of residential areas, centrality of employment districts, convergence of transit facilities, capacity of non-auto infrastructure, and multi-modal connectivity such as active transportation. These components are used to develop land use patterns with additional High-Quality Transit Areas (HQTA) where jobs and housing are within a walkable distance to a transit village, within a half-mile of a well-serviced transit stop, and which include transit corridors with frequent service during peak commute hours. HQTAs provide the framework for new land use zones such as "Pedestrian-Oriented Transit Zones" (POTs).

The SCS outlines requirements that lay a regional policy foundation for local governments to build upon, which integrate transportation and land use strategies to meet GHG-reduction targets. Local governments should:

- Identify existing land use,
- Identify areas to accommodate long-term housing needs,
- Identify areas to accommodate an eight-year projection of regional housing needs,
- Identify transportation needs and the planned transportation network,
- Consider resource areas and farmland,
- Consider state housing goals and objectives,
- Set forth a forecasted growth and development pattern, and

The review of local plans and subregional strategies identified recent trends that support the goals of the SCS with an overall land use pattern. Along with planning for additional housing and jobs near transit, the land use plan allows for changing demands in types of housing, ensures adequate access to open space, and continues to incorporate local input for future growth. The land use pattern accommodates approximately 644,000 additional households by 2020, and an additional 1.5 million households by 2035, while encouraging a more balances job to housing ration by adding 676,000 jobs by 2020 and 1.7 million by 2035. The integrated land use and transportation planning strategy outlined in the SCS allows for better place making, lower costs to taxpayers, public health and environmental improvements, and a responsiveness to the economic climate, reaching a broader scope of goals than improvement to access and mobility alone.

Table 4.3 Land Use Actions and Strategies

Proposed Action/Strategy	Responsible Party(ies)
Coordinate ongoing visioning efforts to build consensus on growth issues among local governments and stakeholders	SCAG
Provide incentives and technical assistance to local governments to encourage projects and programs that balance the needs of the region	SCAG
Collaborate with local jurisdictions and agencies to acquire a regional fair share housing allocation that reflects existing and future needs	SCAG, Local Jurisdictions, HCD
Expand Compass Blueprint program to support member cities in the development of bicycle, pedestrian, Safe Routes to Schools, Safe Routes to Transit, and ADA Transition plans	SCAG, State
Continue to support, through Compass Blueprint, local jurisdictions and sub-regional COGs adopting neighborhood-oriented development, suburban villages, and revitalized main streets as livability strategies in areas not served by high-quality transit	SCAG, State, Local Jurisdictions, COGs
Encourage the use of range-limited battery electric and other alternative fueled vehicles through policies and programs, such as, but not limited to, neighborhood oriented development, complete streets, and Electric (and other alternative fuel) Vehicle Supply Equipment in public parking lots	Local Jurisdictions, COGs, SCAG, CTCs
Continue to support, through Compass Blueprint, planning for new mobility modes such as range- limited Neighborhood Electric Vehicles (NEVs) and other alternative fueled vehicles	SCAG, State
Collaborate with the region's public health professionals to enhance how SCAG addresses public health issues in its regional planning, programming, and project development activities	SCAG, State, Local Jurisdictions
Support projects, programs, and policies that support active and healthy community environments that encourage safe walking, bicycling, and physical activity by children, including, but not limited to development of complete streets, school siting policies, joint use agreements, and bicycle and pedestrian safety education	Local Jurisdictions, SCAG
Seek partnerships with state, regional, and local agencies to acquire funding sources for innovative planning projects	Local Jurisdictions, SCAG, State
Update local zoning codes, General Plans, and other regulatory policies to accelerate adoption of land use strategies included in the 2012–2035 RTP/SCS Plan Alternative, or that have been formally adopted by any sub-regional COG that is consistent with regional goals	Local Jurisdictions
Update local zoning codes, General Plans, and other regulatory policies to promote a more balanced mix of residential, commercial, industrial, recreational and institutional uses located to provide options and to contribute to the resiliency and vitality of neighborhoods and districts	Local Jurisdictions
Support projects, programs, policies and regulations that encourage the development of complete communities, which includes a diversity of housing choices and educational opportunities, jobs for a variety of skills and education, recreation and culture, and a full range of shopping, entertainment and services all within a relatively short distance	Local Jurisdictions, SCAG
Pursue joint development opportunities to encourage the development of housing and mixed-use projects around existing and planned rail stations or along high-frequency bus corridors in transit-oriented development areas, and in neighborhood-serving commercial areas	Local Jurisdictions, CTCs
Working with local jurisdictions, identify resources that can be used for employing strategies to maintain and assist in the development of affordable housing	SCAG, Local Jurisdictions
Consider developing healthy community or active design guidelines that promote physical activity and improved health	Local Jurisdictions
Support projects, programs, policies, and regulations to protect resources areas, such as natural habitats and farmland, from future development	Local Jurisdictions, SCAG
Create incentives for local jurisdictions and agencies that support land use policies and housing options that achieve the goals of SB 375	State, SCAG
Continue partnership with regional agencies to increase availability of state funding for integrated land use and transportation projects in the region	State, SCAG
Engage in a strategic planning process to determine the critical components and implementation steps for identifying and addressing open space resources, including increasing and preserving park space, specifically in park-poor communities	Local Jurisdictions, SCAG
Identify and map regional priority conservation areas for potential inclusion in future plans	SCAG
Engage with various partners, including CTCs and local agencies, to determine priority conservation areas and develop an implementable plan	SCAG, CTCs
Develop regional mitigation policies or approaches for the 2016 RTP	SCAG, CTCs

The transportation network consists of public transit, highways, local streets, bikeways, and walkways. Creation of HQTAs, called for by the land use pattern, requires an expansion of the public transportation and transit service on new and existing routes to create greater accessibility and connectivity throughout the region. Measures to ensure the expansion of the transportation network supportive of the land use plan include adding new corridors and lengthening existing ones in Los Angeles County through Measure R, providing additional travel options for long distance travel within the region and neighboring regions, improving technology along existing highways and local streets, and increasing the active transportation network. The expansion of the transportation network will include highways, local arterials, bus transit, active transportation, light rail transit, high-speed and passenger rail, and transit facilities.

Even with the focus of transportation currently on the reduction of single-occupancy vehicle trips, the addition of highways and arterials will still need improvements. There are critical gaps which hinder access to isolated parts of the region and cause congestion chokepoints elsewhere in the network. Transit facilities and services will also be expanded over the next 25 years. The envisioned rail network will add entirely new corridors and lengthen existing corridors, as well as supplement and host new bus rapid transit (BRT) routes and Metro link lines. The expansion includes frequency, encouraging targeted corridors and larger spans of service in TOD and HQTA areas.

Active transportation networks are an essential part of the regional transportation system and will see some of the largest expansion of a transportation network in the region over the next 25 years. They are low cost, reduce roadway congestion, and increase health and quality of life. The RTP/SCS calls for an expansion of the public transportation network and transit services (i.e., public transit, highways, local streets, bikeways, and walkways) on new and existing routes to create greater accessibility and connectivity throughout the Los Angeles region. Active transportation will receive a total of $6.7 billion in available revenues - an increase of more than 200% over the 2008 RTP. Increasing the use of active modes of transportation will require bicycle and pedestrian facility maintenance, easy access to transit facilities, and safety improvements. Dedicated bicycle facilities require expansion in the region (7,154 miles planned), and established sidewalks will undergo streetscape improvements to improve pedestrian environments.

Table 4.4 Transportation Network Actions and Strategies

Proposed Action/Strategy	Responsible Party(ies)
Perform and support studies with the goal of identifying innovative transportation strategies that enhance mobility and air quality, and determine practical steps to pursue such strategies, while engaging local communities in planning efforts	SCAG, CTCs
Cooperate with stakeholders, particularly county transportation commissions and Caltrans, to identify new funding sources and/or increased funding levels for the preservation and maintenance of the existing transportation network	SCAG, CTCs, Local Jurisdictions
Expand the use of transit modes in our subregions such as BRT, rail, limited-stop service, and point-to-point express services utilizing the HOV and HOT lane networks	SCAG, CTCs, Local Jurisdictions
Encourage transit providers to increase frequency and span of service in TOD/HQTA and along targeted corridors where cost-effective and where there is latent demand for transit usage	SCAG, CTCs
Encourage regional and local transit providers to develop rail interface services at Metrolink, Amtrak, and high-speed rail stations	SCAG, CTCs, Local Jurisdictions
Expand the Toolbox Tuesdays program to include bicycle safety design, pedestrian safety design, ADA design, training on how to use available resources that expand understanding of where collisions are happening, and information on available grant opportunities to improve bicycle and pedestrian safety.	SCAG, State
Prioritize transportation investments to support compact infill development that includes a mix of land uses, housing options, and open/park space, where appropriate, to maximize the benefits for existing communities, especially vulnerable populations, and to minimize any negative impacts	SCAG, CTCs, Local Jurisdictions
Explore and implement innovative strategies and projects that enhance mobility and air quality, including those that increase the walkability of communities and accessibility to transit via non-auto modes, including walking, bicycling, and neighborhood electric vehicles (NEVs) or other alternative fueled vehicles	SCAG, CTCs, Local Jurisdictions
Collaborate with local jurisdictions to plan and develop residential and employment development around current and planned transit stations and neighborhood commercial centers	SCAG, CTCs, Local Jurisdictions
Collaborate with local jurisdictions to provide a network of local community circulators that serve new TOD, HQTAs, and neighborhood commercial centers providing an incentive for residents and employees to make trips on transit.	SCAG, CTCs, Local Jurisdictions
Similar to SCAG's partnership with the City of Los Angeles and LACMTA, offer to all County Transportation Commissions a mutually funded, joint first mile/last mile study for each region	SCAG, CTCs
Develop first-mile/last-mile strategies on a local level to provide an incentive for making trips by transit, bicycling, walking, or neighborhood electric vehicle or other ZEV options	CTCs, Local Jurisdictions
Encourage transit fare discounts and local vendor product and service discounts for residents and employees of TOD/HQTAs or for a jurisdiction's local residents in general who have fare media	Local Jurisdictions
Work with transit properties and local jurisdictions to identify and remove barriers to maintaining on-time performance	SCAG, CTCs, Local Jurisdictions
Develop policies and prioritize funding for strategies and projects that enhance mobility and air quality.	State
Work with the California High-Speed Rail Authority and local jurisdictions to plan and develop optimal levels of retail, residential, and employment development that fully take advantage of new travel markets and rail travelers	State
Work with state lenders to provide funding for increased transit service in TOD/HQTA in support of reaching SB 375 goals	SCAG, State
Continue to work with neighboring Metropolitan Planning Organizations to provide alternative modes for interregional travel including Amtrak and other passenger rail services and an enhanced bikeway network, such as on river trails.	SCAG, State
Encourage the development of new, short haul, cost effective transit services such as DASH and demand responsive transit (DRT) in order to both serve and encourage development of compact neighborhood centers.	CTCs, Municipal Transit Operators
Work with the state legislature to seek funding for Complete Streets planning and implementation in support of reaching SB 375 goals	SCAG, State
Continue to support the California Interregional Blueprint as a plan that links statewide transportation goals and regional transportation and land use goals to produce a unified transportation strategy.	SCAG, State

Transportation Demand Management (TDM) Strategies are key to any transportation network and provide the approach and policies necessary to reduce and redistribute travel demand, specifically of single-occupancy vehicles, spatially and temporally. Extensive TDM strategies that support the expected land use development patterns will increase the usability and effectiveness of the active transportation system. TDM strategies will receive a total of $4.5 billion in available revenues - an increase of more than 200% over the 2008 RTP - in order to close gaps in the regional bikeway network, bring the majority of the sidewalks and intersections in the region into American with Disabilities Act (ADA) compliance, expand parking cash-out programs in urban areas, and promote Guaranteed Ride Home programs. Employment of strategies, such as incentives to reduce solo driving, which increase the usability and effectiveness of the active transportation systemand first-last mile amenities will allow travelers to easily connect to transit service at their origins and destinations.TDM funding can be used to develop mobility hubs around major transit stations, integrate bicycle and transit by providing bicycle racks on buses, and provide dedicated bicycle racks on light and heavy rail vehicles.

Safety is a main priority for transportation demand management in active transportation networks with cyclists; cyclists range from "vehicular cyclists" that are fully confident on most surfaces and in traffic flows to "no way, no how" cyclists that are not interested in bicycling for transportation and may not ride at all. This broad range of rider types makes filling in the bikeway network gaps very important to ensure all levels of cyclists can safely and comfortably navigate to and from their destinations.

Table 4.5 Transportation Demand Management (TDM) Actions and Strategies

Proposed Action/Strategy	Responsible Party(ies)
Examine major projects and strategies that reduce congestion and emissions and optimize the productivity and overall performance of the transportation system	SCAG
Develop comprehensive regional active transportation network along with supportive tools and resources that can help jurisdictions plan and prioritize new active transportation projects in their cities	SCAG, CTCs, Local Jurisdictions
Encourage the implementation of a Complete Streets policy that meets the needs of all users of the streets, roads and highways – including bicyclists, children, persons with disabilities, motorists, neighborhood electric vehicle (NEVs) users, movers of commercial goods, pedestrians, users of public transportation and seniors – for safe and convenient travel in a manner that is suitable to the suburban and urban contexts within the region	Local Jurisdictions, COGs, SCAG, CTCs
Support work-based programs that encourage emission reduction strategies and incentivize active transportation commuting or ride-share modes	SCAG, Local Jurisdictions
Develop infrastructure plans and educational programs to promote active transportation options and other alternative fueled vehicles, such as neighborhood electric vehicles (NEVs), and consider collaboration with local public health departments, walking/biking coalitions, and/or Safe Routes to School initiatives, which may already have components of such educational programs in place	Local Jurisdictions
Encourage the development of telecommuting programs by employers through review and revision of policies that may discourage alternative work options	Local Jurisdictions, CTCs
Emphasize active transportation and alternative fueled vehicle projects as part of complying with the Complete Streets Act (AB 1358)	State, SCAG, Local Jurisdictions

Transportation System Management (TSM) measures maximize the efficiency of the transportation network and support the land use patterns of the RTP/SCS by increasing capacity and improving operation efficiency of the transit network with strategies such as universal transit fare cards, traffic signal synchronization, transit automatic vehicle locations (AVL), and advanced traveler information. System accessibility and safety are addressed by TSM measures as are traffic flow and air quality. The primary measures for TSM in the SCS are enhancing incident management, advanced ramp metering, corridor system management plans, traffic signal synchronization, and improved data collection. Making these improvements will contribute to improved traffic flow, better air quality, and system accessibility and safety.

Maximizing the existing transportation system reduces the need for costly system expansions while alleviateing congestion and reducing accidents. TSM will be key in the economic vitality of the region, as it plays an increasing larger role in the movement of goods throughout the region. System efficiency at the ports and intermodal operations will reduce delays and wait times, assisting in meeting the larger goals of emission reduction. TSM measures also serve the public, providing real-time traffic conditions and alternative routes or transportation options. The measures are not only focused on auto-centric technology, but improvement of efficiency at transit user interfaces, such as purchasing transit tickets.

Comprehensive user statistics, demographics, bicycle travel patterns, accident mapping, and project funding needs are types of ongoing data collection that will be needed to help plan for increases in active transportation investments. All transportation planning projects will need to consider an increase in bicycle and pedestrian accommodations, multi-modal planning, programming, and design. The accommodation by all transportation planning efforts should, in effect, increase active transportation use and safety while accomplishing the environmental and congestion reduction goals that concern the entire region.

Table 4.6 Transportation System Management (TSM) Actions and Strategies

Proposed Action/Strategy	Responsible Party(ies)
Work with relevant state and local transportation authorities to increase the efficiency of the existing transportation system	SCAG, Local Jurisdictions, State
Collaborate with local jurisdictions and subregional COGs to develop regional policies regarding TSM	SCAG, COGs, Local Jurisdictions
Contribute to and utilize regional data sources to ensure efficient integration of the transportation system	SCAG, CTCs
Provide training opportunities for local jurisdictions on TSM strategies such as Intelligent Transportation Systems (ITS)	SCAG, Local Jurisdictions
Collaborate with local jurisdictions and subregional COGs to continually update the ITS inventory	SCAG, COGS, Local Jurisdictions
Collaborate with CTCs to regularly update the county and regional ITS architecture	SCAG, CTCs, Local Jurisdictions
Collaborate with the state and federal Government and subregional COGs to examine potential innovative TDM/TSM strategies	SCAG, State, COGs

For the first time, SCAG has integrated land use, housing and environmental strategies with transportation planning to help meet emissions reduction targets by the California Air Resources Board. This Sustainable Communities Strategy provides an alternative to "business as usual" development. It encourages community revitalization and neighborhoods that are bike and pedestrian friendly, with convenient access to transit.

SCAG (09/20/2012)

The dominant factors that will continue to affect travel behavior, contribute to transit demand, and determine access patterns over the next 30 years, are demographic changes and population growth. The SCS objectives and strategies are a framework for reducing travel distances and providing additional travel choices while addressing these regional challenges and their impact on air pollution and human health. The four building blocks of SCS; land use, transportation networks, transportation demand management strategies, and transportation system management, identify an explicit link between land use policy and transportation investments. Many see the link between land use and transportation planning as the largest breakthrough of the 2012 RTP/SCS; it is very possible that making the link between transportation and health is an even more significant breakthrough.

The ongoing partnership between SCAG and Metro covers a range of initiatives that address these linkages. While the land use pattern provides the region with housing options near transit, the expansion of the network consists of many investments in alternative infrastructure to further the reach of transit. These investments provide the framework for alternatives such as green technology (car charging stations), telecommuting, interconnected active transportation networks, adequate parking, and improvements to roads in poor condition and non ADA compliant sidewalks. The 2012 RTP/SCS's focus on connectivity at all scales is paramount in reaching the goals for sustainability and public health, by decreasing GHG emissions, shortening commute times (associated with poor health) and promoting physical activity as a commute mode by providing safer streets in and around transit zones and communities.

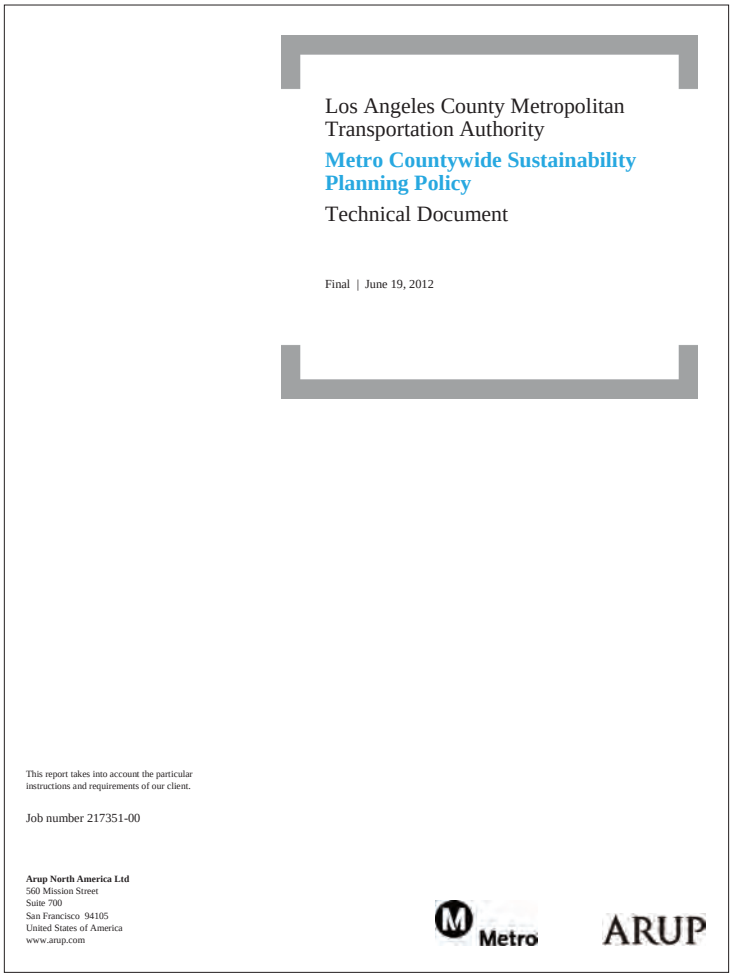
Active transportation, while only one piece of the multi-modal network, will play a key role in the expanded transportation network, particularly the land use pattern. A First Last Mile Strategy should consider expanding the definition of POTs beyond "pedestrians" to include all forms of non-motorized mobility devices that support active living as well as clean energy (i.e., electric) mobility devices. It is worth noting that First Last Mile planning is concerned primarily with mobility in the public realm, most importantly the linkages between origins and destinations that rely on public transportation network infrastructure (rails, roads, walkways, etc.), and as such, is concerned with the connections to and from various land uses, not the visioning of land uses themselves.

SCAG's 2012-2035 RTP/SCS is a policy document that outlines strategies for reaching the region's GHG emission reduction and healthy sustainable community goals. It is a driving document that provides background demographic data for the region along with future growth analysis and vision. Metro's Joint-Work Program with SCAG is a collaboration that includes the RTP/SCS and ensures its progress into the 2016 RTP/SCS, advancing sustainable transportation options through its countrywide planning capacity and programming transportation funds in the region. The RTP/SCS acts as a key component to the technical analysis supporting the First Last Mile Strategic Plan and provides a framework for active transportation recommendations and first last mile solutions.

Countywide Sustainability Planning Policy (CSPP)

June 2012

This document was prepared by Los Angeles County Metropolitan Transportation Authority (Metro) for the citizens of Los Angeles County.


Los Angeles County Metropolitan Transportation Authority

Metro Countywide Sustainability Planning Policy

Technical Document

Final | June 19, 2012

This report takes into account the particular instructions and requirements of our client.

Job number 217351-00

Arup North America Ltd
560 Mission Street
Suite 700
San Francisco 94105
United States of America
www.arup.com

Metro ARUP

The Countywide Sustainable Planning Policy (CSPP) uses SCAG's Regional Transportation Plan (RTP)/ Sustainable Community Strategy (SCS) 2012 as its foundation to create a more sustainable and active transportation system. Compliance with state climate change law is also promoted to implement the regionally adopted land use and transportation vision. The Countywide Sustainable Planning approach integrates land use and transportation design such as pedestrian-oriented transit zones (POTs), transit-oriented developments (TODs), and complete-streets that incorporates local modes of access and promotes "green mode" (walking, biking, rideshare, transit, and clean-fueled vehicles) trips. Complete streets and transit-oriented development policies are consistent with the RTP/SCS and should be promoted at the local level through policy incentive programs.

The CSPP applies place-based policies to activity clusters in order to delineate appropriate active transportation strategies based on existing densities, activity levels, and zoning typologies:

- **Cluster A** includes areas with moderate to high residential density, but limited access to major job centers and long commutes to work. Cluster A should have access to alternative commuting options such as rail and buses active transportation options are limited due to nearby auto-oriented corridors and suburban block patterns. Policies applicable to Cluster A support the growing use of active transportation through facilities development and promotion of safety. Transit-oriented development should be planned at select locations with a focus on mixed-use centers, and transit services to employment centers, corridors, and feeder services should be provided. Projects that utilize existing capacity of streets by all modes should be prioritized.
- **Cluster B** includes two sub-types, both with low housing densities, of suburban/rural communities and special-use areas such as large industrial zones. Cluster B requires diverse transportation strategies for residents, workers, and goods. Because auto-oriented travel is typically the most efficient in suburban and rural communities the advancement and development of new policies that promote efficiency in alternative transportation modes and trip reduction is needed to improve health and mobility in these community types. In special-use areas the addition of transportation alternatives for commuters is important for job access as well as the efficient operation of major freeway

and freight corridors.

Cluster B policies encourage active transportation networks, but the local government planning policies are focused on improving the efficiency and safety of goods movement along with passenger travel. Cluster B place types' transit services focus on creating sub-regional transit hubs and feeder services. Special-use areas support sustainable transportation through the promotion of clean-fuel vehicles and other green transit modes. Where greater development is desired strategies that limit congestion should be considered.

- **Cluster C** defines sub-regional centers, neighborhoods, and districts where housing is dense enough to support local employment centers. Short trip lengths allow for active modes and transit to serve as the primary commute methods.
- **Cluster D** covers areas with significant urban office centers, major destinations, and cultural activity. These areas are mixed-use horizontally and vertically and have high capacity transit stops and corridors throughout. They allow for multimodal connectivity at the local, regional, and statewide scale. Clusters C and D are the place types that best suit mobility options that support car-free and one-car living through extensive pedestrian, bicycle, and transit facilities. Mixed use corridors with local transit coverage and prioritization of active modes of transportation are encouraged.

The four place-based topics - sustainable transportation, local government planning, transit services, and street operations - are used as general guides for policy making, but each activity cluster has a set of specific policies within these guides that best addresses their transportation needs.

Accessibility is analyzed through the Policy's Accessibility Index which includes nine place types that are combined into the four place type clusters. The Index is a secondary characterization that assigns context to current planning and investment projects where they correspond with existing Measure R project implementation. The Index clusters, categorized as capacity enhancements, interchanges, ramps and grade separations, provide a method for understanding Measure R projects.

The Countywide Sustainability Planning Policy is a policy document that lays out specific objectives and strategies to expand the transportation system and focuses on accessibility throughout the region. The identification of place types, and typically which new infrastructure is applied to each place type to improve accessibility, is a jumping off point for defining transit zones and expanding station areas in the First Last Mile Strategic Plan.

Metro's Long Range Transportation Plan (LRTP)

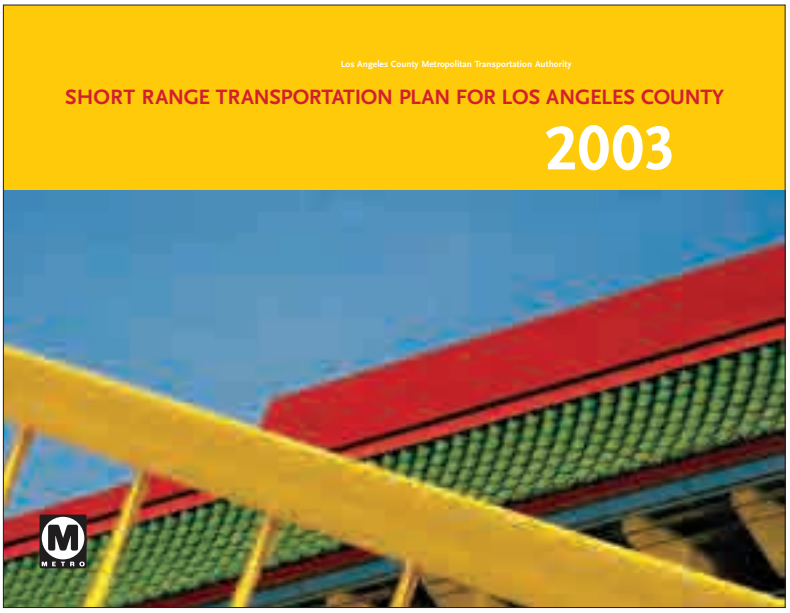
August 2009

This document was prepared by the Los Angeles County Metropolitan Transportation Authority (Metro) for the citizens of Los Angeles County.

Metro's Long Range Transportation Plan aims to improve mobility over the next thirty years by enhancing public transit and reducing greenhouse gas emissions by funding expansion to public transit throughout the region. The LRTP will play a key role in implementing the 2006 Bicycle Transportation Strategic Plan (BTSP), and is focused on improving bicycle and pedestrian access to encourage ridership of new and existing transit. It acknowledges that coordination between transit and users' final destinations, including linkages to bus centers and rail stations, is vital to sustainability of the regional transportation system.

Along with the BTSP, this plan will improve bicycling as a viable transportation mode by shifting the focus from long arterial bikeways to routes under three miles and improving access to bike-transit hubs. Filling gaps in the bikeway system and improving parking at transit stations are essential to encourage the use of bicycles with transit. In addition to bicycling, pedestrian improvements are a priority in the non-motorized component of the transportation network. All motorized and non-motorized modes of transportation should connect to an efficient and safe pedestrian system at the beginning and end of trips, as well as secondary destinations and links into the public transit systems. Improvements to wayfinding, signage, sidewalks, and street crossings should be made alongside installation of physically attractive features and amenities. Metro's approach to improving the pedestrian environment focuses on the development of public policy, adoptions of regulatory standards, and targeted funding.

Short Range Transportation Plan (SRTP)



2003

This document was prepared by Los Angeles County Metropolitan Transportation Authority (Metro) with Mobility 21 Coalition for the citizens of Los Angeles County.

The Short Range Transportation Plan is a master plan to protect funding sources for Los Angeles County's transportation needs and assess options for additional and future funding. Metro will work with subregional organizations to fund and implement priority projects that improve local bus services, expand the Metro Rapid Bus program, expand the light rail system, and introduce Metro Rapid Transitways to create better connectivity throughout the County.

The Mobility 21 Coalition, a contributor to this document, incentivizes better land use and transportation planning interaction and the Short Range Transportation Plan's land use initiative to grow more efficiently. Enhancing non-motorized forms of transportation that provide compliments to transit use supports the land use initiative, as well as the Congestion Management Program (CMP).

The land use initiative encourages infill development near transit stations and along major transit corridors, and promotes land use programs that create self-sustaining urban centers. Minimizing the need for intraregional car travel and increasing the use of active transportation, the plan explores opportunities to construct transit-oriented developments. Initiatives such as creating smart growth enterprise zones, market-based incentives, and traffic impact fees will ensure the impact of growth on the regional transportation network is better addressed. The Land Use Initiative Action Plan calls for coordination between the partnership programs with SCAG's growth visioning process. The bicycle and pedestrian programs are expected to be implemented in the short-term to enhance non-motorized forms of transportation. Creating environments that are comfortable and safe will encourage pedestrians to walk longer distances or take public transportation in exchange for short auto-trips. The SRTP Bicycle and Pedestrian Program Action Plan calls for implementation of programs that complete gaps in countywide networks, encourage access to transit services, and improve mobility and safety. The Action Plan also promotes programs that enhance pedestrian travel, such as expansion of the transit system and redevelopment of urban centers around transit. (Insert SRTP Table of Improvements)

Bicycle Transportation Strategic Plan (BTS)

June 2006

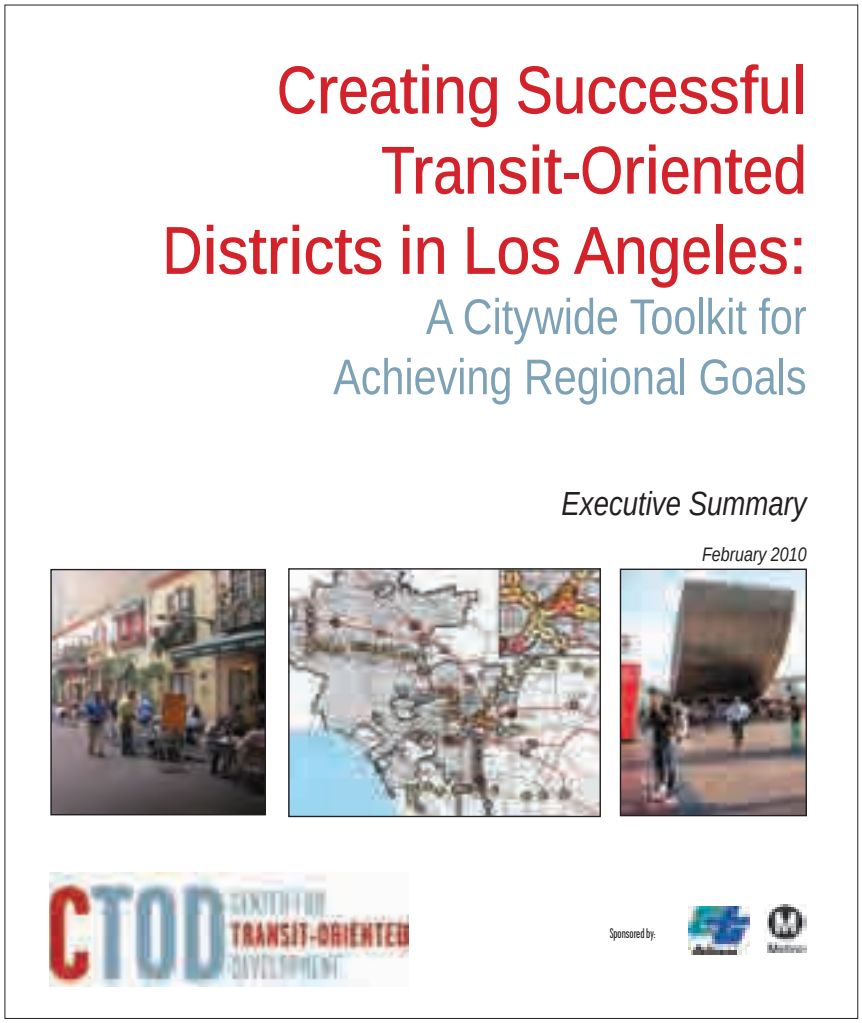
This document was prepared by the Los Angeles County Metropolitan Transportation Authority with Alta Planning + Design, Inc., Transight Limited, and Leslie Scott Consulting for use by the Cities of Los Angeles County.

The Bicycle Transportation Strategic Plan is collaborative document utilizing the Metro Bicycle Transportation Strategic Plan and the Bicycle Transportation Account Compliance Document, both prepared to improve mobility in the region through the use of bicycles. The BTS establishes regional planning policy and tools for local agencies promoting bicycling as a viable transportation mode. The purpose of the BTS is to identify strategies that increase the use of bicycles in place of automobiles for trips to work, errands, recreational destination, and transit. The BTS includes a policy objective to encourage high quality end-of-trip facilities at transit locations and destinations. The countywide incorporation of bicycle parking will help create a network of bike-transit centers, and more seamless linkages for users from their origin to their destination. The bikes-to-transit policy objective encourages transit hub access plans to ensure that bicycle access is addressed in the design of new and existing transit stations.

Creating Successful Transit-Oriented Districts in Los Angeles: A Citywide Toolkit for Achieving Regional Goals

February 2010

This document was prepared by The Center for Transit-Oriented Development (CTOD) for Caltrans and the Los Angeles County Metropolitan Transportation Authority (Metro).

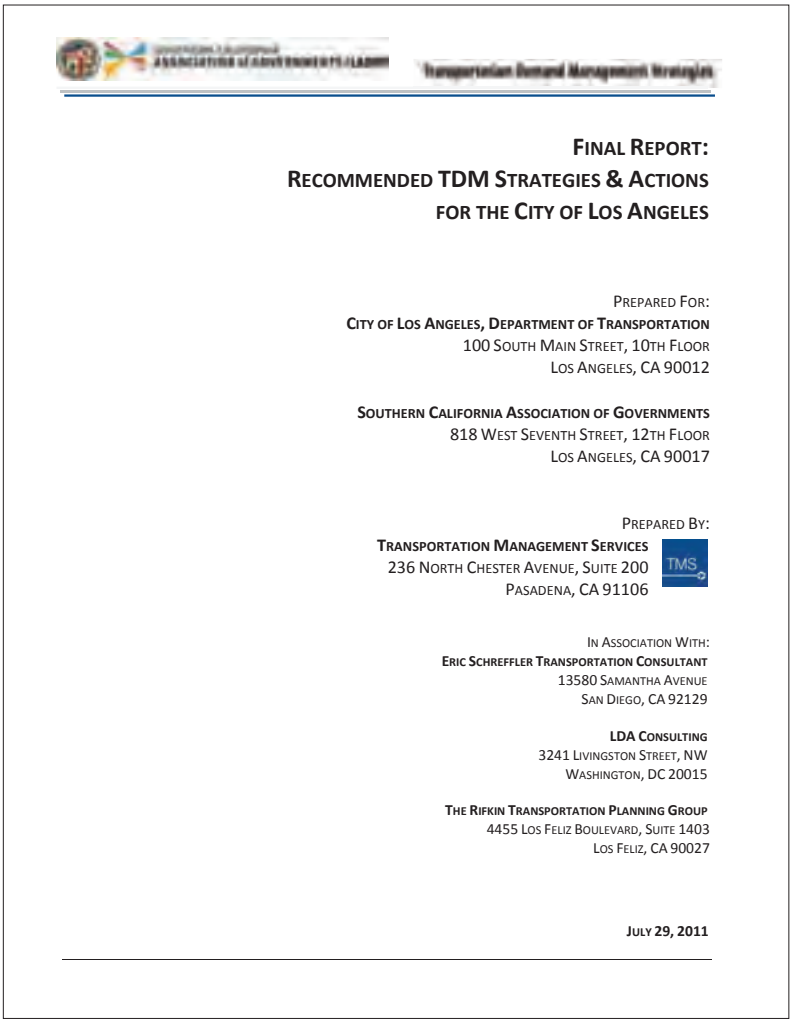


The Center for Transit-Oriented Development identifies strategies that could help station areas achieve high transit ridership, lower VMT, provide housing, create healthy neighborhoods, and provide a multitude of travel options. This TOD study explores the opportunities and challenges of achieving TODs in Los Angeles County. One of the study's strategies for expanding TOD in Los Angeles is supporting the SCS and its implementation of SB 375, which will require a significant change in density and development where transit station areas will be designated as regional priority areas for growth. The study breaks down benefits of TOD into four categories: public health, economic development, affordable housing, and climate change; and assesses each strategy's impact on those benefits. While many strategies address individual benefits offering high quality transit options, increasing housing near transit, improving walkabililty, and enhancing access between transit and job centers all positively impact at least three of the four strategies. The CTOD's report supports the sentiment that coordination and linkages between transit hubs and destinations are vital to a sustainable transit network throughout the region. The CTOD studied 71 existing and under-construction transit stations in Los Angeles and categorized them into nine station area place types based on existing intensity of each station area and the proportion of residents to employees. The "station area typologies" are categorized as residential, balanced, and employment; and are ranked from lowest to highest VMT to determine appropriate strategies that create high-performing TOD projects.

Transportation Demand Management Strategies Report (TDMS)

July 2011

This document was prepared by Transportation Management Services (TMS) with Eric Schreffler Transportation Consultants, LDA Consulting, and The Rifkin Transportation Planning Group for the City of Los Angeles Department of Transportation and the Southern California Association of Governments (SCAG).



FINAL REPORT:
RECOMMENDED TDM STRATEGIES & ACTIONS FOR THE CITY OF LOS ANGELES

PREPARED FOR:
CITY OF LOS ANGELES, DEPARTMENT OF TRANSPORTATION
100 SOUTH MAIN STREET, 10TH FLOOR
LOS ANGELES, CA 90012

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
818 WEST SEVENTH STREET, 12TH FLOOR
LOS ANGELES, CA 90017

PREPARED BY:
TRANSPORTATION MANAGEMENT SERVICES
236 NORTH CHESTER AVENUE, SUITE 200
PASADENA, CA 91106

IN ASSOCIATION WITH:
ERIC SCHREFFLER TRANSPORTATION CONSULTANT
13580 SAMANTHA AVENUE
SAN DIEGO, CA 92129

LDA CONSULTING
3241 LIVINGSTON STREET, NW
WASHINGTON, DC 20015

THE RIFKIN TRANSPORTATION PLANNING GROUP
4455 LOS FELIZ BOULEVARD, SUITE 1403
LOS FELIZ, CA 90027

JULY 29, 2011

The Transportation Demand Management Strategies report summarizes a study to identify actions the City should consider maintaining, enhancing, and/or adopting to reduce the demand for automobile traffic. This TDMS report recognizes how strategies can balance demand for travel by supplying transportation facilities and re-configure an auto-dominated physical environment to promote connectivity. The report ranks existing strategies/actions used to promote transit ridership, giving high rankings to strategies that promote access and ease of transition at transit facilities. Giving higher priority to TDM in LADOT Traffic Study Policies and multi-modal measurements is ranked in the high category as well. Along with positive reinforcement for non-vehicular modes of transportation, such as filling gaps in bicycle networks and creating safer pedestrian walkways, the TDMS has recommendations for decreasing the ease of access for automobiles in transit-oriented developments, such as increased density with decreased parking requirements. While TDM initiatives are pursued by City departments independently, this report offers tools for coordination with multiple departments which will be beneficial for funding larger projects and providing greater improvements.

Metro Eastside Access Project

June 2011

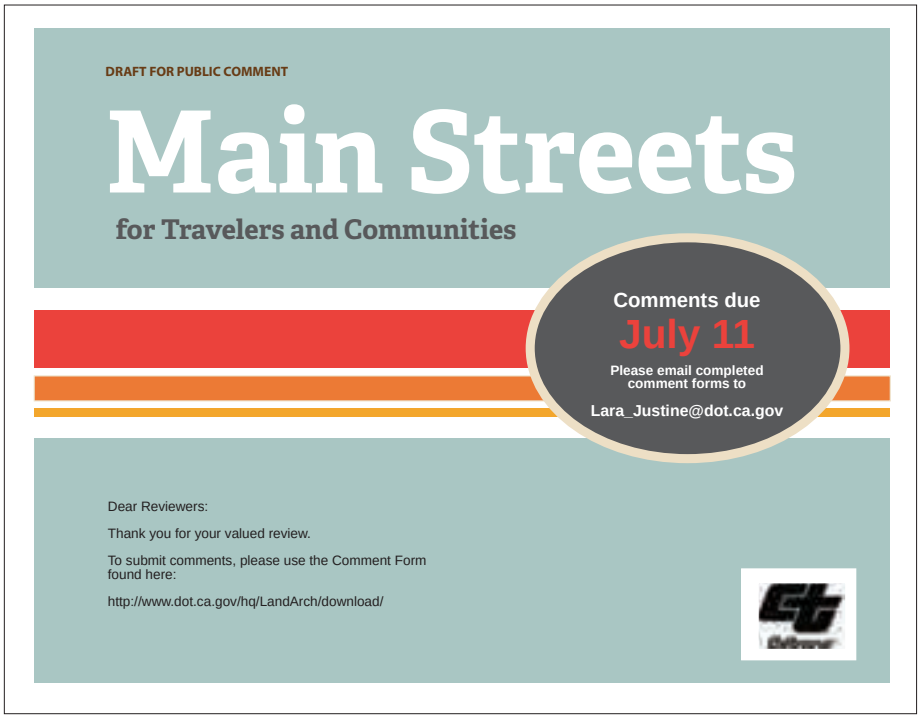
This document was prepared by the Los Angeles County Metropolitan Transportation Authority (Metro) with the Community Advisory Committee for residents on the Eastside of Los Angeles County.

In 2009, the Metro Eastside Access Project identified ways to improve access and safety while reflecting local communities surrounding stations on the Gold Line Eastside expansion. The priorities focused on creative landscape solutions, public art, and lighting and signage on City-owned streets and sidewalks. The street improvements in the Metro Eastside Access Project provide additional benefits to pedestrians' and bikers' experiences. Land use and transportation integration planning is not a component of the project; however, the recommendations identify existing urban centers and work to create linkages between them and transit. These linkages include enhanced wayfinding, pedestrian connections through public plazas, and bicycle improvements such as bike lanes and sharrows. (Insert Eastside Access Project Boards or just the tables from the boards)

Main Streets for Travelers and Communities

2012

This document was prepared by Caltrans for the public.



Main Streets for Travelers and Communities addresses the overlap of main streets' roles as transportation facilities and public places, and how planning and design of main streets impacts travelers, communities, and the environment. Multimodal travel, livability, and sustainability are key components to main street strategic planning. Design flexibility is a standard principle outlined by Caltrans allowing for design exceptions that take the context into consideration; however, Caltrans still calls for the evaluation of multi-mobility, livability, and sustainability before deviation from the design standards outlined in the Highway Design Manual when highways are functioning as main streets. Maximizing multimodal transportation networks is a main principle of Main Streets for Travelers and Communities. Emphasis on mobility, access, options, and connections (such as providing pedestrian access to transit stops) is a strategy for maintaining main streets that respond to the needs of local communities. Multimodal networks must address the users that participate in several modes of travel within a single trip (such as from a bus stop to a parked car) to fill the gaps in the transportation network. Caltrans recommends implementation of "complete streets" to incorporate multimodal principles into the physical configuration of roadways and facilities and best address the needs of travelers.

Metro Station Design Review

April 2012

This document was prepared by the design team ofJohnson Fain, Sussman Prejza, Melendrez, and Lea+Elliot, for the Los Angeles County Metropolitan Transportation Authority (Metro).

The Metro Station Design Review was commissioned to review the diversity of existing station designs and make recommendations to correct deficiencies and inconsistencies. The review contains recommendations for a "kit of parts" that can be applied to a variety of station area types and provide connectivity through visual identity. The main concerns for cohesive station design are legibility, maintainability, and flexibility. Cost effective strategies were given priority, but not where they hinder security, functionality, and accessibility of transit stations. Connectivity is a priority in station area design; the Metro Station Design Review promotes neighborhood linkages by establishing a minimum sphere of influence of improvements and station area branding; encouraging pedestrian circulation over vehicular traffic in transit zones by emphasizing physical pedestrian and bike connections; and utilizing signage to assure local destinations, bicycle infrastructure, and street names are clearly identified.

Compass Blueprint: Framework of Sustainable Transit Communities

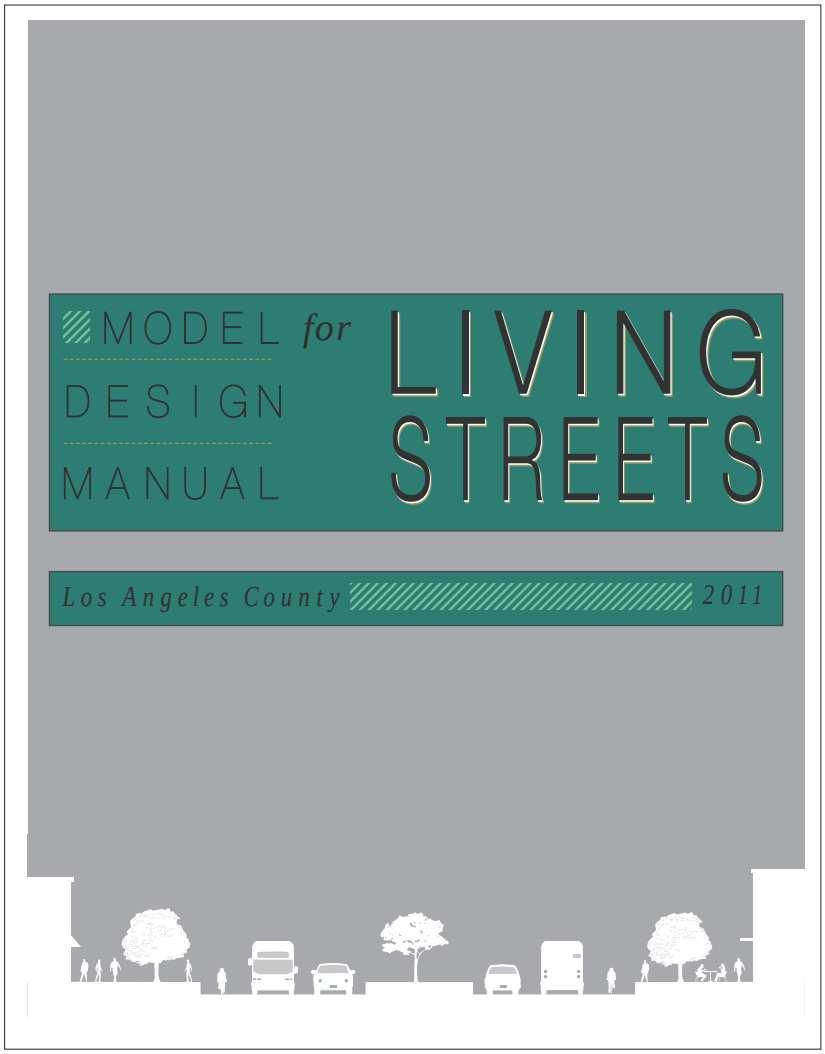
March 2011

This document was prepared by a team of consultants: Design, Community & Environment (DC&E), Bay Area Economics (BAE), Arellano Associates, and Christopher B. Leinberger, for the City of Los Angeles, with funding from the Southern California Association of Governments' (SCAG) Compass Blueprint Program and grants from the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), U.S. Department of Transportation (DOT).

This Compass Blueprint project provides a framework within which the City of Los Angeles and private developers can work for new construction and rehabilitation projects to create balanced Sustainable Transit Communities (STCs). STCs include a mix of housing and employment-generating uses such as offices and cleantech enterprises. This document identifies strategies for sustainable TOD near Metro rail and BRT stations and prioritizes investments. Using a scorecard developed for rating individual station areas, the study selected station areas with the highest potential to become STCs. The station areas were rated based on their existing qualities and availability of opportunity sites, as well as market conditions for creating job centers. When an STC has all of the qualities outlined in this framework it becomes a vibrant place with a strong local economy that encourages further investment in the station area. A major component of the framework is multimodal transportation systems; pedestrian friendly streets, walkability, connectivity, complete streets, and bicycle facilities are highly weighted qualities that impact other components of STCs as well.

The framework uses station place types (defined by the Center for Transit Oriented Development, CTOD), each with a distinct architectural character, mix of businesses and potential for economic success, and shared qualities that are used to inform efforts to transform them into Sustainable Transit Communities. For each of the nine place types defined by the CTOD - suburban neighborhood, neighborhood center, office/industrial district, transit neighborhood, mixed-use center, business district, urban neighborhood, urban center, and central business district/special district - components of the framework are given priority to best balance the given place types' intensity. This framework expands upon the CTOD's work by describing specific built character, mix of uses, and pedestrian and bicycle network improvements needed for each place type to move towards an STC standard. The Compass Blueprint is a model for integrating land use and transportation planning that has been incorporated in the 2012-2035 RTP/SCS and local partners.

Los Angeles County Model Design Manual for Living Streets



October 2011

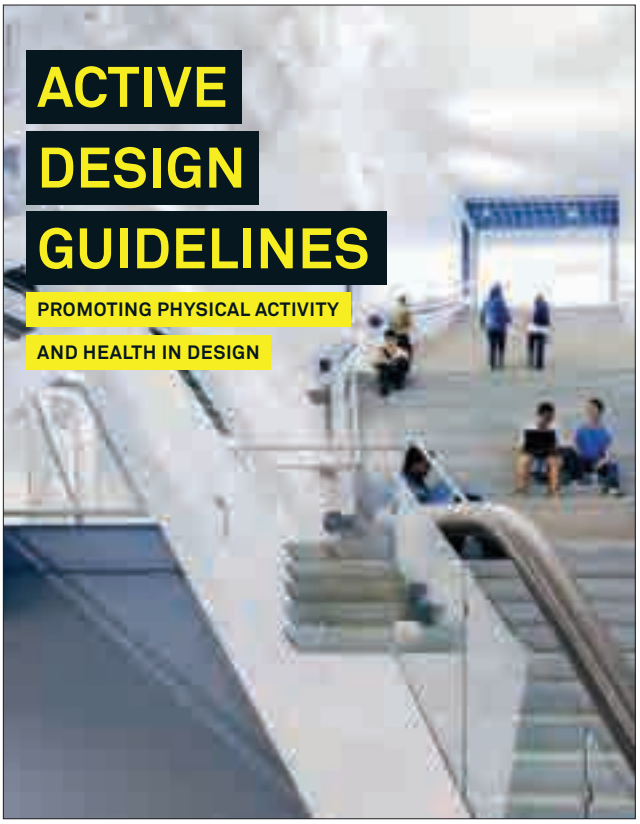
This document was prepared by the Los Angeles County Department of Public Health.

This document serves a manual for creating walkable and bicycle neighborhoods, cities that are conducive to transit use, and livable communities. Experts from traffic engineering, transportation planning, land use planning, architecture, landscape architecture, and public health teamed to produce this set of guidelines that create opportunities for active transportation networks and living streets. Living streets are designed for people of all ages and physical abilities whether they walk, bicycle, ride transit, or drive; and integrate connectivity and traffic calming with pedestrian-oriented site and building design to create safe environments. To assist in meeting the goals of living streets, this manual outlines benchmarks and performance measures for communities to adopt. The benchmarks ensure that every street and neighborhood is comfortable to walk and bicycle in, it is safe for children to use active transportation modes to get to school, all streets provide safe and comfortable crossings, active lifestyles are available to all, and traffic fatalities are reduced or eliminated. Performance measures are put in place to decrease fatalities and injuries in streets, increase active transportation trips and decrease motorized transportation trips, slow vehicle speeds on local streets, increase retail sales and tourism, and improve resident satisfaction in communities.

Sustainable street networks increase the number of people walking and bicycling and reduce vehicle miles traveled. To create a well designed street network the manual identifies seven zone types - natural, rural, sub-urban, general urban, urban center, urban core, and special district - and their associated street networks to assign design standards that will increase connectivity and improve street function. Within each zone type, improvements to intersections, pedestrian access and crossings, bikeway design, transit accommodations, traffic calming measures, streetscape design, and land use policy are identified to promote the engagement of communities along streets and in an active transportation network.

Active Design Guidelines: Promoting Physical Activity and Health in Design

October 2011



This document was prepared by New York City's Departments of Design and Construction (DDC), Health and Mental Hygiene, Transportation (DOT), and City Planning with the Mayor's Office of Management and Budget for designers, architects, and local agencies that play a role in the design and construction of the built environment.

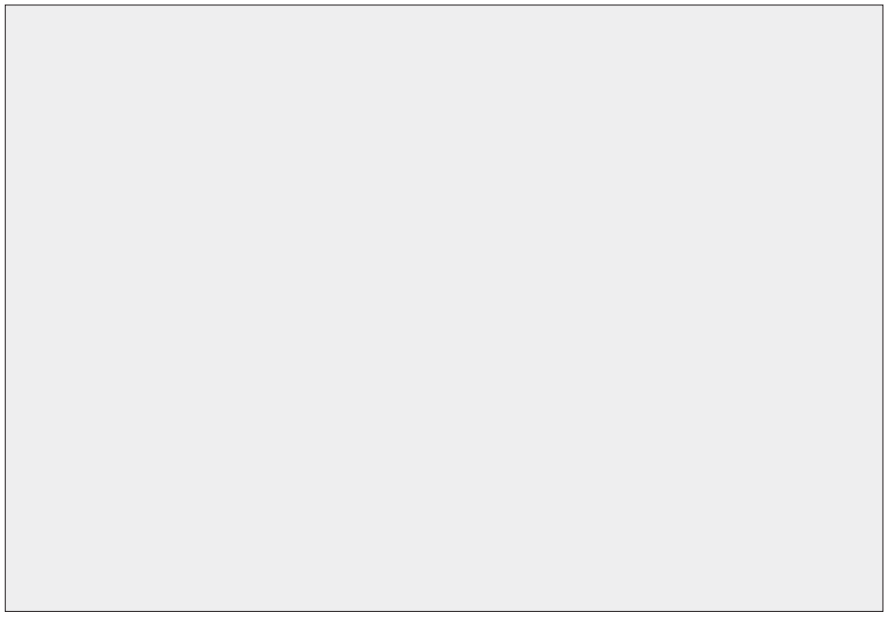
The goal of the Active Design Guidelines is to create an environment that enables all city residents to incorporate healthy activity into their daily lives throughout New York City. The guidelines address neighborhoods, streets, and outdoor spaces that encourage active modes of transportation, including walking and bicycling. To create an active city access to transit and transit facilities, plazas, parks, open spaces, recreational facilities, and services needs to be improved through designing pedestrian friendly streets and bicycle facilities and expanding the active transportation network. The document outlines specific planning and design strategies that promote physical activity through recreation and active transportation. The "three Ds" that define the relationship between urban design and travel patterns: density, diversity, and design are supplemented by The Active Design Guidelines with destination accessibility and distance to transit to fill important gaps in the urban design process for active transportation networks. The strategies related to land use mix and transit address the design of the city's streets and public spaces in addition to strategies for enhancing the walkability and bicycle facilities on city streets. The strategies outlined in the Active Design Guidelines are based on current best practices and emerging ideas that will be tested and refined in the coming years. This document makes recommendations for land use, transit and parking, parks, open space and recreational facilities, public plazas, access to services, street connectivity, traffic calming, pedestrian pathways, programming streetscapes, bicycle networks and connectivity, bikeways, and bicycle infrastructure based on research that correlates the population's behavior with the built environment.

Strategies that increase physical activity by improving access to destinations such as parks and services from places of residence and work include: locating transit stops along well-connected streets and building entrances, providing a mix of land uses in walkable areas; designing facilities that make pedestrian and bicycle access to transit convenient; adding open spaces to large-scale developments; and encouraging the use of pathways, tracks, and open spaces through signage. Maintaining well connected streets with sidewalks that provide direct routes between destinations to increase pedestrianism should be combined with traffic calming strategies that promote walking by improving the pedestrian experience. Equally as important as providing pedestrian routes is creating attractive street environments that encourage walking with destinations such as art installations, outdoor cafes, and street closures for special programming. Bicycle networks and connectivity should be encouraged alongside pedestrian improvements by creating continuous networks

of bikeways, signage, and links between bicycling and transit. Addition of bicycle infrastructure such as parking, specific crossings, rails along outdoor stairways, and bike share programs can enhance the bikeway networks and provide more organized movements of pedestrians, cyclists, and motorists.

Walkable and Livable Communities Institute: Walkability Workbook

April 2012



This document was prepared by the Walkable and Livable Communities Institute for community walkability workshops by local agencies.

Walkability in communities promotes physical health, lowers traffic injury and death rates, and provides better access for people while reducing greenhouse gas emissions. This workbook provides principles of walkability that must be addressed to ensure accessible, welcoming, convenient, and safe pedestrian environments. Sidewalks, bike lanes, vehicle travel lanes, driveways, and parking can all be incorporated on streets with buffers of plantings, medians, striping, and sidewalks that make drivers, bicyclists, and pedestrians more comfortable traveling. Complete streets are designed and operated to enable safe access for pedestrians, bicyclists, motorists and transit riders. To accommodate a diversity of uses, sidewalks require space for street furniture, bike racks, trees, and room for building access that does not disrupt pedestrian flow. Proper bicycle facilities not only promote active transportation through bicycling, but improve pedestrian environments as well. When bicyclists are forced onto sidewalks due to lack of bike lanes, or lack of bike racks cause locking to signage and trees, they impede walkability. Through implementation of phased improvements over time, streets that are void of pedestrian safety and access can begin to promote walkability with sidewalks, crosswalks, parks, seating, signage, and orientation of new developments.

Active Living by Design (ALBD)

2010

Active Living by Design is a founding program in the Active Living initiative of the Robert Wood Johnson Foundation. It creates community-led change by working with local and national partners to build a culture of active living. http://www.activelivingbydesign.org/events-resources/essentials/transportation

Active Living by Design promotes physical activity by increasing transportation choices and expanding opportunities for active transportation. The organization looks at land use patterns and transportation infrastructure that can promote active transportation and increase health while reducing safety risks. A balance of transportation and land use goals can support walking, biking, transit, and alternative forms of travel to help make healthy lifestyles more attainable for communities. The Active Living by Design organization provides links to existing resources, guidelines, enhancement projects, and events that facilitate work on active living projects.

In Santa Ana, Sacramento, Oakland, and California, Active Living by Design has contributed to recreation opportunities by implementing physical improvement projects, establishing advisory groups and partnerships, and securing grants and funding for local projects. ALBD has identified five strategies as an approach to increasing physical activity in a community. Preparation, promotions, programs, policies, and physical projects each comprise specific tactics to create more active communities. They develop and maintain partnerships to conduct neighborhood assessments of barriers and opportunities, and evaluate master plans and ordinances that affect active living. After creating initiatives and programs for active living in community events and outreach, they establish policies that are consistent with land use and transportation plans that promote active living; update road policies, standards, and parking requirements; and secure funding for pedestrian and cycling-oriented capital improvements. ABLD works to successfully integrate physical infrastructure such as sidewalks, bike lanes, and trails with traffic calming measures to ensure safer and more comfortable walking and bicycling environments.

FIRST LAST MILE
STRATEGIC PLAN

Case Study Sites

Task 3.4 – Case Studies
Task 3.4.1 - Select Case Studies
Task 3.4.2 Develop Research/Evaluation
Task 3.4.3 - Case Study Analysis

Metro

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

IBI Group January 2013

Contents

Contents

FIRST LAST MILE
STRATEGIC PLAN

Executive Summary

Case study locations have been selected for 12 sites, covering a range of SCPF identified typologies, as well as a range of geographic, demographic and physical challenges that give a full view of the potential opportunities and constraints in need of addressing throughout the region.

FIRST LAST MILE
STRATEGIC PLAN

Case Study Sites

Selection Methodology and Identification

In order to analyze questions germane to first last mile strategic planning, a number of case study locations have been selected; covering the range of Metro Countywide Sustainability Planning Policy identified typologies, as well as a range of geographic, demographic and physical attributes. The intent is to use these case study sites as "testing grounds" and as such the stops are intended to represent as best as possible an accurate sample of the entire Los Angeles County transit network. Opportunities and constraints found within the geographic regions of the selected sites, should be representative of conditions found throughout the system.

The process of site selection began with the development of a methodology to classify the numerous transit stops within Los Angeles County. There are about 15,000 transit stops in Los Angeles County, the vast majority being local bus stops. For the purposes of this analysis, priority was given to stops that are defined by dedicated infrastructure (stations), complemented with local bus stops if necessary. A brief description of the methodology utilized to propose the initial list of Case Study Sites is outlined in the paragraphs below.

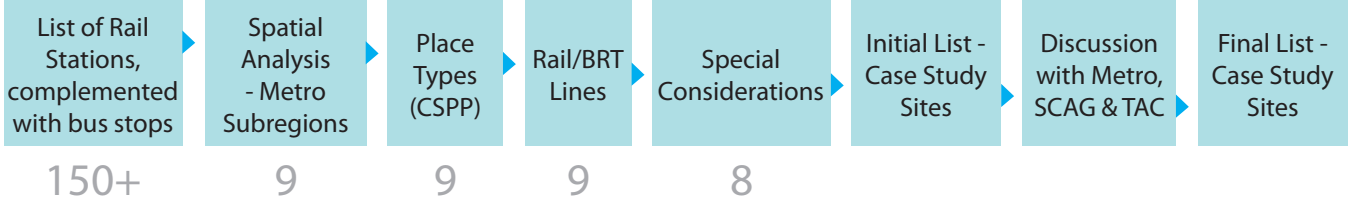
The work initiated with a compilation of all Metrolink and Metro heavy rail, Metro light rail, Metro BRT and Metro rapid stops in Los Angeles County. Regional diversity was considered by dividing the full list by Metro Subregion, with the intent to assure representation from each geographic area. The Metro Countywide Sustainability Planning Policy (CSPP) place types were added to each station to ensure the consideration of a variety of areas with respect to residential density and employment centrality. Characteristics regarding these stations were added to allow further station classification, and these special considerations include:

- High transit density node/multi-modal hub
- Terminus Station (Yes or No)
- Type (Street level, elevated, underground)
- Presence of Park-and-Ride
- Adjacent or within Freeway ROW
- Next to or within a regional destination
- Existing or Future station
- Adjacent to or on the border or multiple jurisdictions

These incremental filters allowed the design and planning team to prepare a list of proposed sites that offer a broad and representative picture of the interface between Metro's mass transit system and its associated urban/sub-urban contextual fabric.

Exhibit 1 illustrates the general structure of the site selection methodology.

Exhibit 1 – Site Selection Methodology



The station classification regarding Subregion and place type is illustrated in Exhibit 2. The background color is relative to the place type, the font color denotes the Metro Subregion and the line is identified after the station name.

Exhibit 2 – Station Classification

	LOW CENTRALITY	MEDIUM CENTRALITY	HIGH CENTRALITY
LOW RESIDENTIAL DENSITY	Santa Clarita (ML) V. Gr. / Acton (ML) Palmdale (ML) Roscoe (O) Nordhoff (O) Sylmar/ S.Fernando (ML) Sun Valley (ML) Industry (ML)	Via Princessa (ML) Sun Valley (ML) Sierra Madre Villa (GL) South Pasadena (GL) Covina (ML) Baldwin Park (ML) Industry (ML)	Civic Center (R/P) Expo Park/USC (E) Spring/1st (Silver) Filmore (GL) Douglas (G) El Segundo (G) Mariposa (G)
MEDIUM RESIDENTIAL DENSITY	Lancaster (ML) Palmdale (ML) Roscoe (O) Nordhoff (O) Sylmar/ S.Fernando (ML) Northridge (ML) Reseda (O) Tampa (O) Chatsworth (O/ML) Sun Valley (ML) Industry (ML)	Harbor Fwy/I-105 (Silver) Avalon (G) Crenshaw (G) Harbor Fwy (G) Vermont/Athens (G) 103rd /Watts (B) Compton (B) Firestone (B) Long Beach (G) Norwalk (G) Willowbrook (B/G) Woodman (O) Sepulveda (O) Woodley (O) Balboa (O) Sun Valley (ML) Valley College (O) El Monte Station (Silver/ML) Cal State LA (Silver/ML) Allen (GL) Industry (ML) Southwest Mus. (GL)	Aviation/LAX (G) Redondo Beach (G) Rosecrans/I-110 (Silver) Harbor GGTC (Silver) Artesia (B) Commerce (ML) Lakewood (G) Montebello/Commerce (ML) Norwalk/ Santa Fe Springs (ML) Slauson (B) Willow (B) Atlantic (GL) East LA/C. Center (GL) Indiana (GL) Maravilla (GL) Expo/Crenshaw (E) Expo/Western (E) Farmdale (E) La Cienega/ Jefferson (E) Glendale (ML) Downtown Burbank (ML) Burbank/B.Hope Airport (ML)
HIGH RESIDENTIAL DENSITY	Newhall (ML)	N.Hollywood (R/O) Van Nuys (O/ML) Laurel Canyon (O) Sherman Way (O) Manchester/I-110 (Silver) Del Amo (B) P. Coast Hwy (B) Wardlow (B) Highland Park (GL)	Hawthorne / Lennox (G) 1st Street (B) 5th Street (B) Anaheim (B Florence (B) Pacific (B) Transit Mall (B) Culver City (E) 4th St/ Colorado (E)* Del Mar (GL) Lake (GL) Memorial Park (GL) De Soto (O) Canoga (O) Warner Center (O) Pierce College (O) Universal City (R) Downtown Burbank (ML) Burbank/ B.Hope Airport (ML) 7th Street / Metro Ctr (B/R/P/E) 23rd Street (E) Chinatown (GL) Expo / La Brea (E) Expo / Vermont (E) Grand (B) Heritage Square (GL) Hollywood / Highland (R) Hollywood / Vine (R) Hollywood / Western (R) Jefferson / USC (E) Lincoln / Cypress (GL) L. Tokyo/ A. District (GL) Mariachi Plaza (GL) Pershing Sq. (R/P) Pico (B/E/SC) Pico / Aliso (GL) San Pedro (B) Soto (GL) Union Station (R/P/GL/ML) Vermont / Beverly (R) Vermont / S. Monica (R) Vermont / Sunset (R) Vernon (B) Washington (B) Westlake / MacArthur Pk (R/P) Wilshire / Normandie (P) Wilshire / Vermont (R/P) Wilshire / Western (P) Silver Line Stations LA Co. & USC Med. Ctr El Monte Busway & Alameda/ U. Station 1st St. & Hill St. Grand Av. & 3rd St. (SB) Olive St. & Kosciuszko Way (NB) Flower St. & 5th St. (SB) Olive St. & 5th St. Flower St. & 7th St. (SB) Figueroa St. & 7th St. (NB) Flower St. & Olympic Blvd. (SB) Figueroa St. & Olympic Blvd. (NB) Figueroa St. & Pico Blvd. Figueroa St./ Washington Blvd. 23rd St. & Flower St. (SB) HOV Roadway & Adams Blvd (NB) Flower St. & Adams Blvd. (SB) 37th Street/USC Slauson/I-110

Subregion

Arroyo Verdugo Cities (3)
Central Los Angeles (56)
Gateway Cities (22)
North Los Angeles County (6)
Las Virgenes / Malibu (0)
San Fernando Valley (22)
San Gabriel Valley (16)
South Bay (15)
Westside Cities (2)

Transit Line

(ML)	Metrolink
(B)	Blue Line
(E)	Expo Line
(G)	Green Line
(GL)	Gold Line
(O)	Orange Line
(P)	Purple Line
(R)	Red Line
(Silver)	Silver Line
(NB)	Northbound
(SB)	Southbound

The proposed methodology yielded fourteen sites for further discussion, summarized in Exhibit 3.

Exhibit 3 – Case Study Sites Proposed for Discussion

	LOW CENTRALITY	MEDIUM CENTRALITY	HIGH CENTRALITY
LOW RESIDENTIAL DENSITY	Las Virgenes/Malibu • Agoura Rd/ Liberty Canyon Rd (Bus 161) - SL - FWY	San Gabriel Valley • Sierra Madre Villa Station (GL) - MM - T - PnR - FWY - J	South Bay • Douglas (G) - PnR - EL
MEDIUM RESIDENTIAL DENSITY	San Fernando Valley • Reseda (O) - SL - MM	San Gabriel Valley • El Monte Station (S) - MM - T - PnR - SL	Gateway Cities • Slauson (B) - EL
HIGH RESIDENTIAL DENSITY	North Los Angeles County • Newhall (ML) - SL	San Fernando Valley • N. Hollywood (R/O) - MM - T - PnR - UG&SL OR Central Los Angeles • Highland Park (GL) - SL	Central Los Angeles • Hollywood/Highland (R) - UG - RD - MM Central Los Angeles • Wilshire / Normandie (P) - UG Westside Cities • 4th St / Colorado Ave(E*) - FS - RD - T - SL Arroyo Verdugo Cities • Broadway/ Brand (Line 780 - Glendale) - SL OR Arroyo Verdugo Cities • Olive/S. Fernando (Line 794 - Burbank) - MM - FWY

Subregion

Arroyo Verdugo Cities
Central Los Angeles
Gateway Cities
North Los Angeles County
Las Virgenes / Malibu
San Fernando Valley
San Gabriel Valley
South Bay
Westside Cities

Transit Line

(ML) Metrolink
(B) Blue Line
(E) Expo Line
(G) Green Line
(GL) Gold Line
(O) Orange Line
(P) Purple Line
(R) Red Line
(Silver) Silver Line
(NB) Northbound
(SB) Southbound

Special Considerations

(PnR) Park and Ride
(T) Terminal

Type of Station:
(EL) Elevated
(UG) Underground
(SL) Street Level

(MM) Serves more than one transit line/high number of stops in the immediate vicinity
(FS) Future Station
(RD) Regional Destination
(J) Adjacent to, or on the border, or multiple jurisdictions

The sites proposed ensure representation of all lines and subregions, and include a mix of special considerations. The list was presented at the October 25th Technical Advisory Committee (TAC) meeting for discussion.

Feedback received from TAC members altered the proposed list. For example, the El Monte Transit Center was replaced with the Harbor Gateway Center, as the prior selected site is less representative of general conditions. The final site selection is illustrated in Exhibit 4, the sites are presented on an overall map illustrated in Exhibit 5, and a summary of key data is provided for each site selected in the following pages.

Exhibit 4 – Case Study Sites

	LOW CENTRALITY	MEDIUM CENTRALITY	HIGH CENTRALITY
LOW RESIDENTIAL DENSITY	Las Virgenes/Malibu • Agoura Rd/ Liberty Canyon Rd (Bus 161) - SL - FWY	San Gabriel Valley • Sierra Madre Villa Station (GL) - MM - T - PnR - FWY - J	South Bay • Douglas (G) - PnR - EL
MEDIUM RESIDENTIAL DENSITY	San Fernando Valley • Reseda (O) - SL - MM	Gateway Cities • Compton (B) - PnR - SL South Bay/Gateway Cities • 103rd/Watts (B) - PnR - SL	South Bay • Harbor GTC (Silver) - T - SL - MM - PnR - FWY
HIGH RESIDENTIAL DENSITY	North Los Angeles County • Newhall (ML) - SL - PnR	San Fernando Valley • N. Hollywood (R/O) - MM - T - PnR - UG&SL Central Los Angeles • Highland Park (GL) - SL	Central Los Angeles • Wilshire / Normandie (P) - UG Westside Cities • Wilshire/Westwood (Wilshire BRT/P) - FS - RD - SL - MM Arroyo Verdugo Cities • Olive/S. Fernando (Line 794 - Burbank) - MM - FWY

Subregion

Arroyo Verdugo Cities
Central Los Angeles
Gateway Cities
North Los Angeles County
Las Virgenes / Malibu
San Fernando Valley
San Gabriel Valley
South Bay
Westside Cities

Transit Line

(ML) Metrolink
(B) Blue Line
(E) Expo Line
(G) Green Line
(GL) Gold Line
(O) Orange Line
(P) Purple Line
(R) Red Line
(Silver) Silver Line
(NB) Northbound
(SB) Southbound

Special Considerations

(PnR) Park and Ride
(T) Terminal

Type of Station:
(EL) Elevated
(UG) Underground
(SL) Street Level

(MM) Serves more than one transit line/high number of stops in the immediate vicinity
(FS) Future Station
(RD) Regional Destination
(J) Adjacent to, or on the border, or multiple jurisdictions

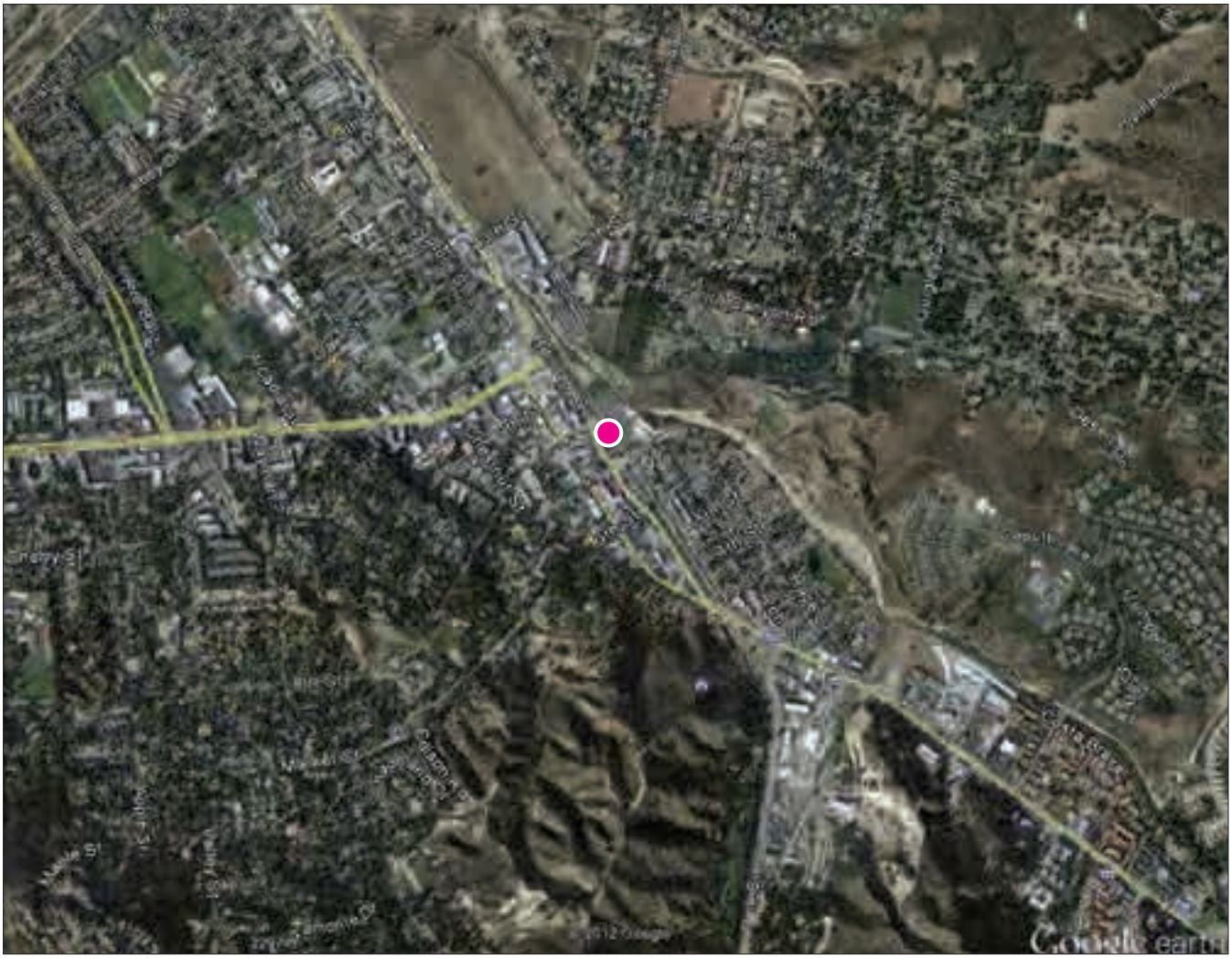
Exhibit 5 – Case Study Sites - Map

SITE 1: Newhall Metrolink Station

CSPP Place Type:	High Residential/Low Centrality
Metro Subregion:	North Los Angeles County
City:	Santa Clarita
Special Considerations:	SL

CHARACTERISTICS

- Metrolink - Heavy Rail
- Street level, low ridership corridor
- Connection to Local Santa Clarita Transit, Commuter Express Lines and Amtrak California Thruway Bus
- 3 parking lots, over 300 spaces (150 park and ride spaces – Metrolink riders only)
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 14,290
  - From 1 to 2 miles: 26,150
  - From 2 to 3 miles: 21,820



SITE 2: Agoura Rd/Liberty Canyon Rd Bus Stop - Line 161

CSPP Place Type:	Low Residential/Low Centrality
Metro Subregion:	Las Virgenes/Malibu
City:	Agoura Hills
Special Considerations:	SL/FWY

CHARACTERISTICS

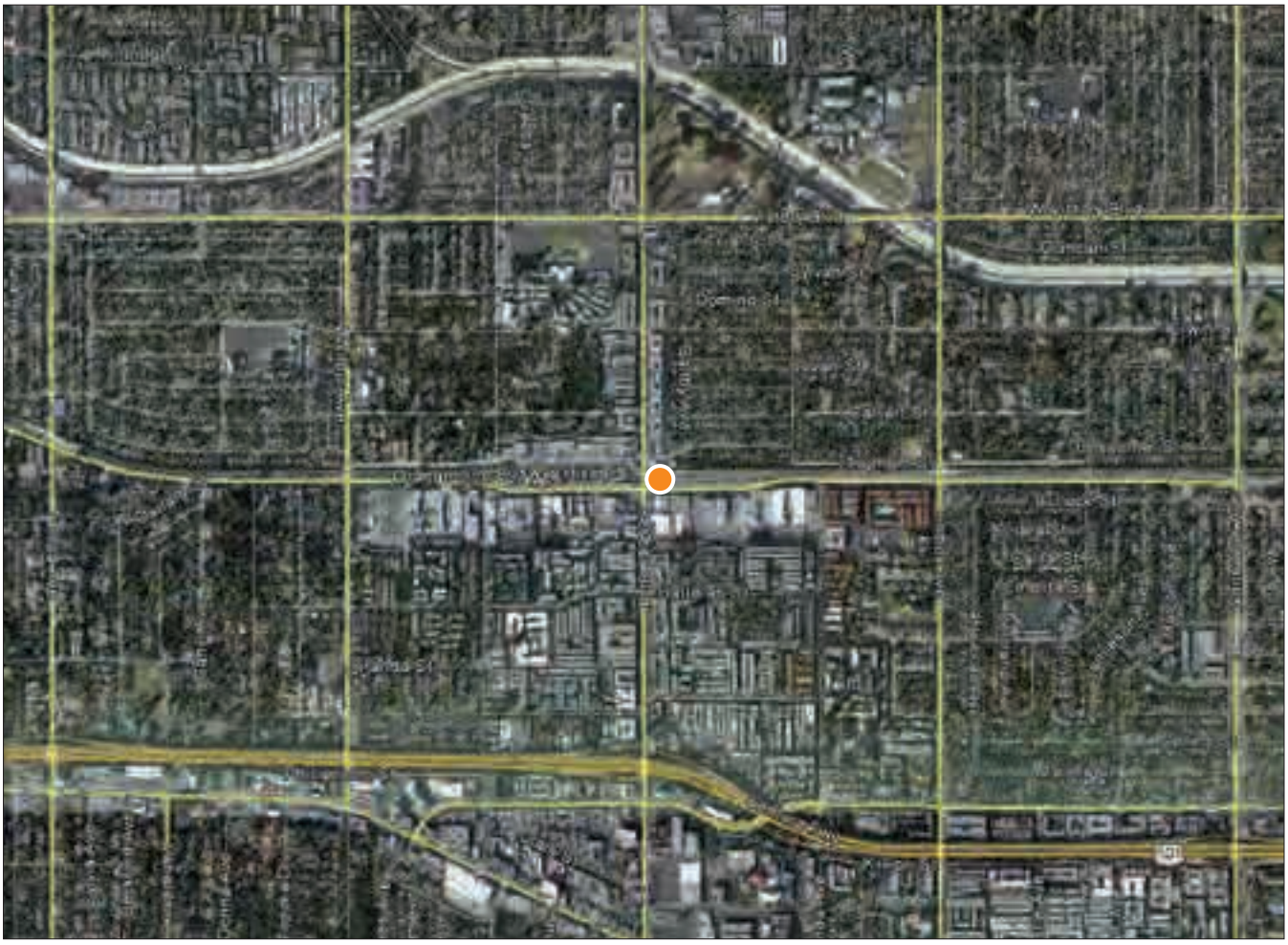
- Metro Local Bus
- Connection to Commuter Express
- Street level, low ridership
- Adjacent to freeway
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 15,780
  - From 1 to 2 miles: 7,070
  - From 2 to 3 miles: 3,620

SITE 3: Reseda Orange Line Station

CSPP Place Type: Medium Residential/Low Centrality
Metro Subregion: San Fernando Valley
City: Los Angeles
Special Considerations: SL/MM

CHARACTERISTICS

- BRT
- Street level station, high corridor ridership
- Proximity to freeway and block sizes are barriers
- Connection to Metro Local and Metro Rapid
- 522 park and ride spaces
- Orange Line Bike Path adjacent to station
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 34,990
  - From 1 to 2 miles: 69,300
  - From 2 to 3 miles: 87,860

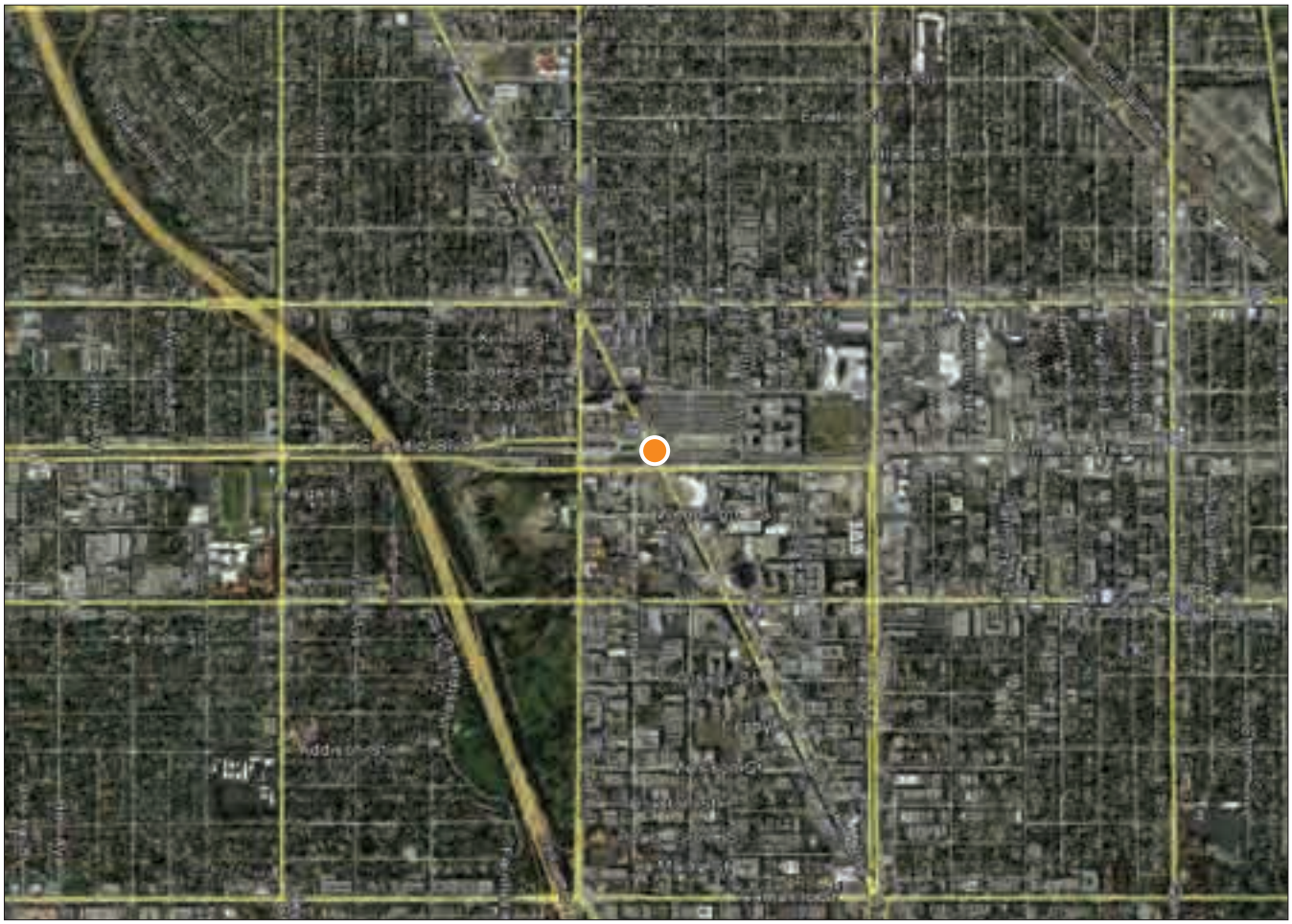


SITE 4: North Hollywood Red Line/Orange Line Station

CSPP Place Type:	High Residential/Medium Centrality
Metro Subregion:	San Fernando Valley
City:	Los Angeles
Special Considerations:	MM/T/PnR/UG&SL

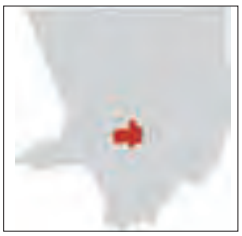
CHARACTERISTICS

- BRT/Heavy Rail, connection of two major transit lines
- Underground and street level station, high corridor ridership
- Terminus station for Metro Orange Line (surface) and Metro Red Line (underground)
- Proximity to freeway is a barrier
- Connection to Metro Local, Santa Clarita Transit, Burbank Bus, LADOT Commuter Express
- 1904 park and ride spaces
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 44,810
  - From 1 to 2 miles: 98,600
  - From 2 to 3 miles: 109,800



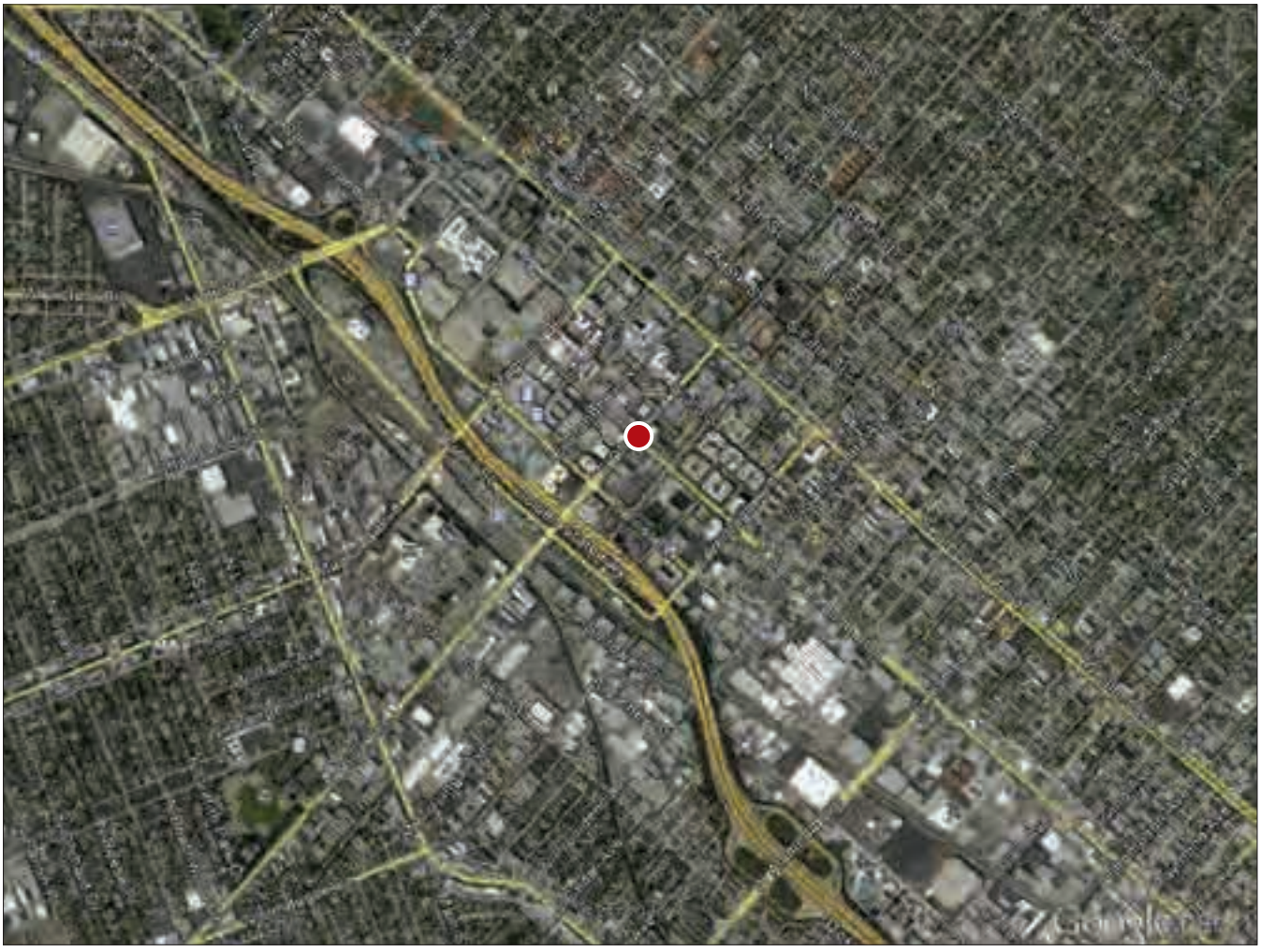
SITE 5: Olive Street/San Fernando Bus Line Stop - Line 794

CSPP Place Type:	High Residential/High Centrality
Metro Subregion:	Arroyo Verdugo Cities
City:	Burbank
Special Considerations:	MM/FWY/SL



CHARACTERISTICS

- Rapid Bus
- Street level
- Proximity to I-5 is a barrier
- Connection to Metro Local bus lines
- Close proximity to Downtown Burbank Metrolink Station
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 37,700
  - From 1 to 2 miles: 58,200
  - From 2 to 3 miles: 54,300



SITE 6: Sierra Madre Villa Gold Line Station

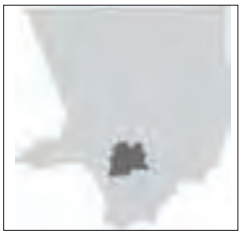
CSPP Place Type:	Low Residential/Medium Centrality
Metro Subregion:	San Gabriel Valley
City:	Pasadena
Special Considerations:	MM/T/PnR/FWY/J

CHARACTERISTICS

- LRT
- Freeway-median station (210 Freeway)
- Elevated above Sierra Madre Villa Avenue, high corridor ridership
- Current terminus station for the Gold Line
- Connection to Metro Local, Metro Express, Foothill Transit, Pasadena ARTS and other city shuttle service
- 1026 parking spaces
- Adjacent to unincorporated LA County (East Pasadena)
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 13,720
  - From 1 to 2 miles: 57,000
  - From 2 to 3 miles: 80,000

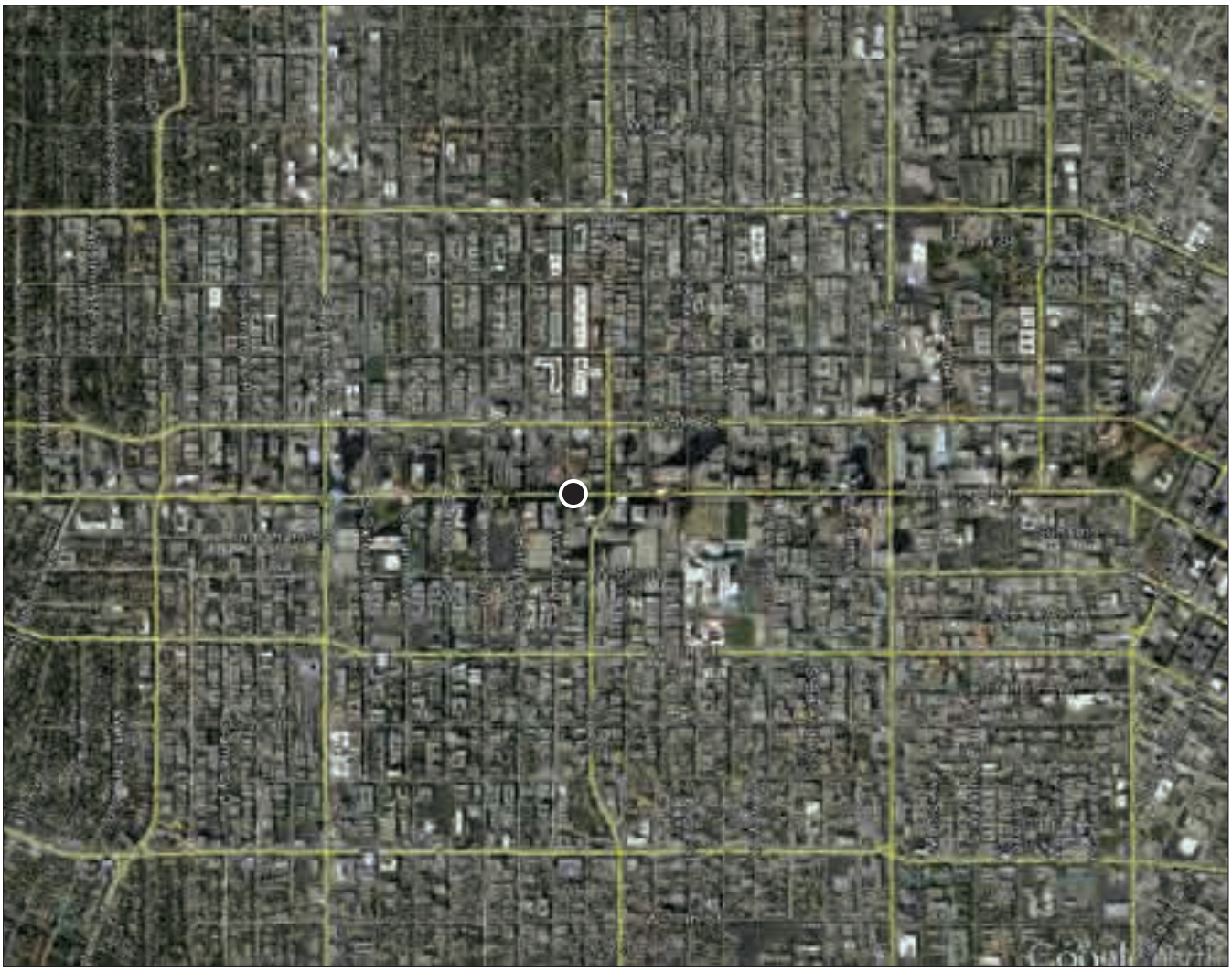
SITE 7: Wilshire/Normandie Purple Line Station

CSPP Place Type:	High Residential/High Centrality
Metro Subregion:	Central Los Angeles
City:	Los Angeles
Special Considerations:	UG



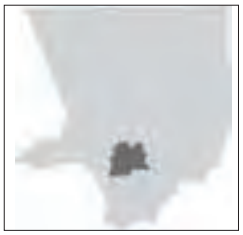
CHARACTERISTICS

- Heavy rail
- Underground and street level station, low corridor ridership
- Connection to Metro Local, Metro Rapid and Foothill Transit
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 125,220
  - From 1 to 2 miles: 227,290
  - From 2 to 3 miles: 266,070



SITE 8: Highland Park Gold Line Station

CSPP Place Type:	High Residential/Medium Centrality
Metro Subregion:	Central Los Angeles
City:	Los Angeles
Special Considerations:	SL

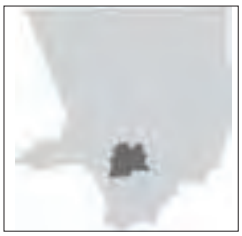


CHARACTERISTICS

- LRT
- Street level, high corridor ridership
- Proximity to freeway and block sizes are barriers
- Connection to Metro Local, LA DOT DASH
- 145 park and ride spaces
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 45,540
  - From 1 to 2 miles: 80,400
  - From 2 to 3 miles: 129,800

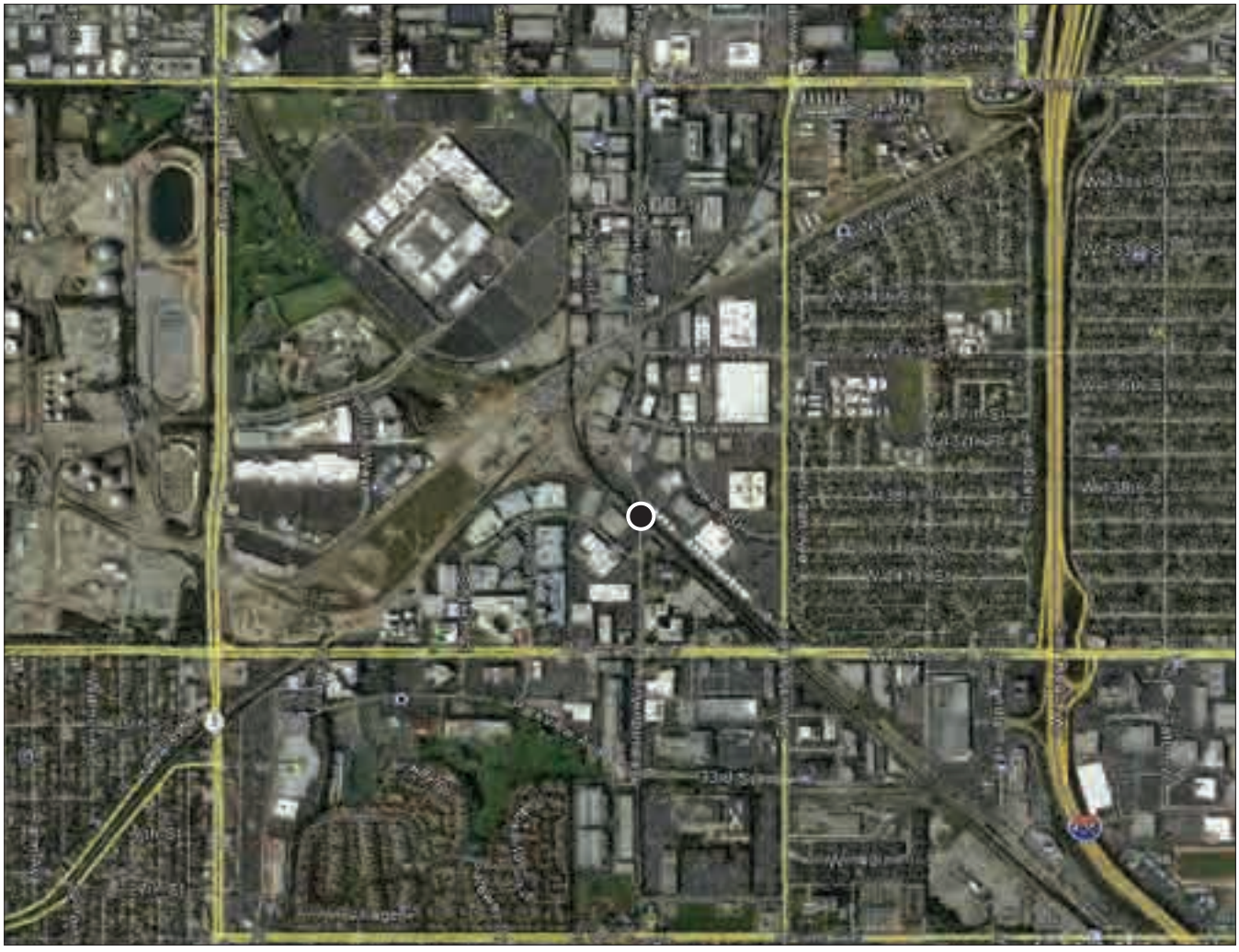
SITE 9: Douglas Green Line Station

CSPP Place Type: Low Residential/High Centrality
Metro Subregion: Central Los Angeles
City: El Segundo
Special Considerations: EL/PnR



CHARACTERISTICS

- LRT
- Elevated
- Connection to Metro Local, Beach Cities Transit and Amtrak Thruway
- 30 park and ride spaces
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 8,150
  - From 1 to 2 miles: 72,750
  - From 2 to 3 miles: 152,540

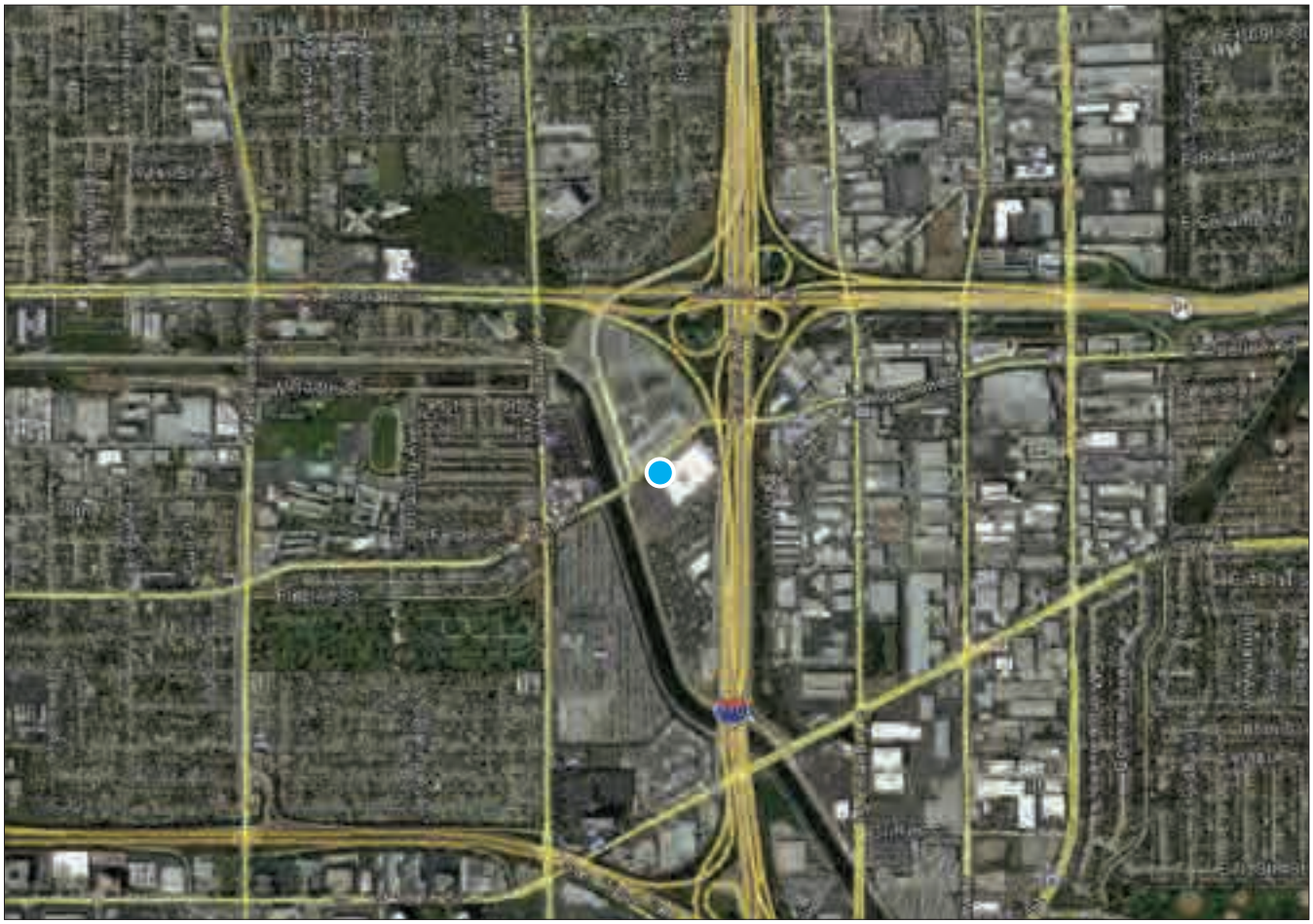


SITE 10: Harbor Gateway Transit Center (Artesia Transit Center) Silver Line Station

CSPP Place Type:	Medium Residential/High Centrality
Metro Subregion:	South Bay
City:	Los Angeles
Special Considerations:	SL/T/MM/PnR/FWY

CHARACTERISTICS

- Street level
- Terminus line
- Connection to Metro Express, Metro Local, Torrance, Carson and Gardena local lines
- 980 park and ride spaces
- Adjacent to freeway
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 14,980
  - From 1 to 2 miles: 49,860
  - From 2 to 3 miles: 110,160

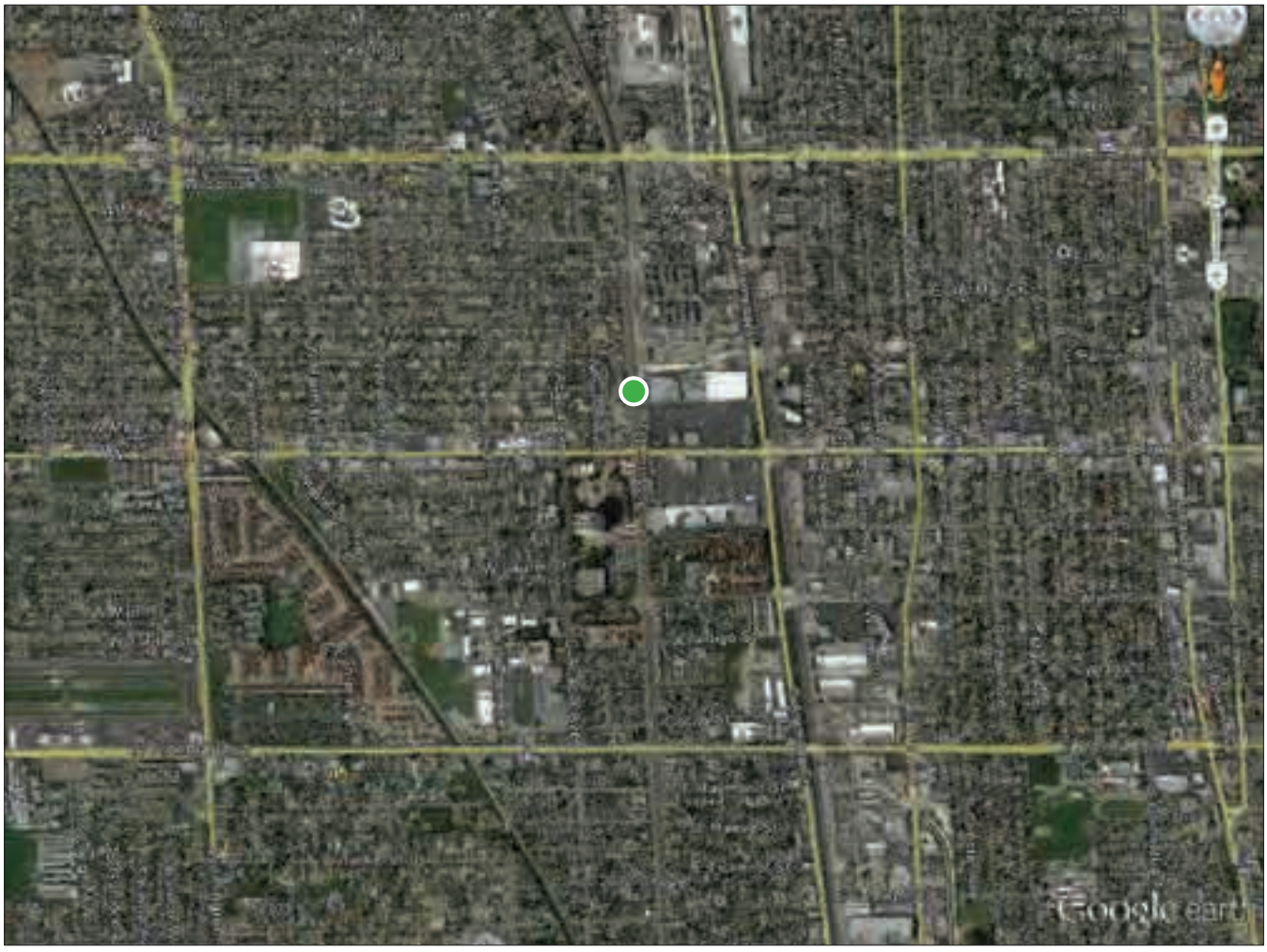


SITE 11: Compton Blue Line Station

CSPP Place Type:	Medium Residential/Medium Centrality
Metro Subregion:	Gateway Cities
City:	Compton
Special Considerations:	SL/PnR

CHARACTERISTICS

- LRT
- Street level, moderate corridor ridership
- Proximity to MLK Transit Center
- Connections to Metro Local, Compton Renaissance, and Gardena Transit Service
- 196 park and ride spaces
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 43,529
  - From 1 to 2 miles: 104,431
  - From 2 to 3 miles: 132,333

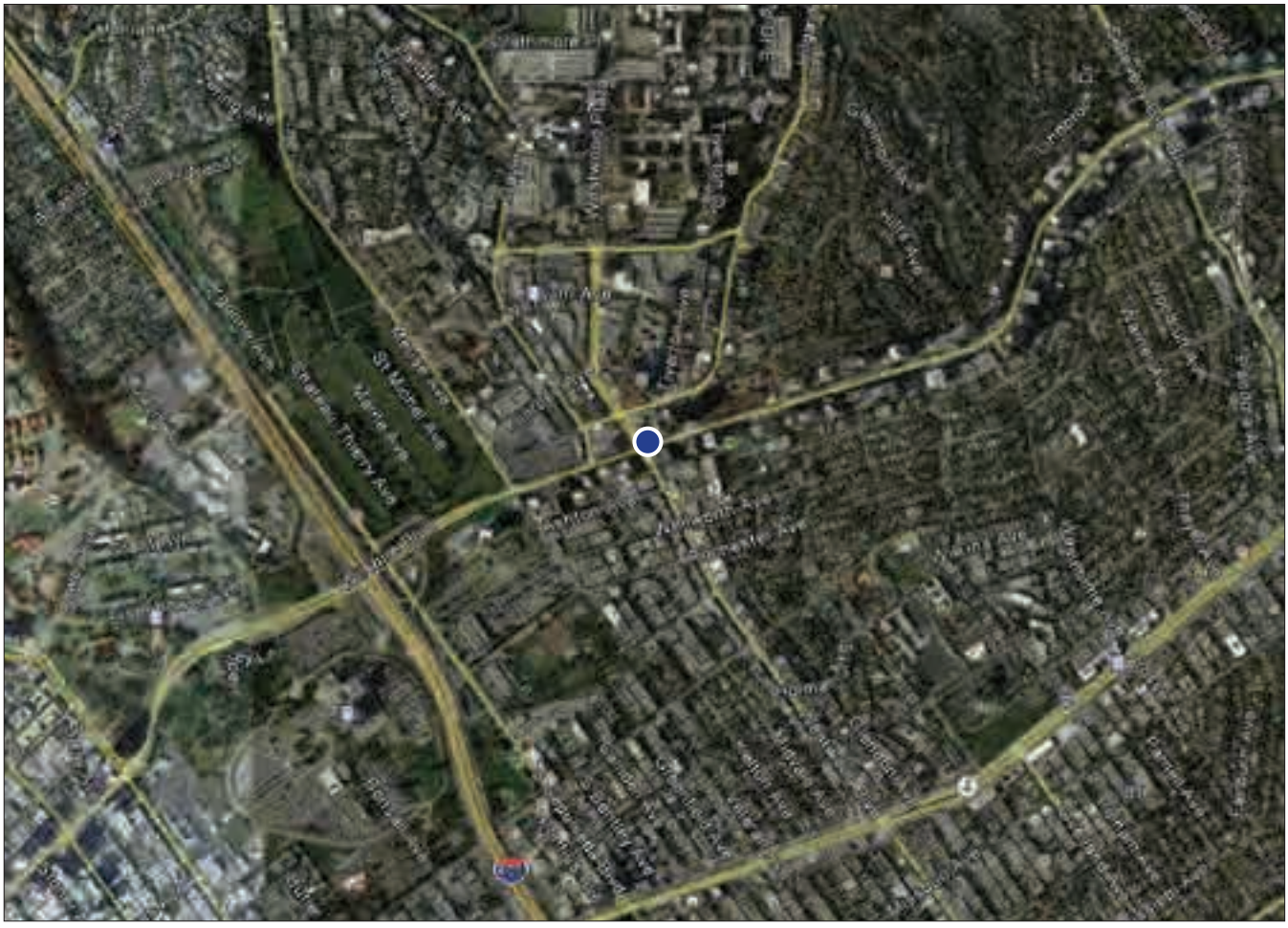


SITE 12: Wilshire/Westwood Wilshire BRT

CSPP Place Type:	Medium Residential/Medium Centrality
Metro Subregion:	Westside Cities
City:	Los Angeles
Special Considerations:	MM/FS/RD/UG&SL

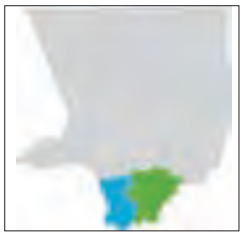
CHARACTERISTICS

- BRT/Heavy Rail
- Street level and underground station, moderate corridor ridership (projection)
- 405 Freeway within 0.5 mile
- Proximity to UCLA
- Future
- Connectivity to Local and Rapid lines
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 45,880
  - From 1 to 2 miles: 82,460
  - From 2 to 3 miles: 90,330



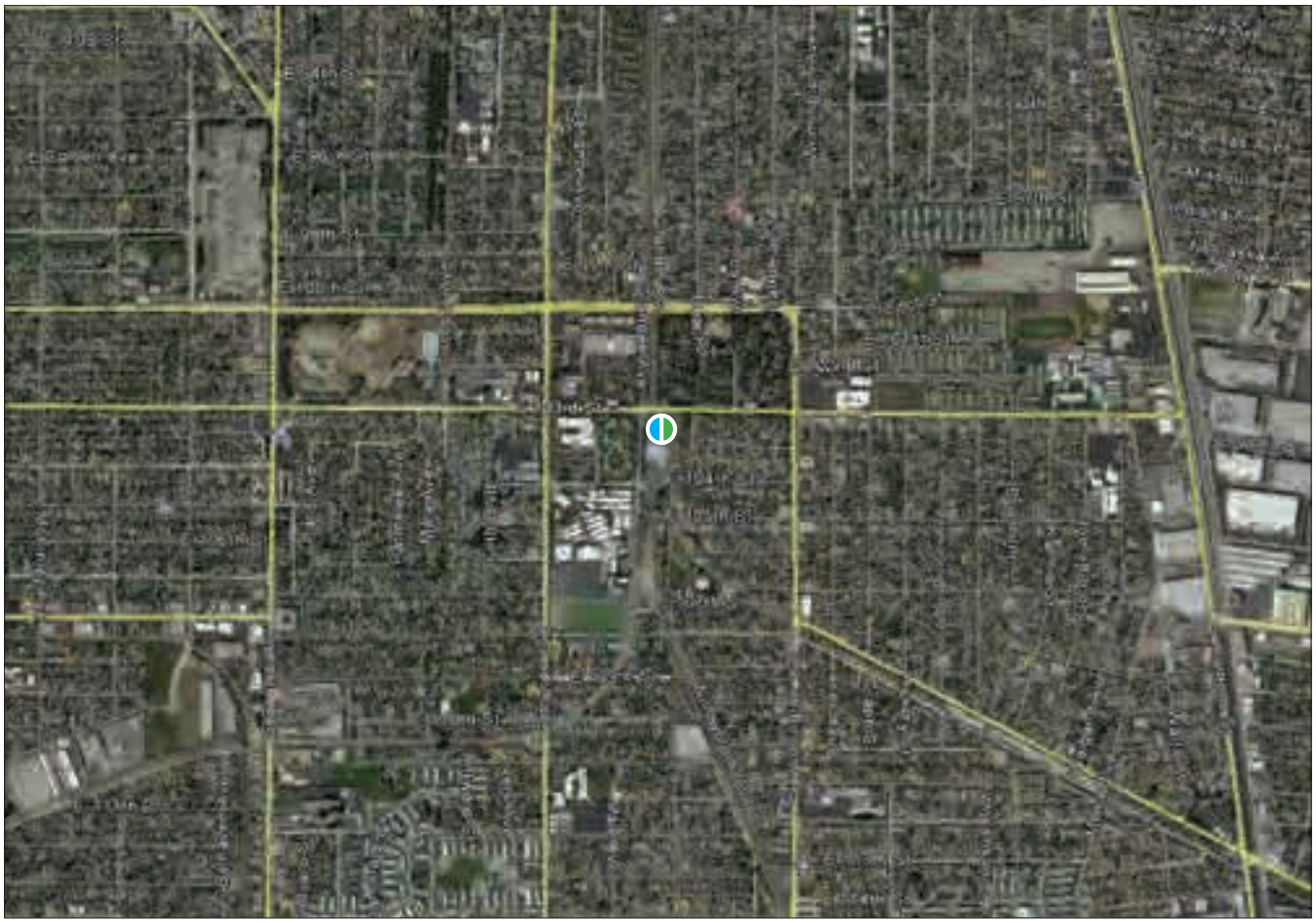
SITE 13: 103rd/Watts Blue Line Station

CSPP Place Type: Medium Residential/Medium Centrality
Metro Subregion: South Bay/ Gateway Cities
City: Los Angeles
Special Considerations: SL/PnR



CHARACTERISTICS

- LRT
- Street level, moderate corridor ridership
- Next to/within railroad ROW
- Proximity to railroad and block sizes are barriers
- Nearby destinations: Watts Health Center, Greater El Monte Community Hospital
- Connections to Metro Local and LADOT DASH service
- 62 park and ride spaces
- Population in the vicinity of the station (2010 Census)
  - Within 1 mile: 52,560
  - From 1 to 2 miles: 146,380
  - From 2 to 3 miles: 258,290

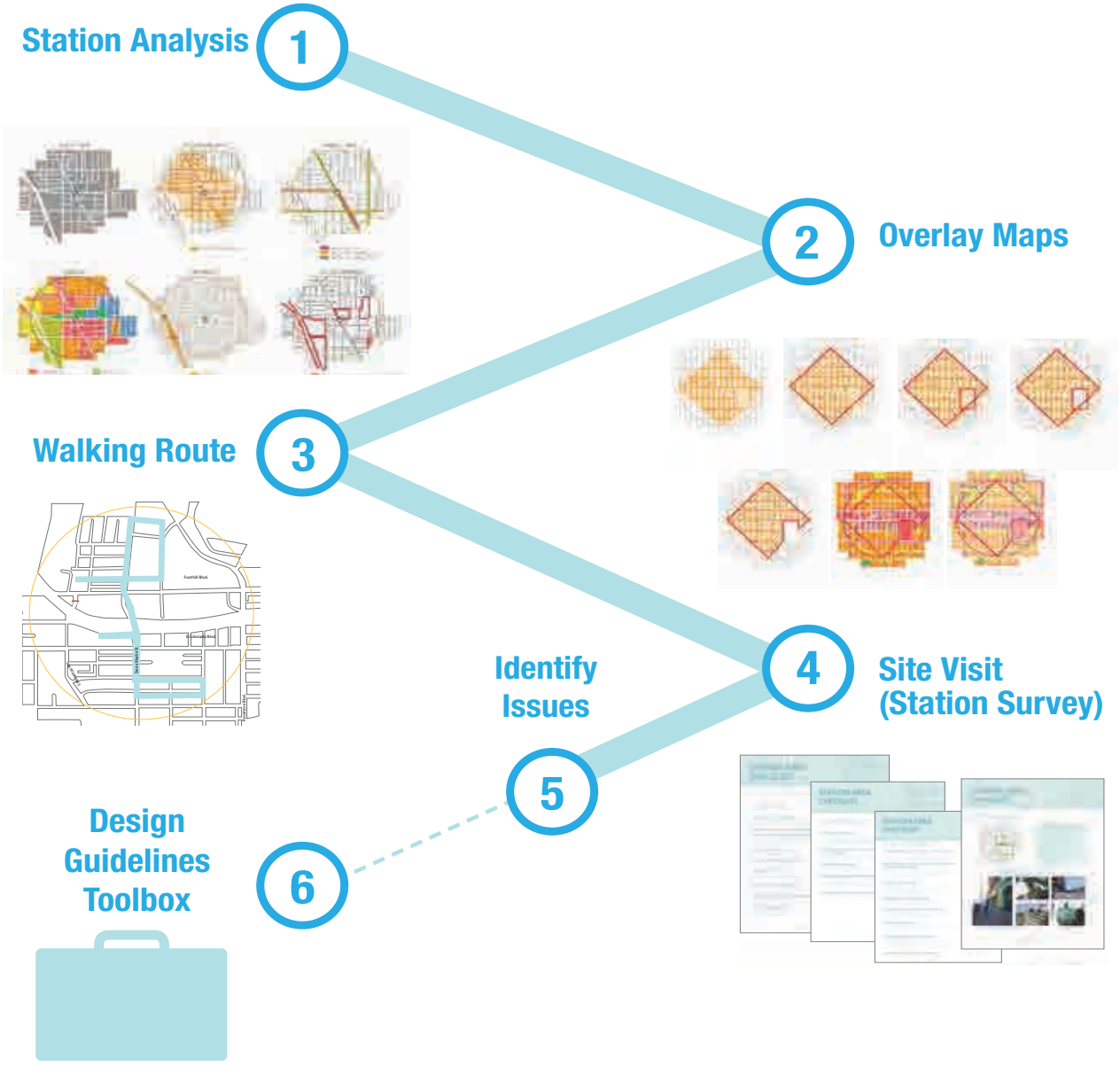


FIRST LAST MILE
STRATEGIC PLAN

Case Study Sites

Research and Analysis

To better understand the unique challenges of each station area chosen during the Site Selection Phase, each case study site selected was evaluated at both a "macro" and "micro" level. The intent of the preliminary station analysis was to perform a overall survey of conditions and characteristics of neighborhoods immediately surrounding the selected station areas. This analysis involved mapping, compiling, and overlaying various layers of station-specific data that illuminated existing conditions within a ½-mile radius of the station area. The ½-mile radius has been defined as an average 10-minute walk for pedestrians, and serves as the primary catchment area for first/last mile transit



1. Preliminary Station Analysis

The following access-related station area characteristics were analyzed at the ½-mile radius:

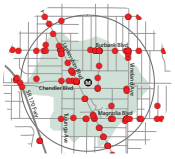
Points of Interest
The Points of Interest map highlights key sites located within the ½-mile radius of the station and infers logical routes between the station area and these interest points. Analyzing these routes better defined potential transit users. Key points of interest included schools, event centers, public institutions, parks, and any other local attractions to the transit catchment area.

Street Grid
The Street Grid map illuminates the street and block network surrounding station areas. This grid shows areas that lack connectivity, logical pathways, and/or create obstacles for site navigation. The map also doubles as a base map for the station analysis that follows.

Pedestrian Shed
The Pedestrian Shed map graphically displays the level of pedestrian accessibility for each station area. With the transit station as a starting point, all ½-mile routes based on the street grid were mapped and then consolidated into a larger catchment shape. The pedestrian shed begins to call out limitations to access as a result of each station's unique street grid. A diamond shaped pedestrian shed is ideal (as it provides the most extensive connections for non-vehicular travelers).

High Vehicular Speeds
The High Vehicular Speeds map shows potential areas that would cause safety concerns for pedestrians and bicylicts. Speeds that average higher that 35 mph are shown.

Key Transit Access Corridors
Key Transit Access Corridors are graphic depictions of Metro's Origin/ Destination study. These maps graphically represent the logical pedestrian routes frequently utilized by transit users.



Collision Severity and Location
The Collision Severity and Location map begins to show key intersections where high rates of pedestrian and bicycle collisions exist.

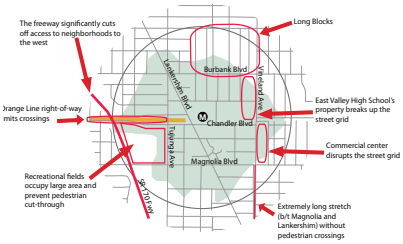
Land Use Map
The Land Use Map depicts concentrations of land use within each ½-mile radius. The land use map highlights the types and characteristics of users that are able to comfortably access the locations surrounding the station.

Bicycle Connections
All infrastructure dedicated to bicycles in the roadway are shown in the Bicycle Connections map. This generally includes: existing bike lanes, sharrows, separated bike facilities, bike 'friendly streets (in some areas where cities have defined this as a category), future bike routes, etc.

Transit Connections
Using Metro data, routes of all transit modes are mapped within the ½-mile radius. This includes: all bus lines, light and heavy rail, and any other transit lines serving the station area.

Statistics
The following statistics were extracted from each station area to provide an overview of the site: average block length, intersection density, walk score, overlay zones, density, employment, and journey to work.

2. Access Barriers Overlay Map
After compiling the information collected during the macro-level station area analysis, the maps described above were overlayed to show potential areas of intervention. The overlays described below provided substantial information that informed on-the-ground analysis.



Overlay land use and pedestrian shed map
To begin, the station land use map was overlayed with the pedestrian shed map. Here, any holes that existed within the ½-mile radius that would provide a logical origin/destination user was highlighted. For example, where there were heavy residential land uses on an area of the map that did not connect to the ½ mile pedestrian shed, a note was made, and the area was highlighted.

Overlay land use and bike connections map
The second step was to overlay the station land use map with the bicycle connections map. Here, any holes that existed within the ½-mile radius that would provide a logical origin/destination user was highlighted. The holes shown in these maps accounted for any areas that were missing connections to potentially heavy usage by bike riders.

All highlighted areas were then synthesized. These maps informed the basis for routing the site visit.

3. Determine walking route
Pulling from all highlighted areas from the overlay maps described above, walking routes were drawn that addressed potential improvement areas. As such, the walking route directly responded to potential problems or opportunity areas seen in the macro-level analysis and allowed for a more detailed on-the-ground analysis.

4. Site Visit - Station Survey
The site visit offered the opportunity to begin micro-level analysis, and to begin to assess areas of intervention.

For station specific analysis, a set of evaluation criteria and questions were written to consider current and future access needs and opportunities at each representative station/stop area. These questions were written as a survey checklist form. Mainly qualitative, these checklists measured performance of each station/stop area. With the end goal of increasing transit ridership, urban design elements that are most important for rider comfort and system function were added to the survey tool.

The sample checklist (see Appendix) was prepared as a guide for on-the-ground analysis of each station area. While initially prepared for the case sites selected for the First/Last Mile, the format of the checklist is broad, and touches upon a range of issues faced by most station areas in the study region. As such, this checklist can be used to evaluate a wide range of stations in the area.

The checklist is designed to broadly assess:1) safety elements, 2) aesthetics, and 3) accessibility within a station area. Each of these categories account for multi-modal experiences for all types of transit users. The results are keyed to a scoring tool that allows for comparison between stations. The scoring matrix below outlines the ranking system for each station area.

In addition to assessing the physical conditions of the environment, overall observations were also made that record how people move to and from the stations themselves. This analysis is supplemented by photo documentation, and an open-answer area for additional information gathered during the site visit.

Using this checklist, each station area has been visited, evaluated, and summarized in the pages that follow.

Scoring Matrix

1-1.99	Poor
2-2.99	Fair
3-3.99	Good
4-5	Excellent

Checklist (see Appendix)

5. Identify Issues
From each surveyed station area, key issues are then identified. The synthesized data for each station area is documented in the pages that follow.

SITE 1: Newhall Metrolink Station

CSPP Place Type: **Cluster A; High Residential/Low Centrality**
City: **Santa Clarita**
Special Considerations: **SL**

Safety Rating: 3.33/5 (Good*)
Aesthetics Rating: 3.4/5 (Good*)
Accessibility Rating: 2.43/5 (Fair*)

*Based on Checklist Rating Matrix

Opportunities Observed at Newhall Metrolink Station

Main Street is the heart of Old Town Newhall and is one block west of the Metrolink station. Main Street has been beautifully re-constructed per the vision outlined in the Downtown Newhall Specific Plan. A wide range of pedestrian oriented treatments along Main Street have been built, including brick paving, wood decked boardwalks at corners, mid-block crossing, traffic calming, intersection bulb-outs, appropriately scaled landscaping and street furnishings. The improvements could extend one block east along Market Street to strengthen the pedestrian link to the Metrolink Station.

The station area is composed of three distinct 'neighborhood islands'. There is a tranquil community of single family dwellings to the southeast of the tracks bounded by the tracks to the north and west, Newhall Creek to the east, and Newhall Avenue to the south. Main Street itself is flanked by small apartment buildings and anchored by a new library. The third neighborhood island in the station area is to the north of Lyon Ave.

Issues Observed at Newhall Station

Safety

- Pedestrian safety concerns with regard to: traffic volumes, speeds and crossing times / distances along Railroad Ave., Lyons Ave,, and Newhall Ave.

Aesthetics

- No issues to report

Accessibility

- Crossings across Railroad Avenue are limited
- Crossing at Market and Main Street has very long signal cycle time, and no pedestrian prioritization
- No accessible path for residents who live east of the tracks, or for pedestrians crossing to the south side of the street
- Long pedestrian crossing and short traffic signal cycle at Lyons Ave and Newhall intersection
- No pedestrian signage for Metrolink beyond the station site itself
- Bike facilities not observed

SITE 1: Newhall Metrolink Station

Points of Interest

INSTITUTIONS

1. Newhall DMV
2. Newhall Library
3. Senior Center
4. LA County Community Center
5. Santa Clarita Community Center

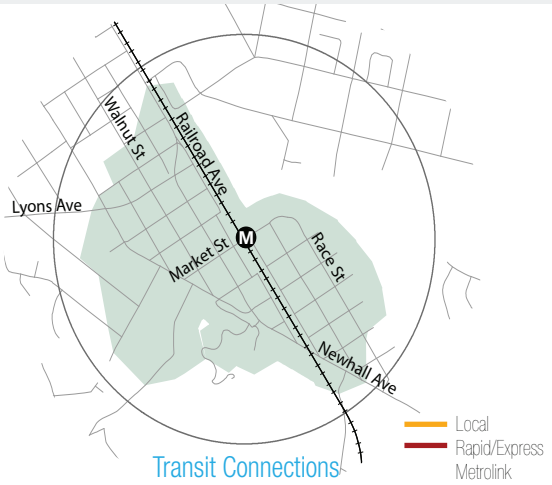
SCHOOLS

6. Newhall Elementary
7. Town & Country Farm School
8. The Master's College

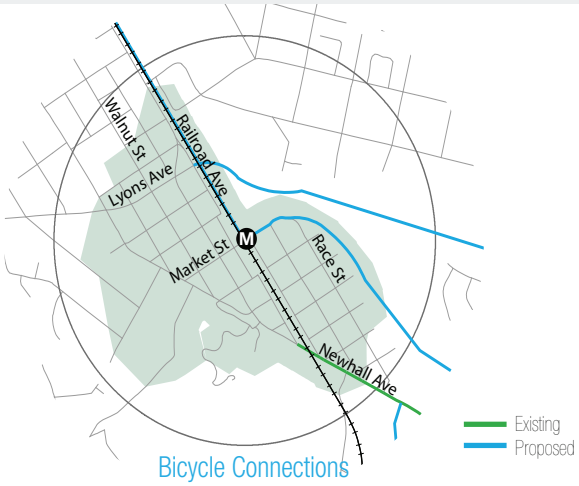
PARKS

9. William S. Hart Park
10. Creekview Park

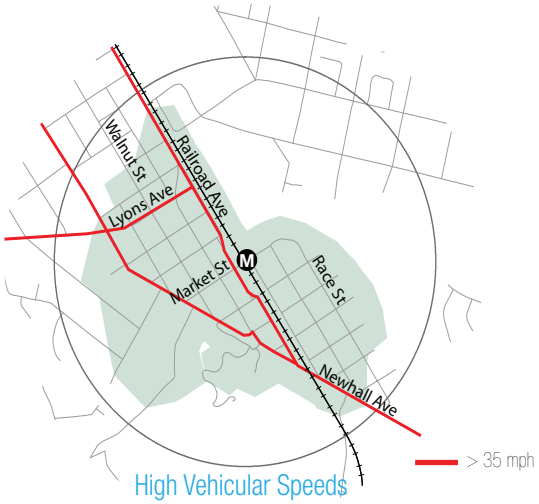
SITE 1: Newhall Metrolink Station



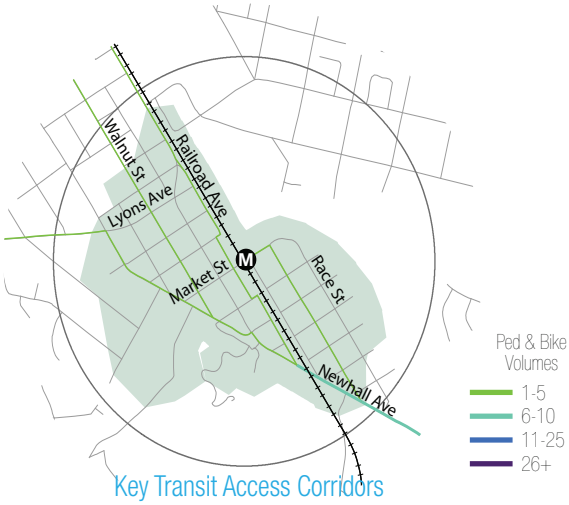
Transit Connections



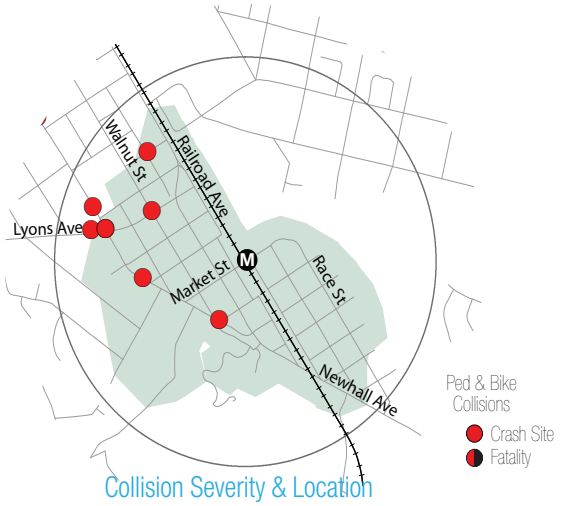
Bicycle Connections



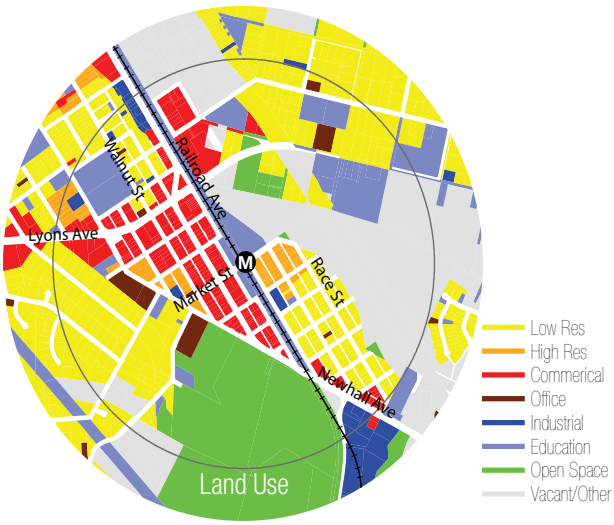
High Vehicular Speeds



Key Transit Access Corridors



Collision Severity & Location



Land Use

Walk Score: 78 / Overlay Zones: N/A / Density: 4,331 total population / Employment: 3.65 jobs per acre / Journey to Work: 23.2% take transit/bike/walk to work

SITE 1: Newhall Metrolink Station

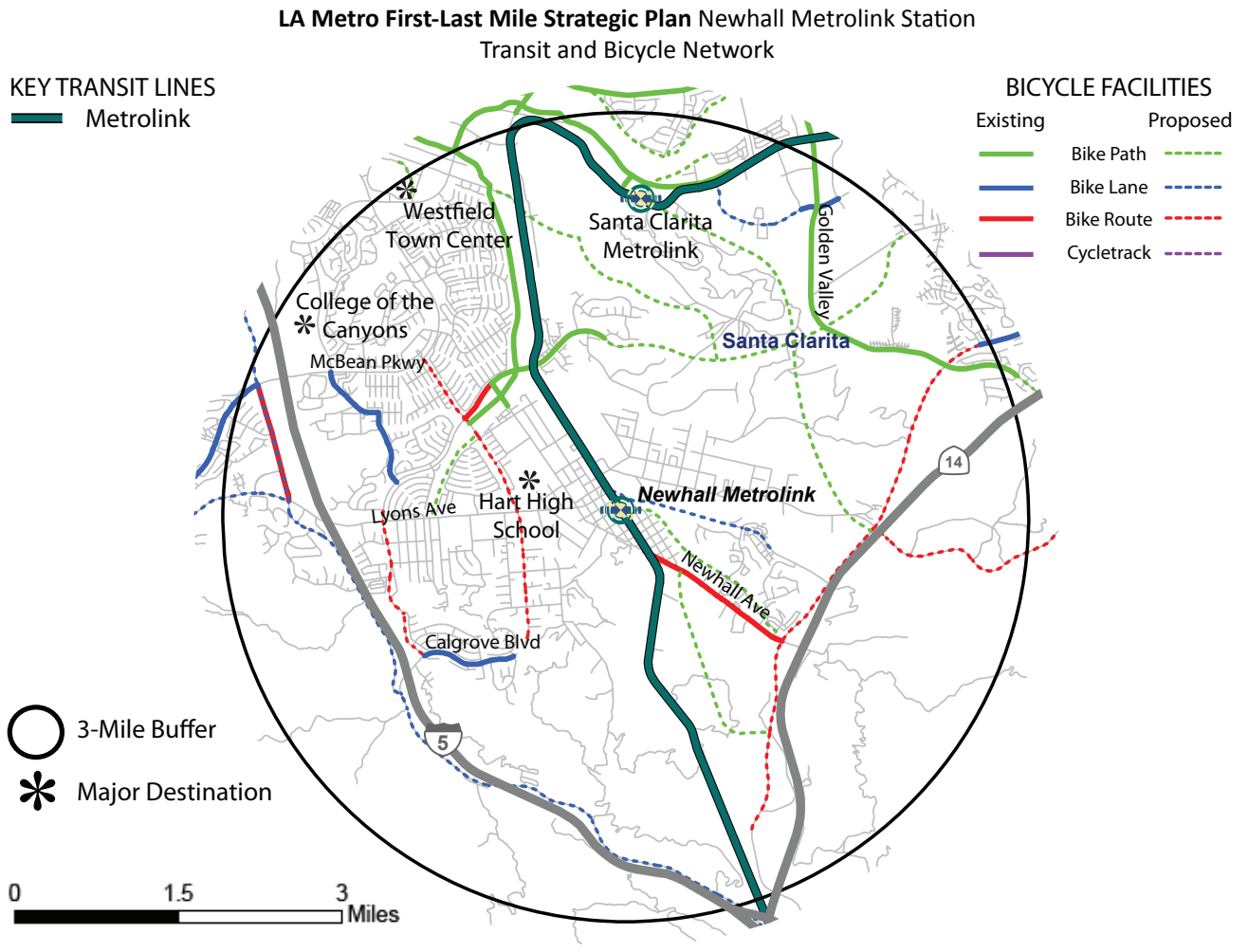


PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 1: Newhall Metrolink Station

2.3 Vehicular-oriented residential neighborhood with limited pedestrian amenities

3.1 Pedestrian crossing at Railroad & Newhall Ave is not friendly

3.1 Discontinuous sidewalk along Newhall Ave. approaching Lyon Ave.

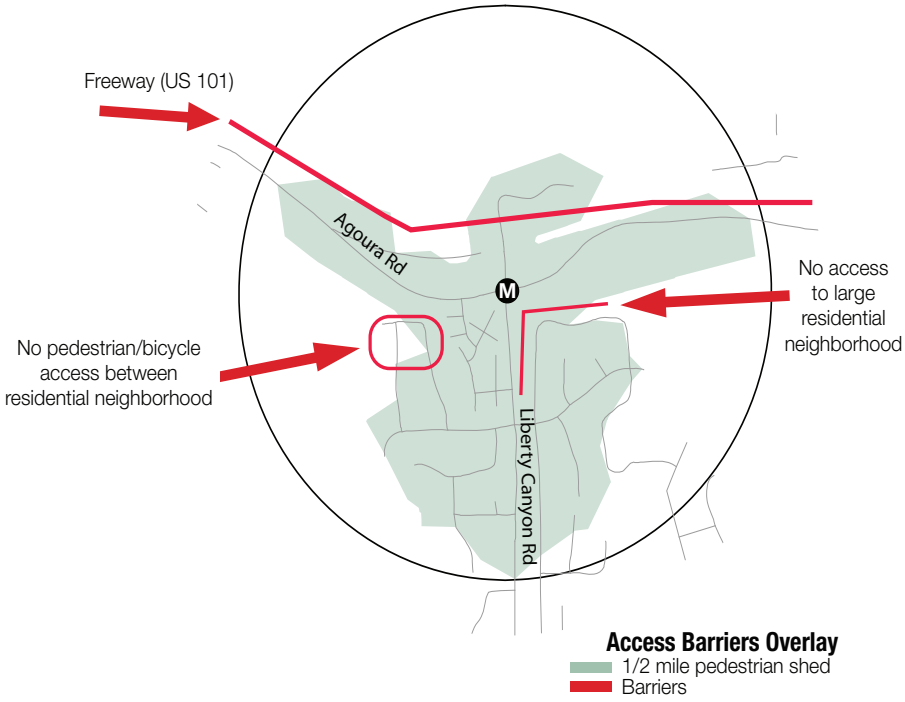
3.2 Non-accessible pedestrian path across tracks

SITE 2: Agoura Rd/Liberty Canyon Rd Bus Stop - Line 161

CSPP Place Type: **Cluster B; Low Residential/Low Centrality**
City: **Agoura Hills**
Special Considerations: **SL/FWY**

Safety Rating: 3.86/5 (Good*)
Aesthetics Rating: 3.6/5 (Good*)
Accessibility Rating: 3.67/5 (Fair*)

*Based on Checklist Rating Matrix



Opportunities Observed at Agora Rd/Liberty Canyon Rd Bus Stop

Metro Line 161 connects Thousand Oaks to Warner Center traveling primarily along the 101 corridor. The Agoura Rd/Liberty Canyon stop services a small pocket of residential development located to the south of the stop. The streets and walks are well-maintained and free of obstruction. Traffic speeds tend to be higher due to the open nature of the roads. There are some painted bike facilities and the streets are wide enough to provide plenty of safe manoeuvring space for bikes and pedestrians. The bus stop is provided with a bench and a sign post.

Issues Observed at Agora Rd/Liberty Canyon Rd Bus Stop

Safety

- Traffic speeds along Agoura Road are high, but in-line with the type of development in the area

Aesthetics

- Station itself is lacking shade amenities
- Station area is pleasant though uneventful
- Auto-oriented

Accessibility

- No issues to report

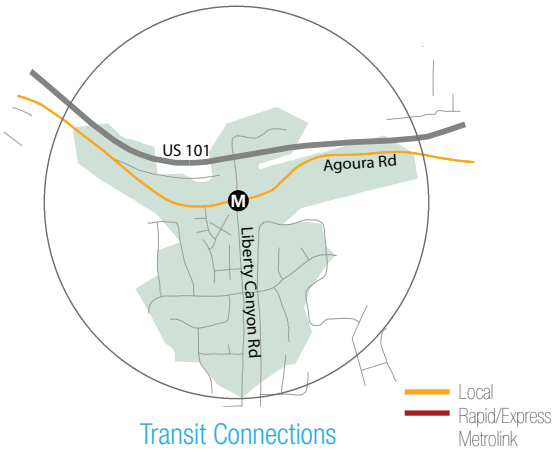
SITE 2: Agoura Rd/Liberty Canyon Rd Bus Stop - Line 161

Points of Interest

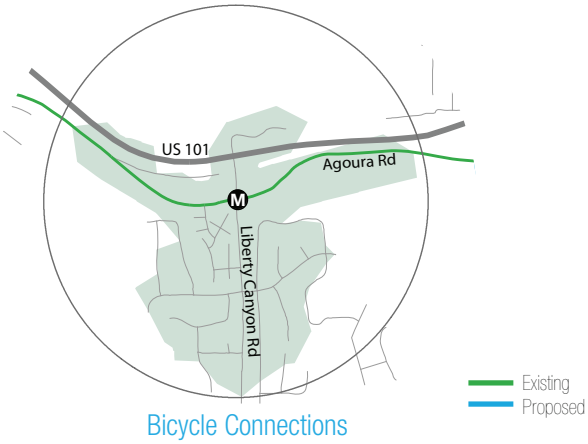
SCHOOLS

1 Ilan Ramon Day School

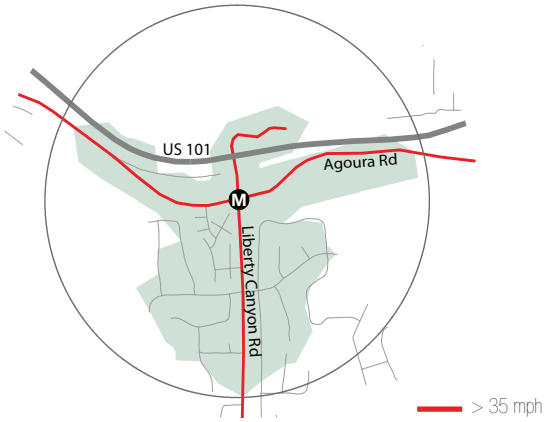
SITE 2: Agoura Rd/Liberty Canyon Rd Bus Stop - Line 161



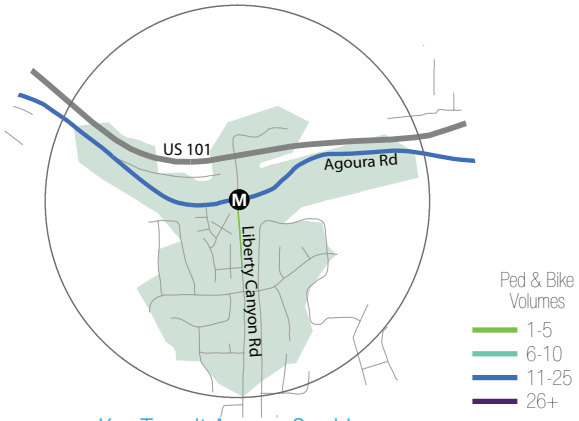
Transit Connections



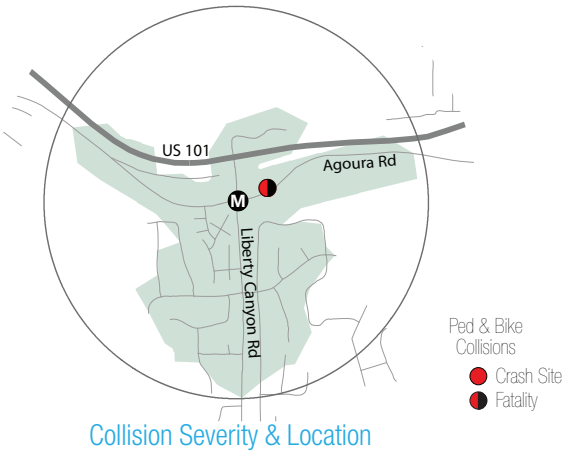
Bicycle Connections



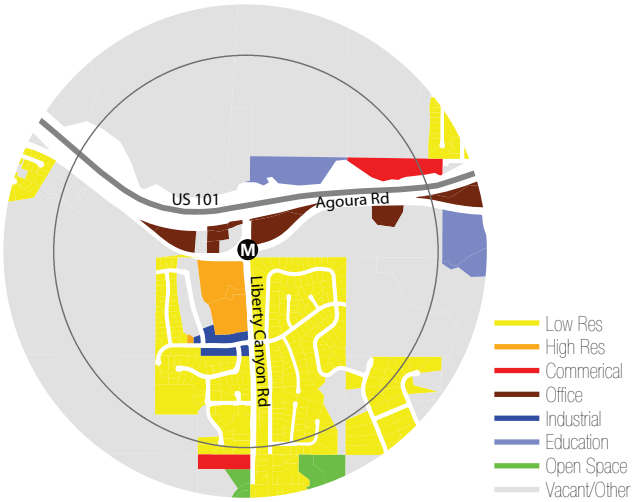
High Vehicular Speeds



Key Transit Access Corridors



Collision Severity & Location



Land Use

Walk Score: 26 / Overlay Zones: N/A / Density: N/A / Employment: N/A / Journey to Work: N/A

SITE 2: Agoura Road/Liberty Canyon Road Bus Stop

LA Metro First-Last Mile Strategic Plan Agoura Road/Liberty Canyon Road Bus Stop
Transit and Bicycle Network

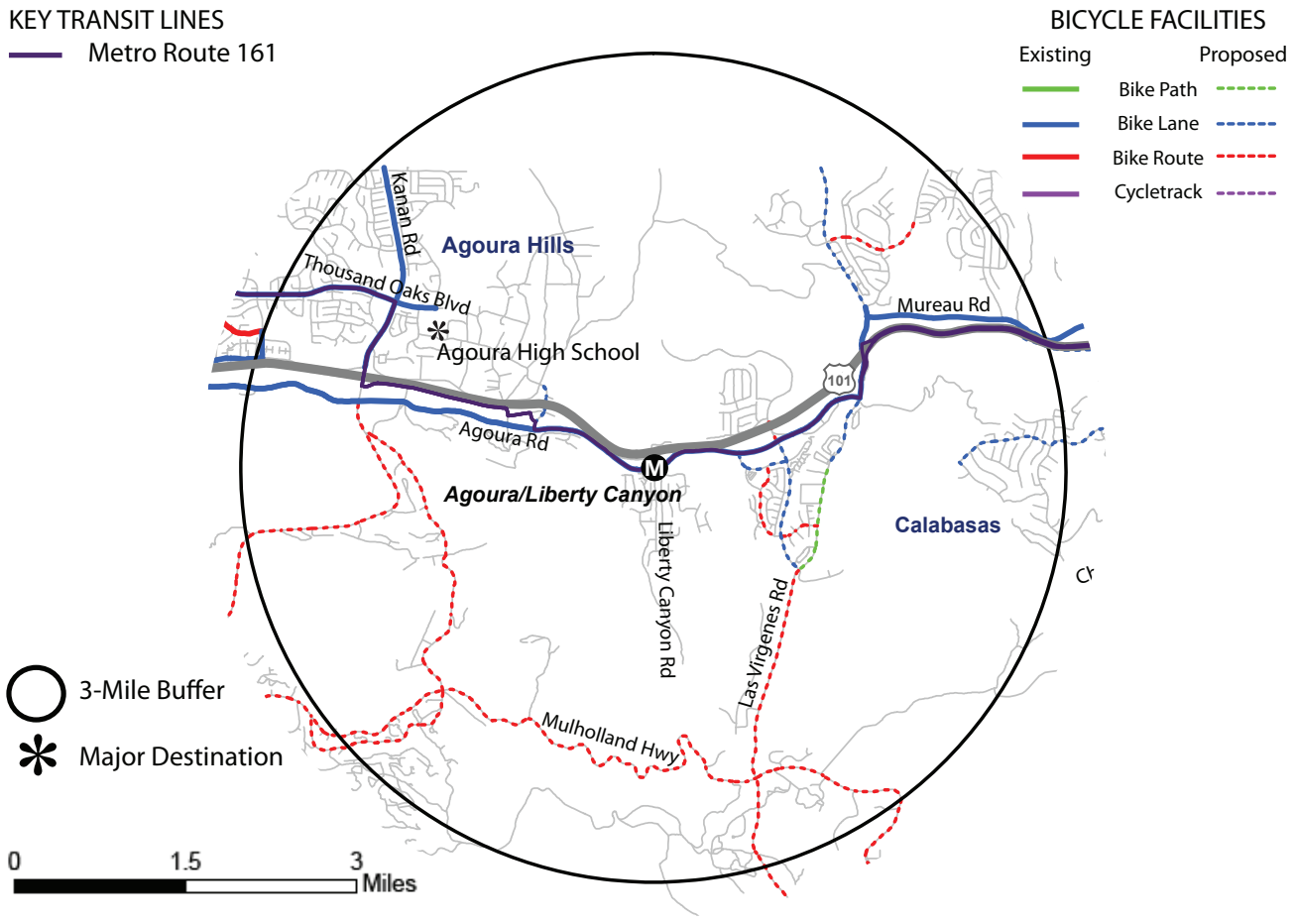


PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 2: Agoura Rd/Liberty Canyon Rd Bus Stop - Line 161

1.5/1.6 Lack of bus shelter, pedestrian amenities, large car-oriented superblocks with opportunity for speeding

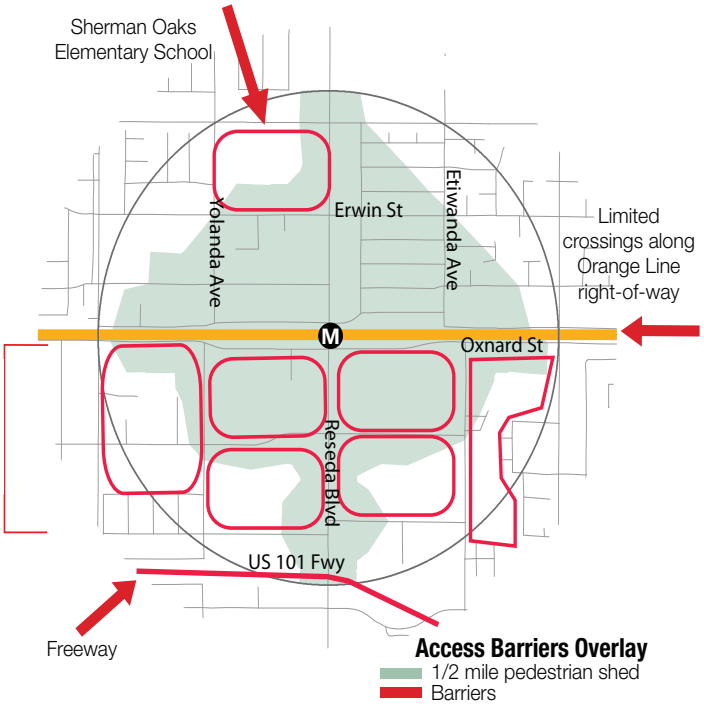
1.6/2.3 Narrow pedestrian sidewalks, high traffic speed and lack of pedestrian amenities

SITE 3: Reseda Orange Line Station

CSPP Place Type: **Cluster A; Medium Residential/Low Centrality**
City: **Los Angeles**
Special Considerations: **SL/MM**

Safety Rating: 2.14/5 (Fair*)
Aesthetics Rating: 2.2/5 (Fair*)
Accessibility Rating: 2.88/5 (Fair*)

*Based on Checklist Rating Matrix



Opportunities Observed at Reseda Orange Line Station

Oxnard Street, to the south of the station, is characterized by small industrial uses, complete with a small strip mall, gas station, small industry-related uses, two larger institutional uses and a local landmark all within 1/4 mile of the Orange Line. The lots on the south side are very deep and bisected by service alleys. Some sites are actively used, others vacant.

There is steady pedestrian traffic to and from the Orange Line mostly north and south along Reseda primarily due to transfers to and from the local busses that service Reseda Blvd.

The Orange Line stop itself is serviced by large surface parking lots directly to the east and west of the Oxnard/ Reseda intersection, and a dedicated bike path that runs along the tracks. Densely-populated residential areas exist to the north and south of the station, beyond the light industrial areas.

Issues Observed at Reseda Orange Line Station

Safety

- Traffic volumes and speeds along Reseda Blvd contribute to safety concerns for pedestrians
- Lack of crossings along Oxnard
- Vacant industrial parcels along Oxnard / lack of 'eyes-on-the-street'

Aesthetics

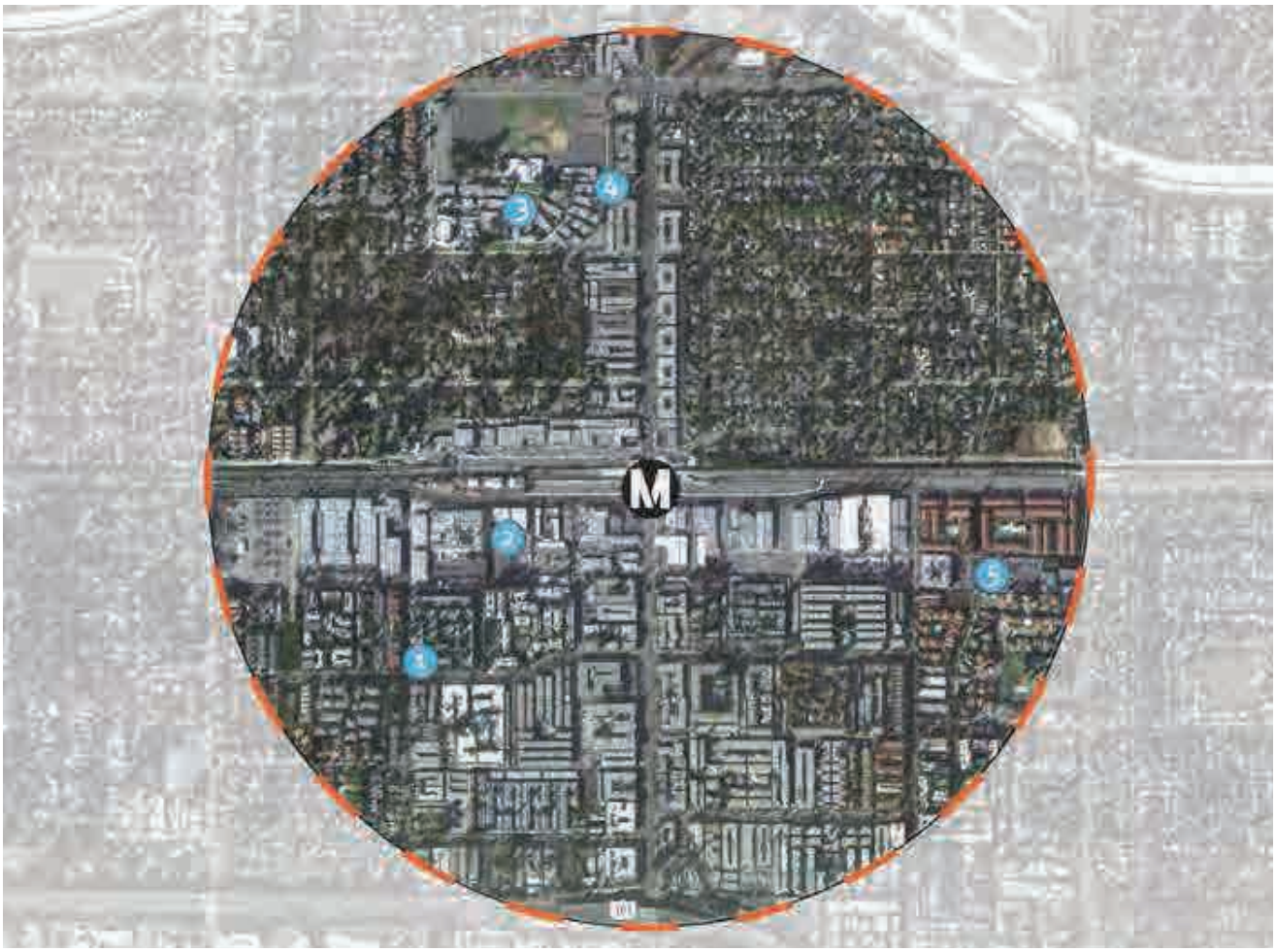
- Lack of visual interest, non-transparency, minimal entries
- Existing uses internal-facing, minimal street presence adjacent to Oxnard Street

Accessibility

- Lack of pedestrian crossings along Reseda
- Traffic calming required along Reseda and Oxnard in vicinity of station
- Large block lengths
- Lack of shade trees along sidewalks
- Very wide streets, difficult to cross, especially for slower pedestrian and universal access modes

SITE 3: Reseda Orange Line Station

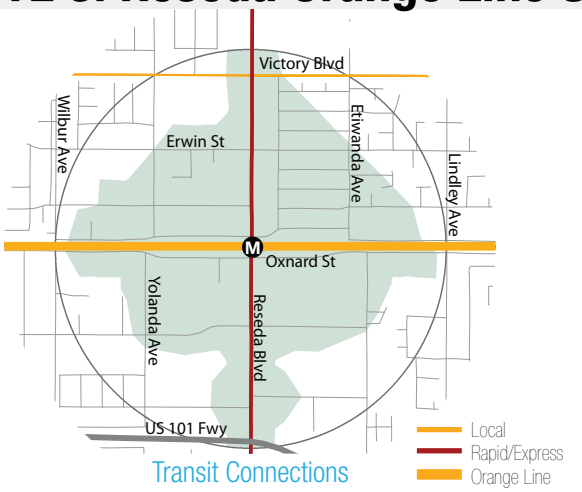
Points of Interest



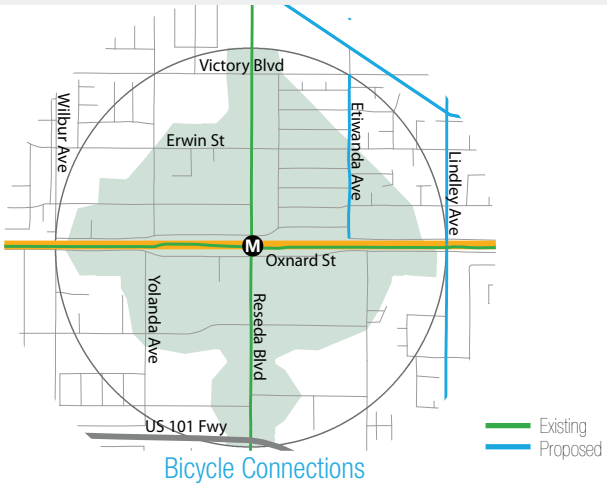
SCHOOLS

1. Little Scholars Montessori
2. Columbia College Hollywood
3. Sherman Oaks Center for Enriched Studies
4. The Magic Years Nursery School
5. Lycee International De Los Angeles

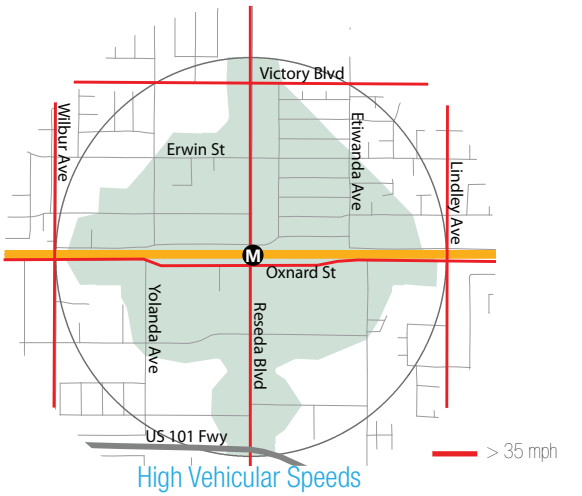
SITE 3: Reseda Orange Line Station



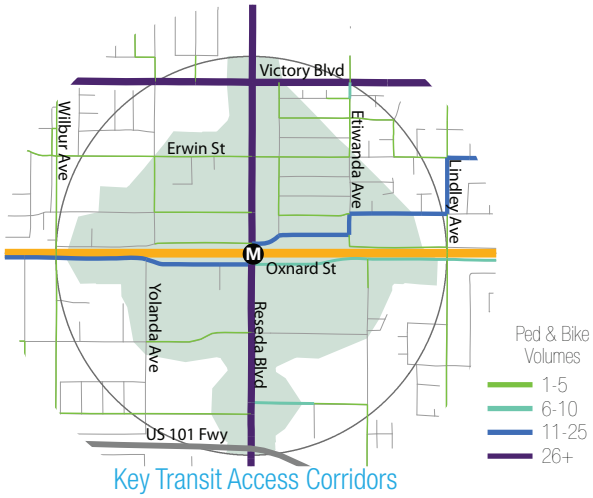
Transit Connections



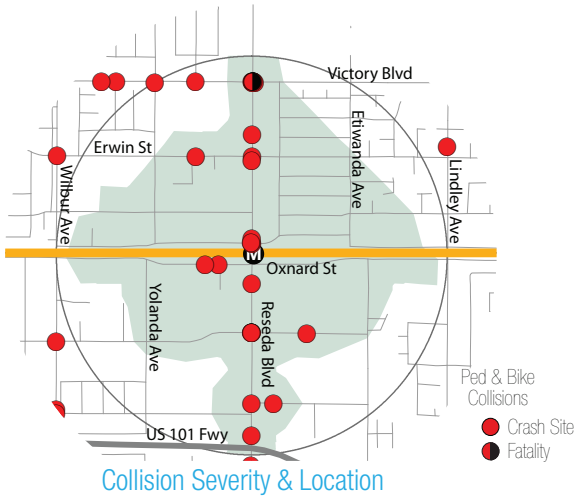
Bicycle Connections



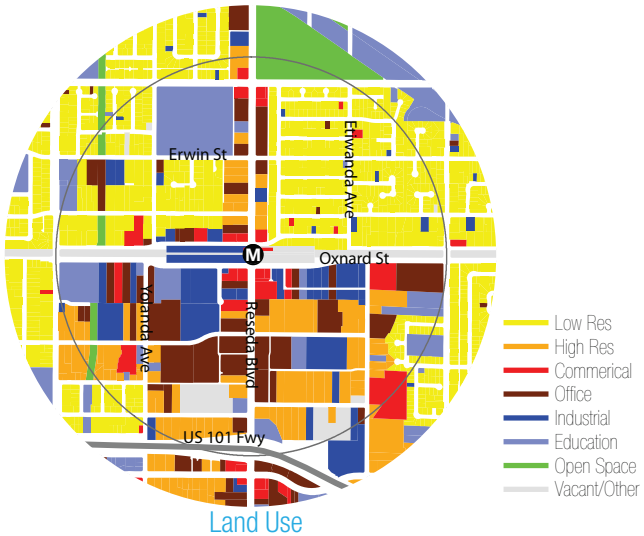
High Vehicular Speeds



Key Transit Access Corridors



Collision Severity & Location



Land Use

Walk Score: 74 / Overlay Zones: N/A / Density: 13,038 total population / Employment: 4.59 jobs per acre / Journey to Work: 12.2% take transit/bike/walk to work

SITE 3: Reseda Orange Line Station

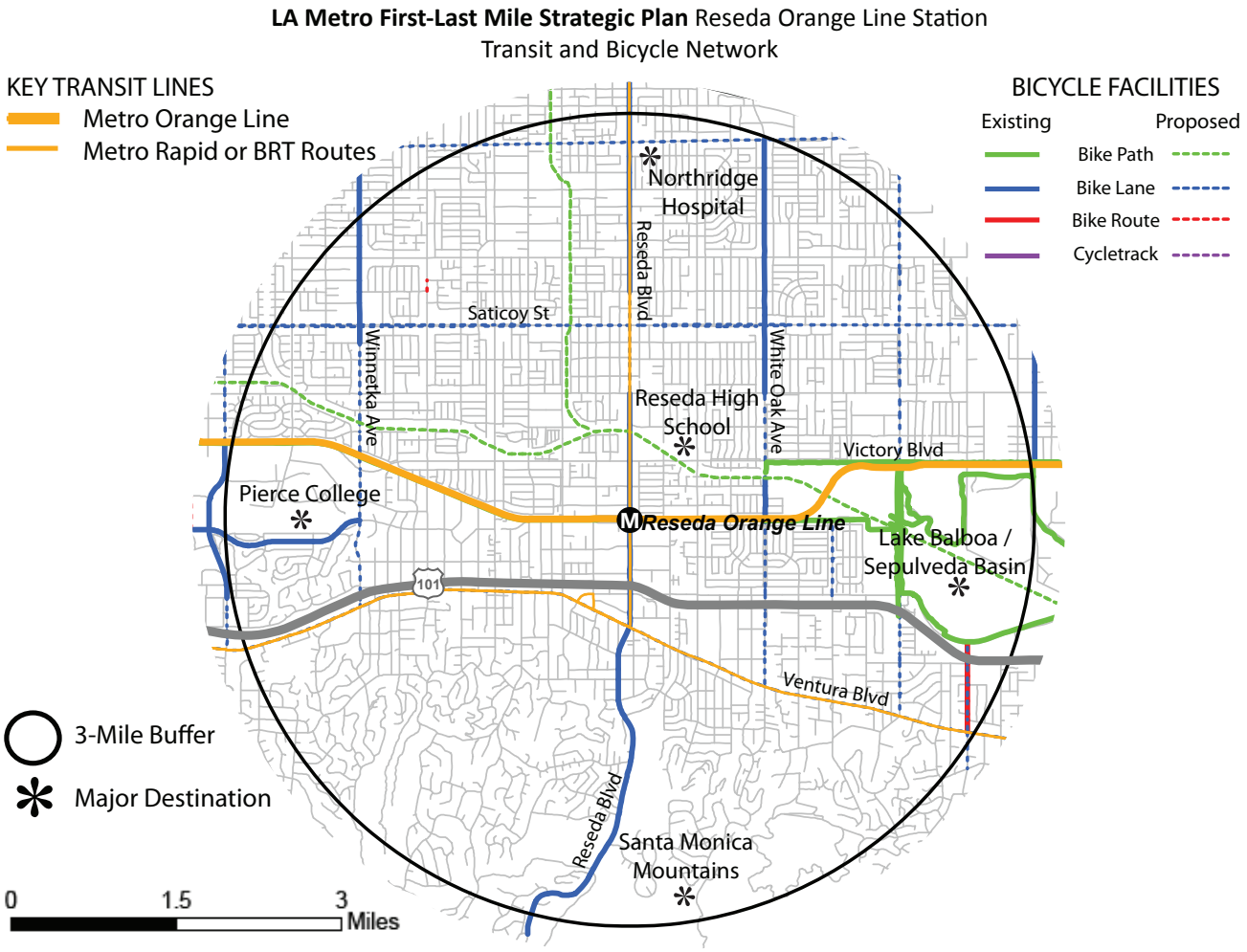


PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 3: Reseda Orange Line Station

1.7 Visual clutter, unclear signage

2.4 Alley and empty parking lot in center of large station area block

3.7 Orange Line multi-use trail without accessible ramp

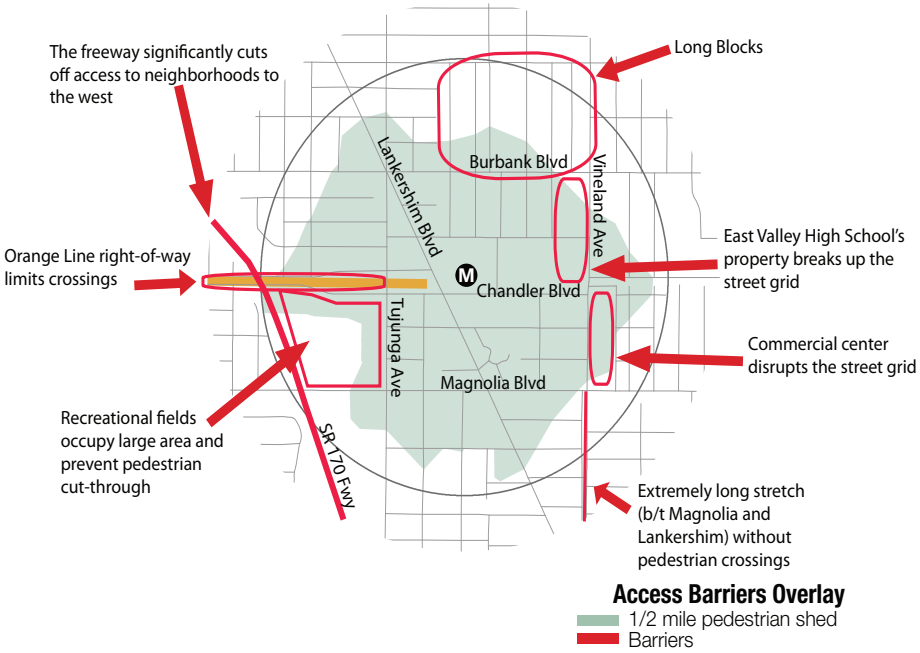
3.8 Looking across Oxnard to fenced and underutilized Metro park-and-ride lot

SITE 4: North Hollywood Red Line/Orange Line Station

CSPP Place Type: **Cluster C; High Residential/Medium Centrality**
City: **Los Angeles**
Special Considerations: **MM/T/PnR/UG&SL**

Safety Rating: 3.38/5 (Good*)
Aesthetics Rating: 3/5 (Good*)
Accessibility Rating: 2.75/5 (Fair*)

*Based on Checklist Rating Matrix



Opportunities Observed at Olive St/San Fernando Station

The North Hollywood Station serves as a critical connector for the Metro Red Line and the Orange Line Bus. The Red Line connects directly to a Downtown Los Angeles terminus, while the Orange Line Bus Terminal directly connects to easterly to Ventura. The station lies in the center of the North Hollywood (NoHo) Arts District.

Additionally, the site is adjacent to the Hollywood Art Institute campus, and a lively retail and housing district. With recent streetscape enhancements and the subject of a number of CRA/LA redevelopment projects, the North Hollywood Station serves a vast demographic and has significant catchment potential within the surrounding region. Also located within the 1/2 mile pedestrian shed is the NoHo Park, which has the potential to draw daily visitors. Currently, the park does not offer enough seating, and does not have a welcoming street-edge.

Issues Observed at Olive St/San Fernando Station

Safety

- Lack of separated bicycle infrastructure along main roads

Aesthetics

- Along secondary streets that connect residential neighborhoods to station, land uses and the site's block network create an unpleasant pedestrian environment (e.g. superblocks with minimal pedestrian crossings, and unfriendly/noisy land uses flanking the street)

Accessibility

- Orange and Red Lines stops face different directions and connections between the two are unclear
- Bicycle racks are completely full
- Park-and-ride is often full

SITE 4: North Hollywood Red Line/Orange Line Station

Points of Interest

INSTITUTIONS

1. NoHo Senior Citizen Valley Therapeutic Recreation
2. NoHo Regional Library
3. YMCA

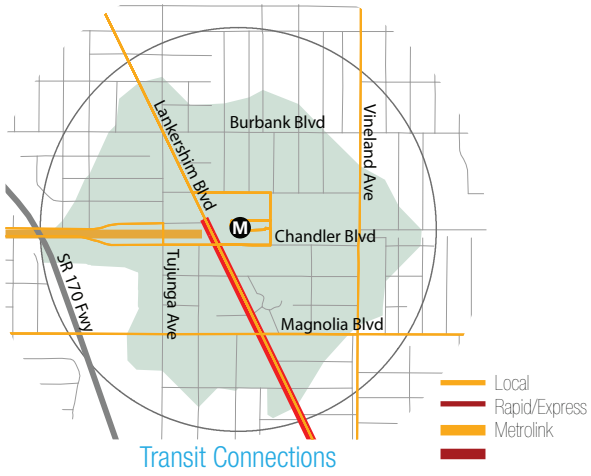
SCHOOLS

4. Oakwood Secondary School
5. St. Pauls First Lutheran School
6. The Art Institute of California
7. East Valley High School

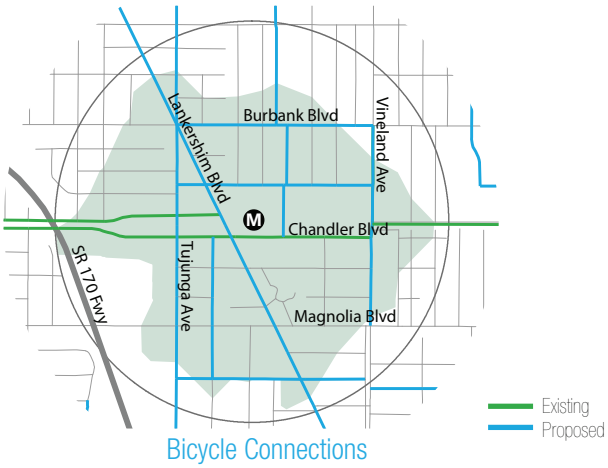
PARKS

8. NoHo Park

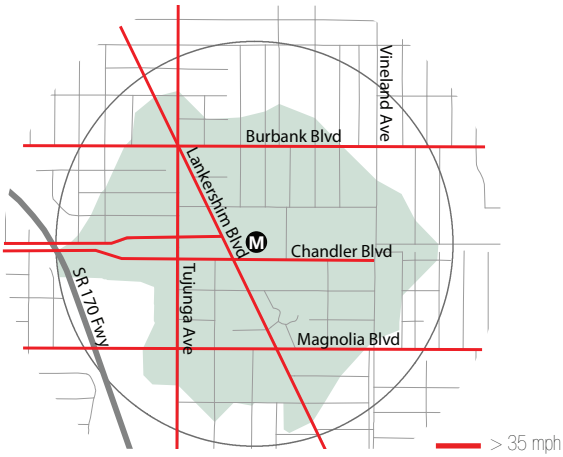
SITE 4: North Hollywood Red Line/Orange Line Station



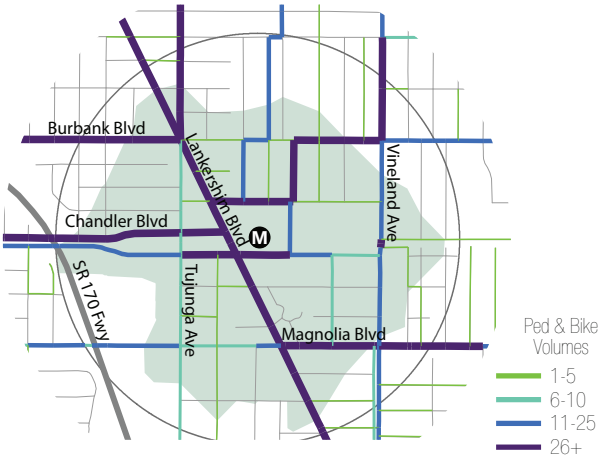
Transit Connections



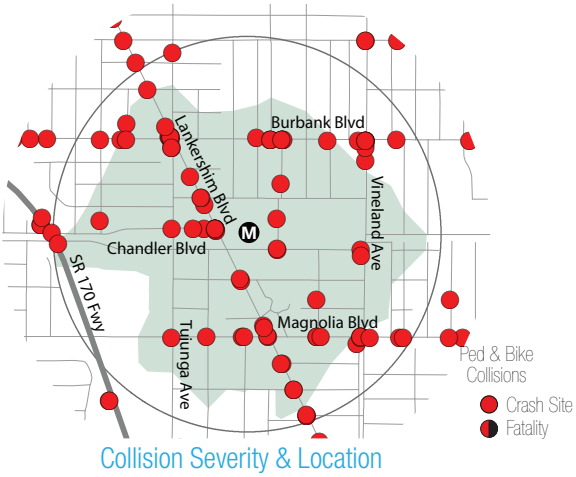
Bicycle Connections



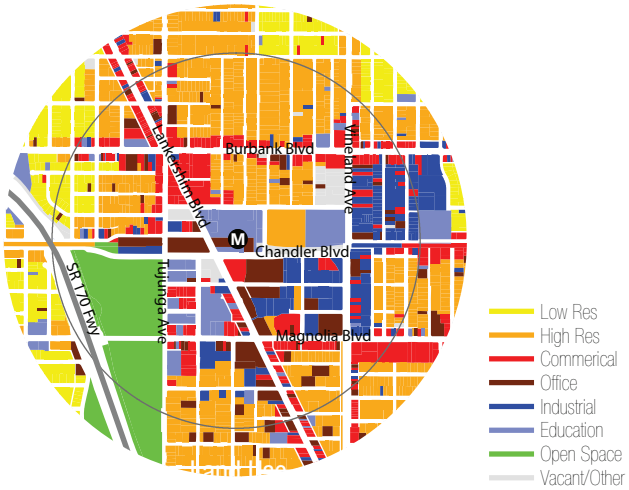
High Vehicular Speeds



Key Transit Access Corridors



Collision Severity & Location



Walk Score: 95 / Overlay Zones: "NoHo" Commerical Arts District / Density: 11,870 total population / Employment: 8.47 jobs per acre / Journey to Work: 14.7 take tansit/bike/walk to work

SITE 4: North Hollywood Orang/Red Line Station

LA Metro First-Last Mile Strategic Plan North Hollywood Orange/Red Line Station
Transit and Bicycle Network

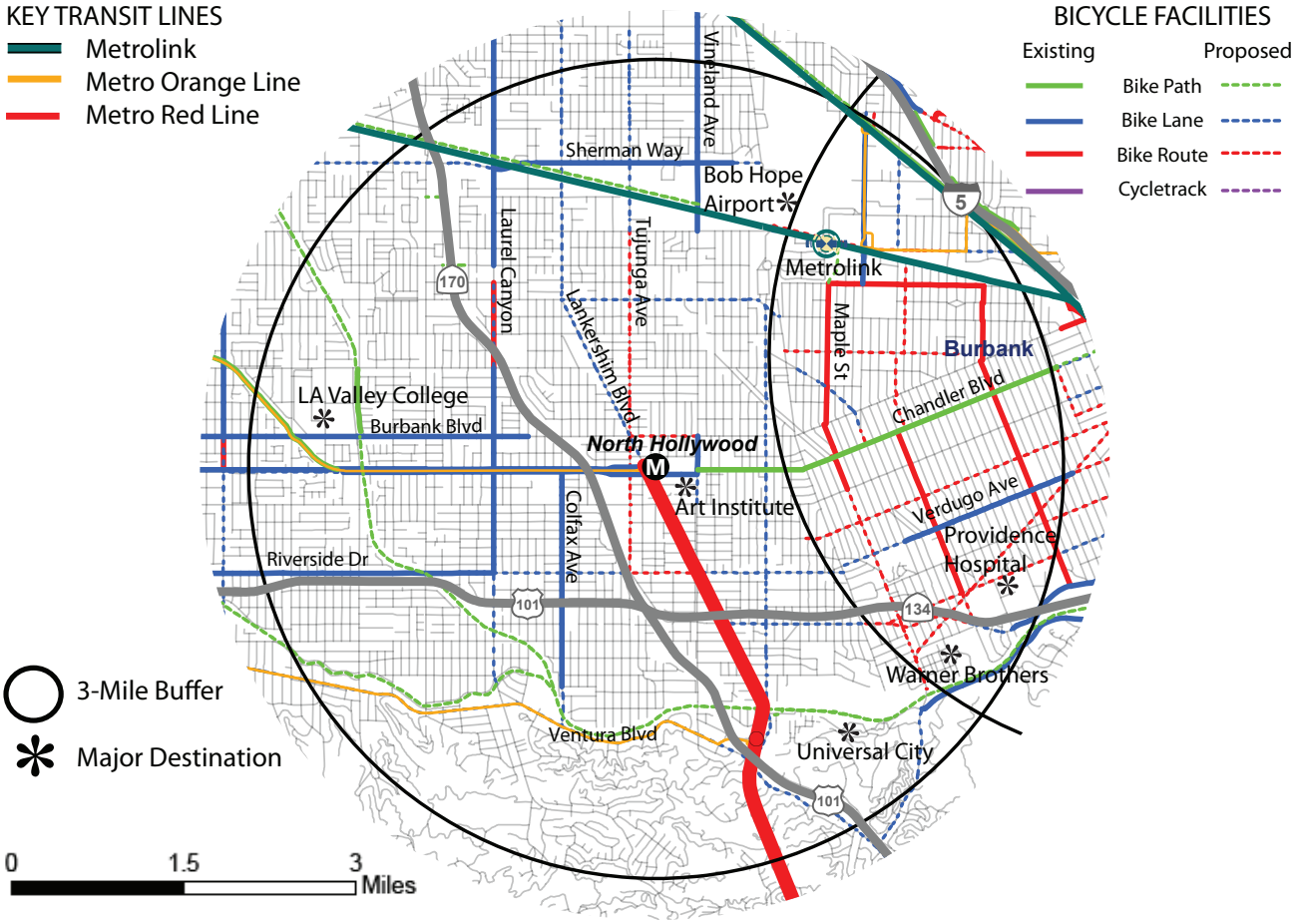
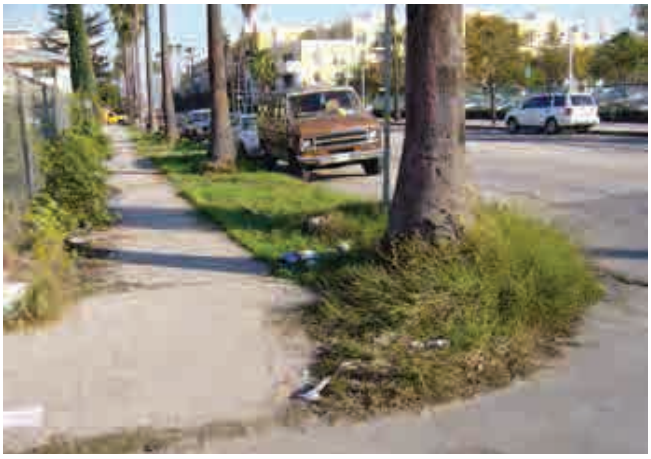


PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 4: North Hollywood Red Line/Orange Line Station



1.3 Lack of maintenance of public realm

3.2 Lack of crossings along superblocks

3.1 Inadequate sidewalks

3.1 Utilities in sidewalks

3.5 Graffiti on signage

3.7 Lack of curb cuts

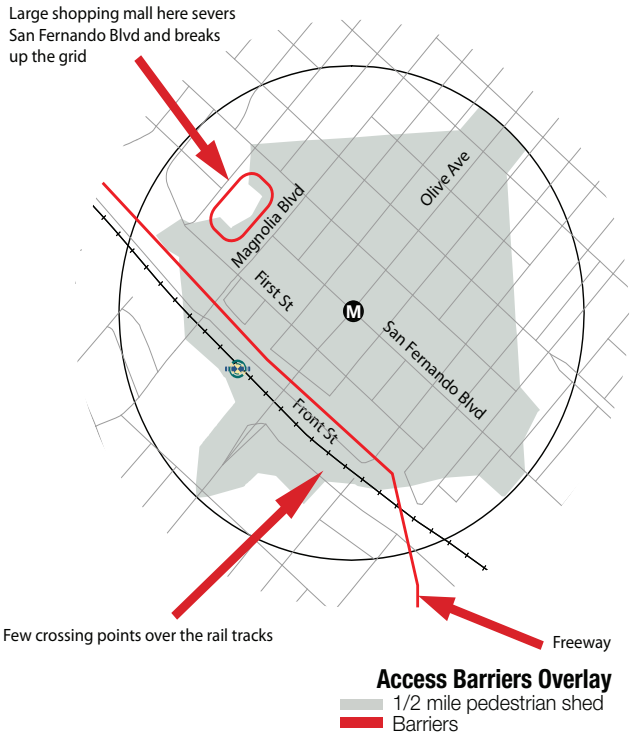
3.8 Fenced parking is a barrier for community access

SITE 5: Olive Street/San Fernando Bus Line Stop - Line 794

CSPP Place Type: **Cluster D; High Residential/High Centrality**
City: **Burbank**
Special Considerations: **MM/FWY/SL**

Safety Rating: 3.25/5 (Good*)
Aesthetics Rating: 3.6/5 (Good*)
Accessibility Rating: 2.7/5 (Fair*)

*Based on Checklist Rating Matrix



Opportunities Observed at Olive St/San Fernando Station

Olive St/San Fernando is a unique station that serves more than one transit line. In addition to the Metro Bus Line 794 at the intersection of Olive St. and San Fernando Blvd., a regional Metrolink station lies just within the 1/2 mile accessible pedestrian shed. Connecting the bus line with the wider, Metrolink regional transit line provides a critical link to regional travelers, offering the opportunity to extend the first/last mile shed.

Streetscaping surrounding Metro Bus Line 794 incorporates a number of pedestrian amenities and services. Ample bike racks are provided, along with significant shade tree planting along heavily trafficked corridors. Highly visible crossings and wide sidewalks provide ample room for 794 riders when entering Downtown Burbank.

Issues Observed at Olive St/San Fernando Station

Safety

- Bikes are not separated from vehicles or provided a buffer
- Lack of clear safety signage

Aesthetics

- Vacant industrial parcels along Oxnard / lack of eyes-on-the-street

Accessibility

- Unclear transit mode transfer between Metrolink station and Bus Stop 794
- Limited and hard to read transit signage
- Pathways to Metrolink line the freeway, and are uninviting to pedestrians
- Lack of street lights along roads that connect transit modes
- Lack of bicycle infrastructure, special paving and/or street level amenities outside of downtown node

SITE 5: Olive Street/San Fernando Bus Line Stop - Line 794

Points of Interest

INSTITUTIONS

1. Burbank Water and Power
2. Burbank Town Center
3. Burbank City Hall
4. Burbank Central Library

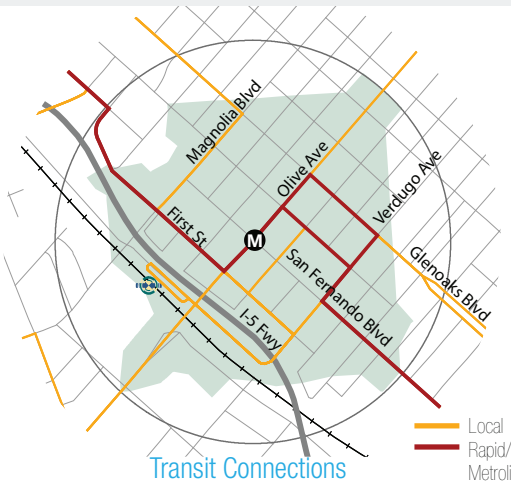
SCHOOLS

5. Inter Coast Colleges

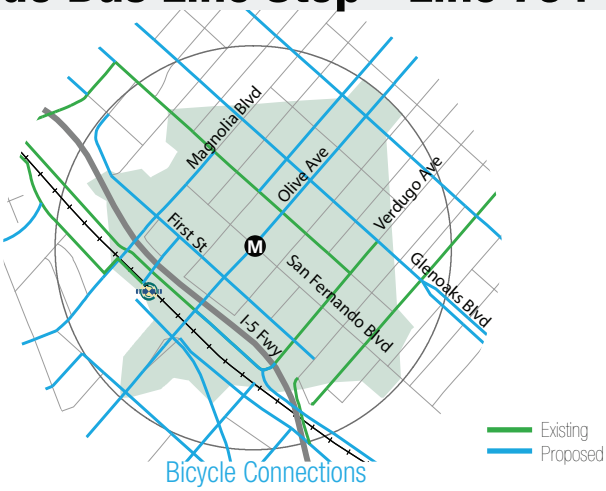
PARKS

6. Robert K. Ovrom Park & Community Center

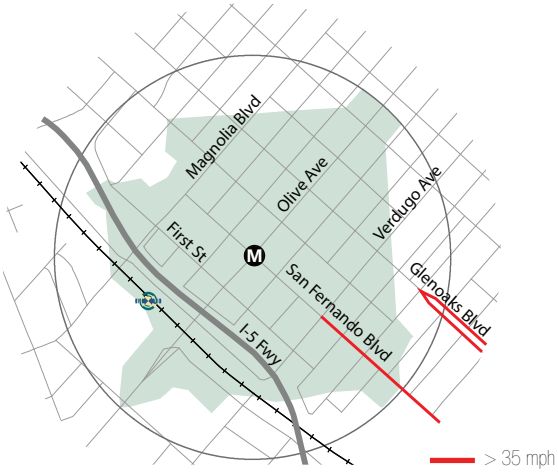
SITE 5: Olive Street/San Fernando Bus Line Stop - Line 794



Transit Connections

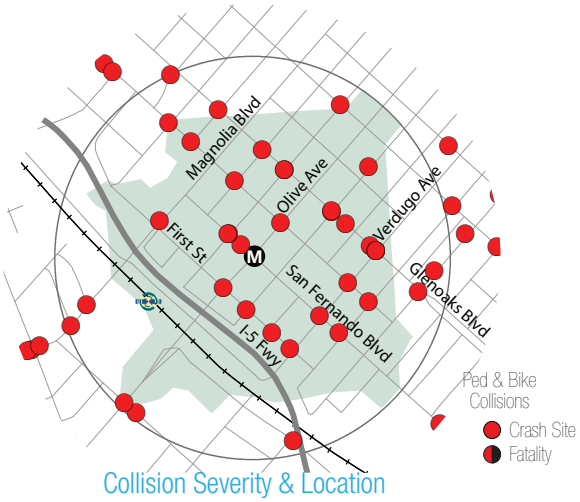


Bicycle Connections

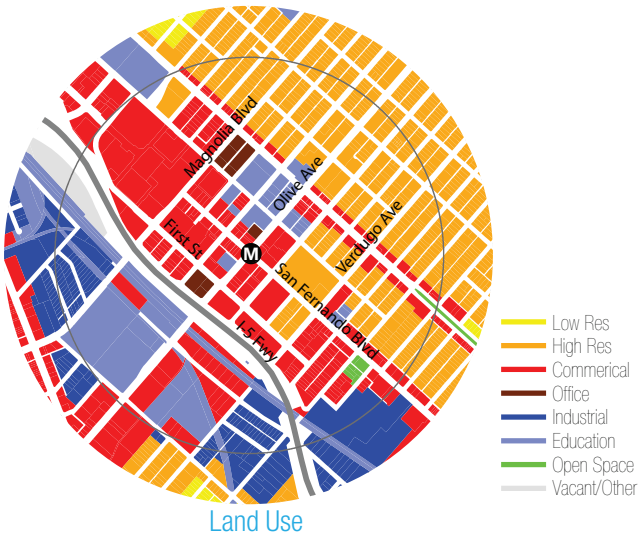


High Vehicular Speeds

Key Transit Access Corridors



Collision Severity & Location



Land Use

Walk Score: 94 / Overlay Zones: N/A / Density: 4,845 total population/ Employment: 69.29 jobs per acre / Journey to Work: 14.4% take transit/bike/walk to work

SITE 5: Olive Street/San Fernando Blvd Bus Stop

LA Metro First-Last Mile Strategic Plan Olive Street/San Fernando Blvd Bus Stop
Transit and Bicycle Network

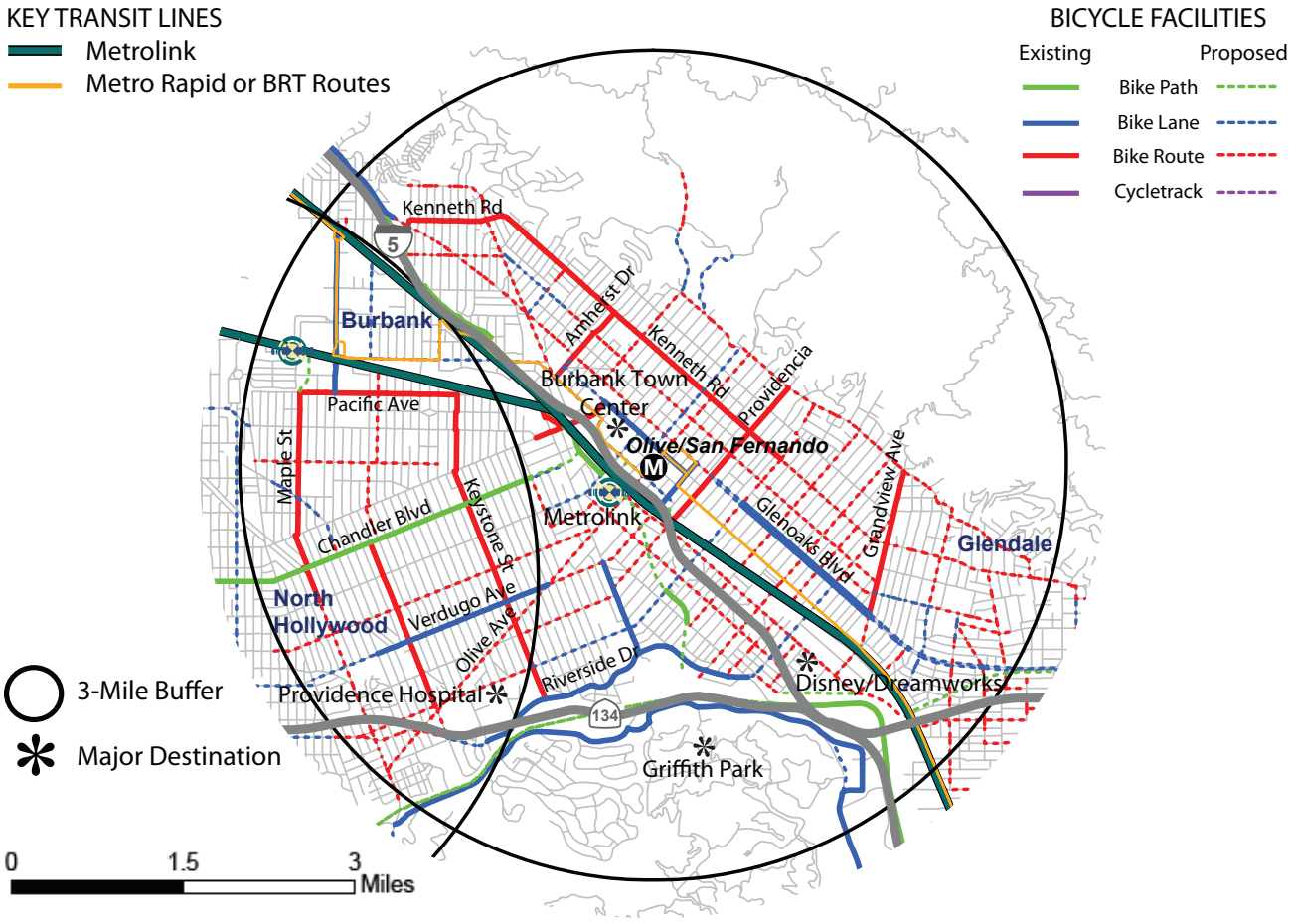


PHOTO DOCUMENTATION

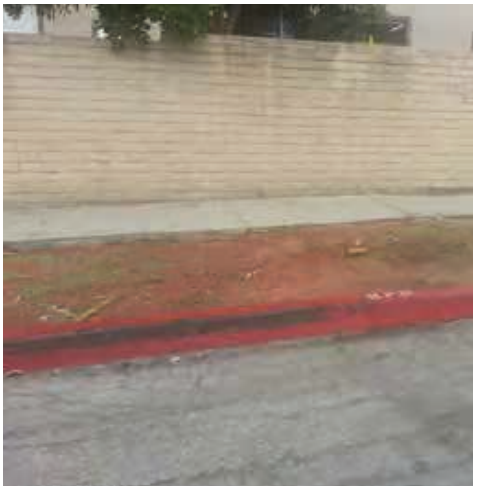
*Photos are keyed to checklist (see Appendix)

SITE 5: Olive Street/San Fernando Bus Line Stop - Line 794

1.1/1.6 No pedestrian lighting adjacent to Metrolink/cut through traffic at unsafe speeds.

1.7 Unclear Safety Signage

1.2/2.1 Vacant lots



2.3 Need for landscaping/maintenance

3.4/3.6 Limited signage and unclear transit transfer

2.5 Unfriendly street conditions for pedestrians

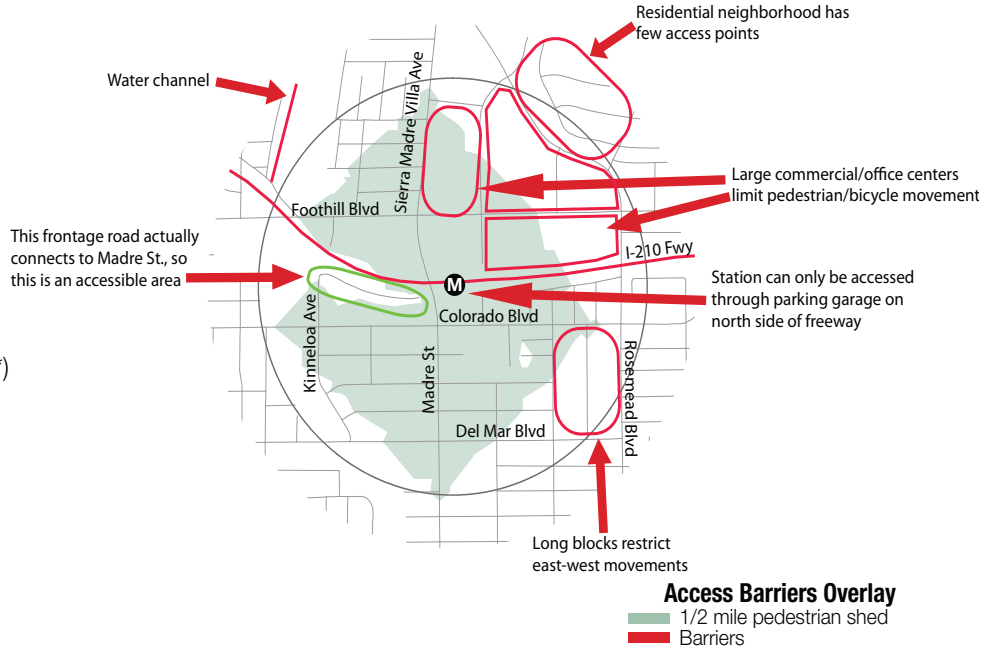
3.1 No connection to downtown Burbank

SITE 6: Sierra Madre Villa Gold Line Station

CSPP Place Type: **Cluster B; Low Residential/Medium Centrality**
City: **Pasadena**
Special Considerations: **MM/T/PnR/FWY/J**

Safety Rating: 2.88/5 (Fair*)
Aesthetics Rating: 2.6/5 (Fair*)
Accessibility Rating: 2.88/5 (Fair*)

*Based on Checklist Rating Matrix



Opportunities Observed at Sierra Madre Villa Station

The Sierra Madre Villa Station is in the freeway median of the I-210 freeway. Opportunities for residents working in concentrated commercial nodes (e.g. Downtown Los Angeles) exist as a visual and logical alternative to vehicular congestion. The station offers a robust park-and-ride structure (958 stalls), and connects to a retail center to the north.

The station currently allows access to and from the northern, commercially dominated landscape, but does not provide connection for residents living to the south of the station. Opportunities to enhance first/last mile ridership include the following: provide a pedestrian bridge that allows access to the station for the adjacent residential community, increase high quality signage to the south of the freeway to highlight the Gold Line station, and enhance active transportation infrastructure to the surrounding residential neighborhood.

Issues Observed at Sierra Madre Villa Station

Safety

- Limited lighting along residential neighborhoods adjacent to the station
- Lack of transparent ground floors or entries
- Limited safety signage (when crossing residential neighborhood to the station)

Aesthetics

- Limited number of shade trees and/or landscaping within the public realm
- Overall lack of pedestrian amenities
- No bus shelters in waiting areas
- Loud freeway noise

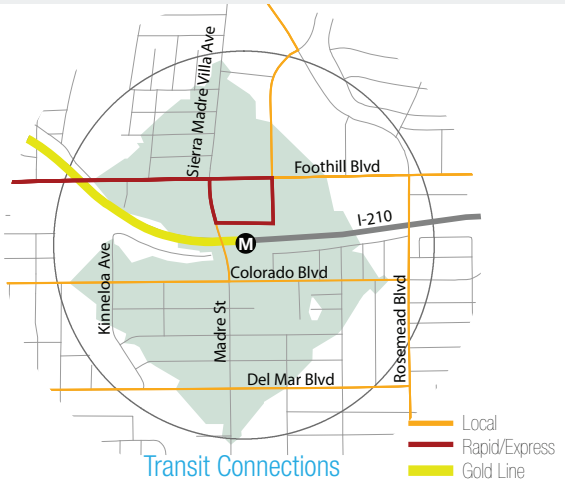
Accessibility

- Access is only located through 4th floor of parking structure, and is not connected to residential community to the south
- Narrow sidewalks, where provided
- Lack of signage for transit mode transfer
- Pathways are unmarked/not intuitive

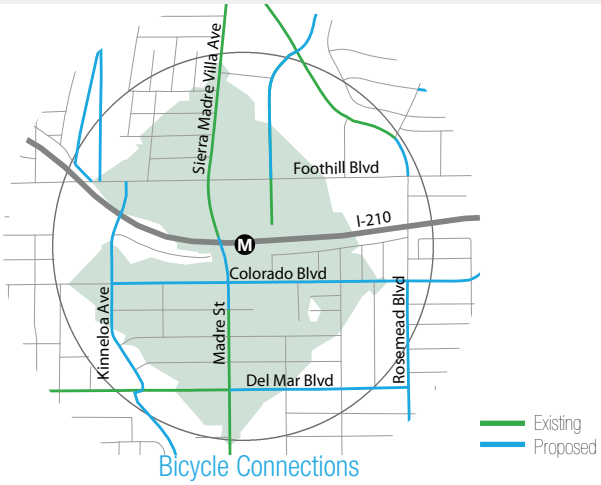
SITE 6: Sierra Madre Villa Gold Line Station

Points of Interest

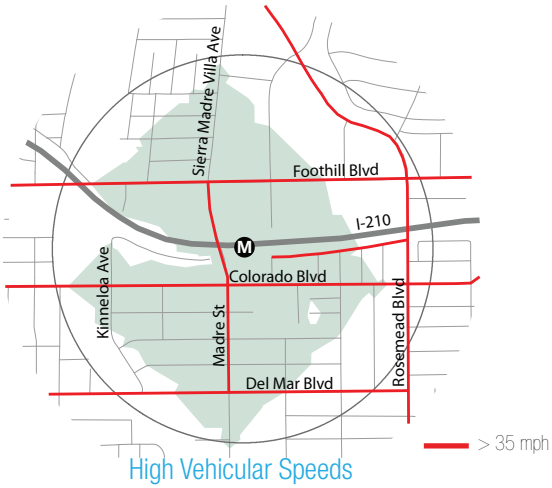
SITE 6: Sierra Madre Villa Gold Line Station



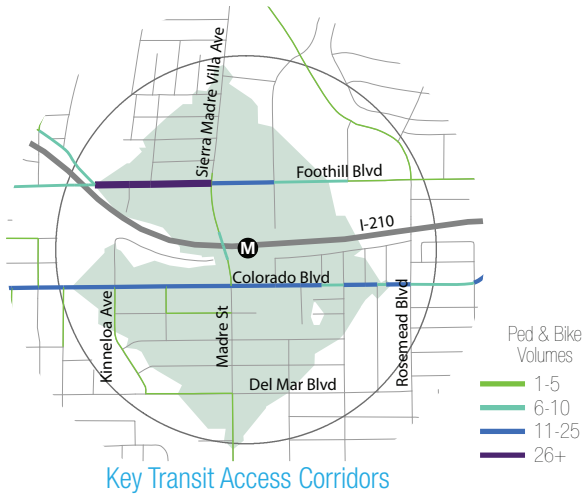
Transit Connections



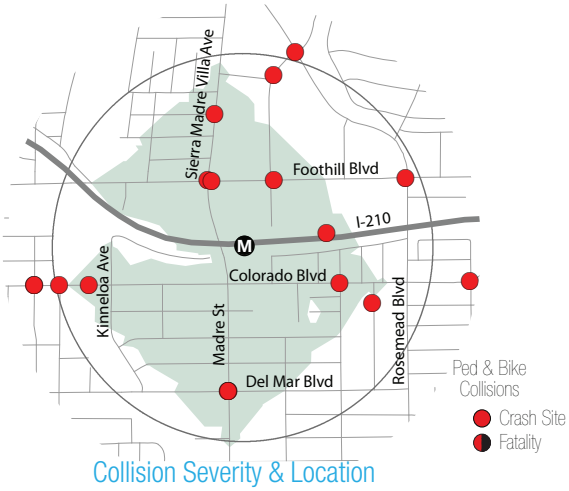
Bicycle Connections



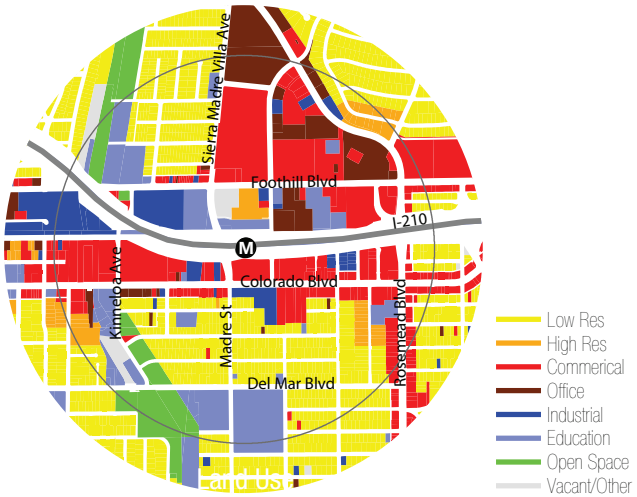
High Vehicular Speeds



Key Transit Access Corridors



Collision Severity & Location



Walk Score: 75 / Overlay Zones: N/A / Density: 3,351 total population/ Employment: 12.61 jobs per acre / Journey to Work: 7.2 take transit/bike/walk to work

SITE 6: Sierra Madre Villa Gold Line Station

LA Metro First-Last Mile Strategic Plan Sierra Madre Villa Gold Line Station
Transit and Bicycle Network

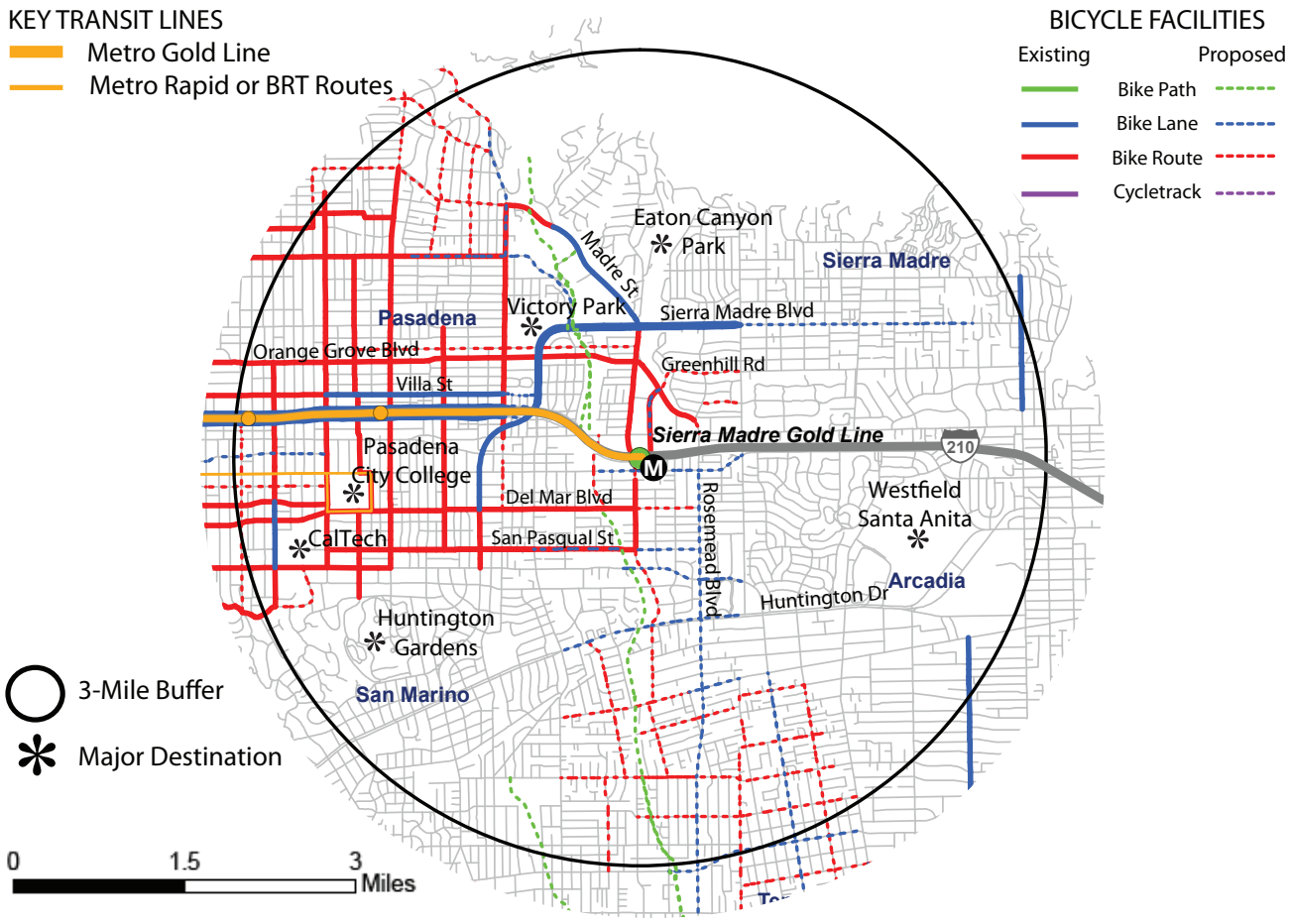


PHOTO DOCUMENTATION

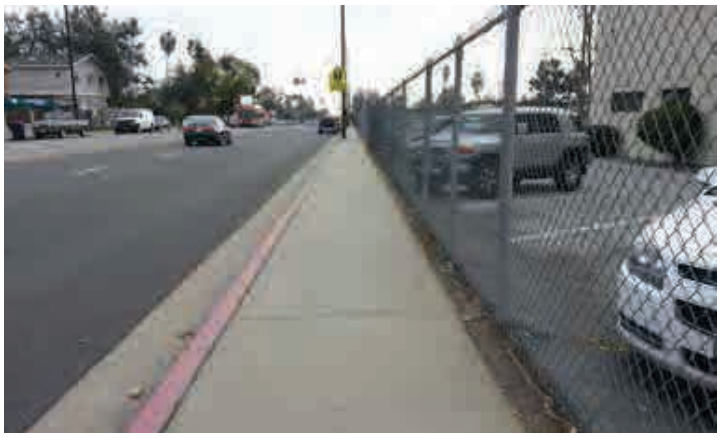
*Photos are keyed to checklist (see Appendix)

SITE 6: Sierra Madre Villa Gold Line Station

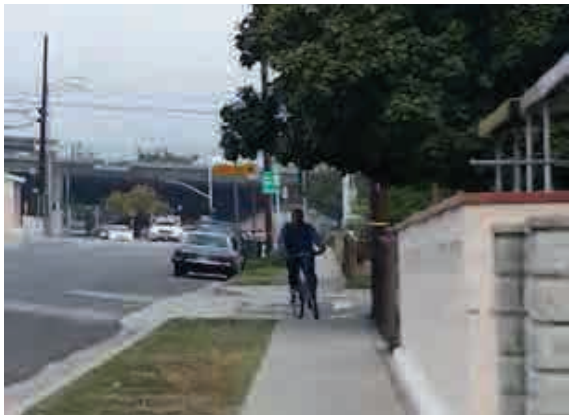
2.3 Need for increased landscaping and/or shade trees

2.4 Lack of bus shelter / pedestrian amenities

2.5 Visual Clutter - not obscured by landscape



3.2 Narrow sidewalks along highly trafficked path



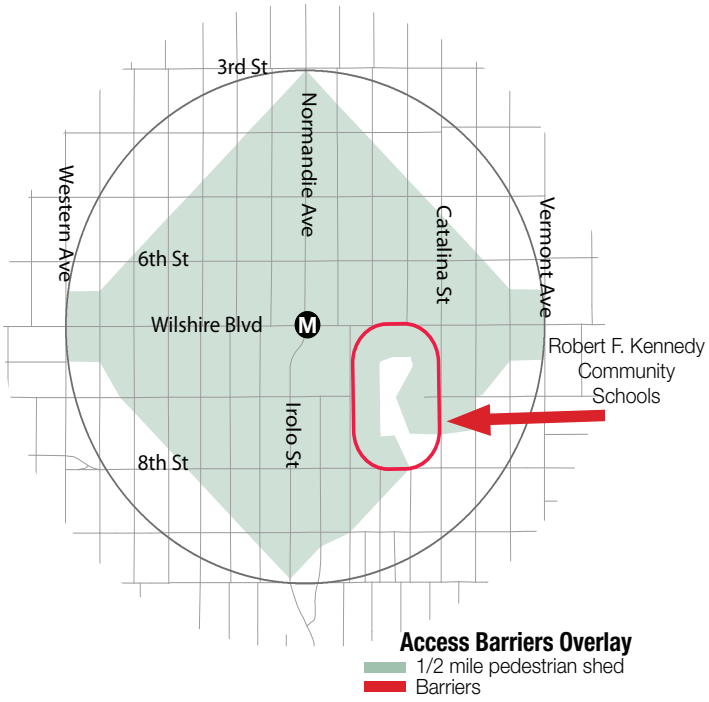
3.5 Need for safe, separated bicycle facilities

SITE 7: Wilshire/Normandie Purple Line Station

CSPP Place Type: **Cluster D; High Residential/High Centrality**
City: **Los Angeles**
Special Considerations: **UG**

Safety Rating: 2.25/5 (Fair*)
Aesthetics Rating: 2.4/5 (Fair*)
Accessibility Rating: 2.57/5 (Fair*)

*Based on Checklist Rating Matrix



Opportunities Observed at Wilshire/Normandie Station

Located along the Wilshire Corridor (a key connector throughout Los Angeles County) the Wilshire Normandie Station is situated in the midst of an active commercial zone and along a regular street grid. Additionally, adjacent to the site are a number of educational facilities, including Robert F. Kennedy Community Schools, a 26-acre facility that hosts six independent public schools. Serving over 4,200 students at this campus alone, the site hosts students of all ages within a 9-block radius.

Wilshire's commercial corridor is surrounded by a dense residential population. Bicycle-friendly streets parallel Wilshire Boulevard, and allow ample room for non-vehicular traffic to the north of the station. Additionally, Metro has proposed a regional Bus Rapid Transit that will run along Wilshire Boulevard, connecting regional and local users to the Wilshire/Normandie Purple Line Station.

Issues Observed at Wilshire/Normandie Station

Safety
- Lack of pedestrian lighting within 1/2 mile radius
- Located along a high-speed corridor

Aesthetics
- No identifying sense of place
- Sparse landscaping along residential connector streets
- Trash strewn along streets/lack of overall maintenance

Accessibility
- Crowded sidewalks
- Long crossing wait time
- Unclear transit transfer / directional signage
- Lack of bicycle lanes - bicyclists riding on crowded streets

SITE 7: Wilshire/Normandie Purple Line Station

Points of Interest

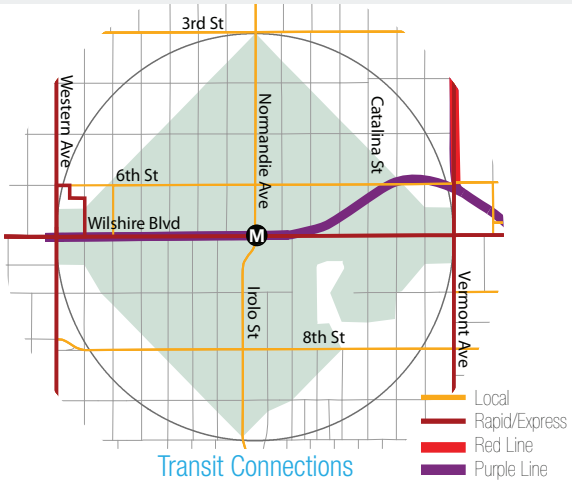
INSTITUTIONS

1. Pio Pico Library
2. LA Housing Department

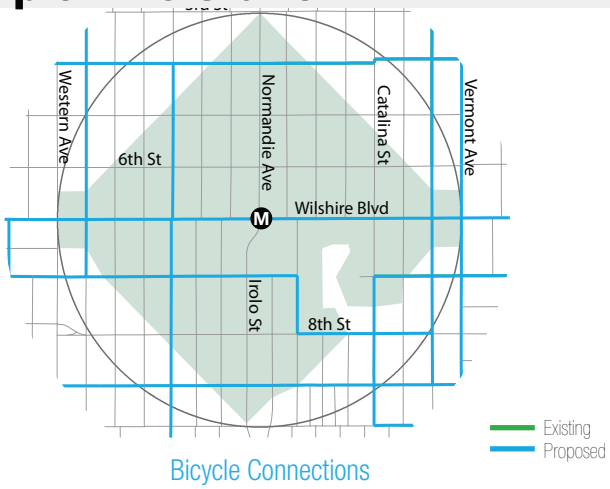
SCHOOLS

3. Bryan College Los Angeles
4. Abraham Lincoln School of Law
5. Everest College
6. LA College of Nursing

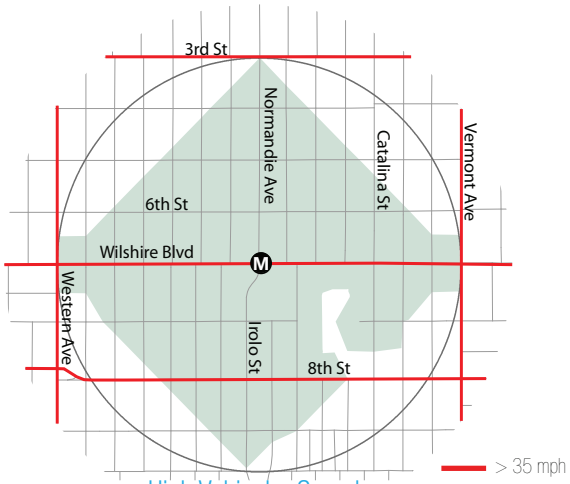
SITE 7: Wilshire/Normandie Purple Line Station



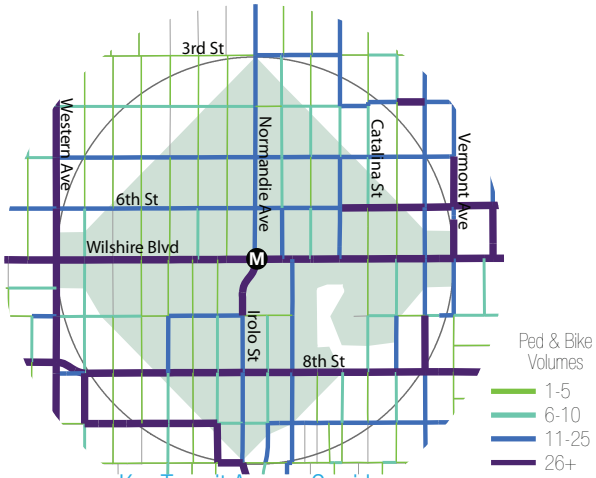
Transit Connections



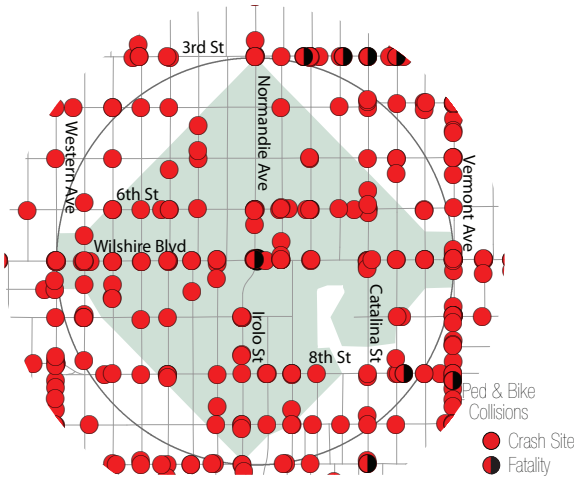
Bicycle Connections



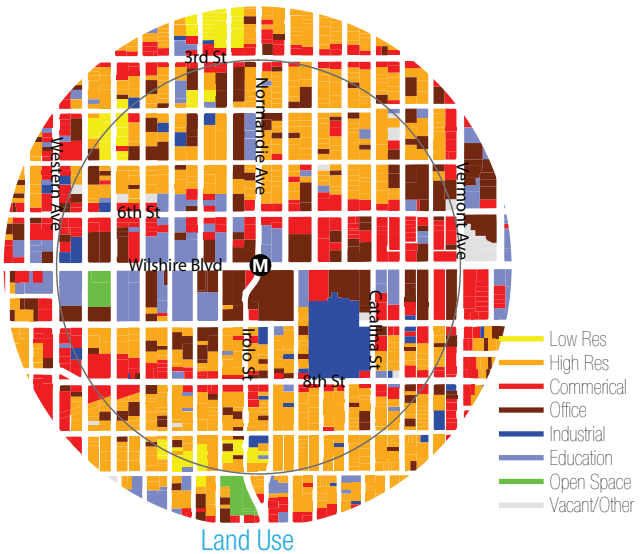
High Vehicular Speeds



Key Transit Access Corridors



Collision Severity & Location



Land Use

Walk Score: 95 / Overlay Zones: N/A / Density: 39,309 total population / Employment: 47.36 jobs per acre / Journey to Work: 36.3% take transit/bike/walk to work

SITE 7: Wilshire/Normandie Purple Line Station

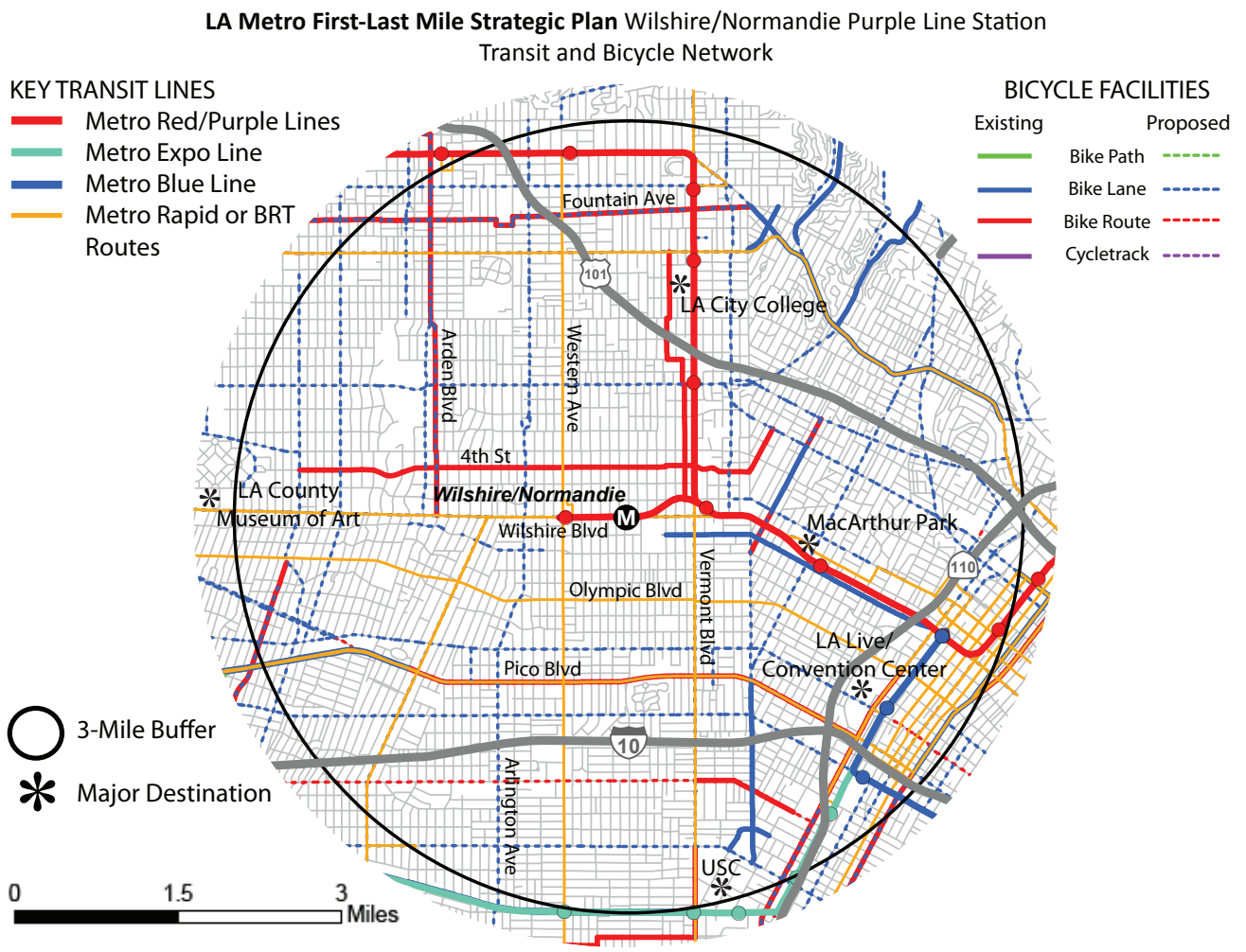


PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 7: Wilshire/Normandie Purple Line Station

1.4 Lack of bicycle facilities (off-street(

1.4 Lack of bicycle facilities (on street)

2.2 Empty tree wells

2.4 Trash strewn along sidewalk

3.5 Unclear signage / grafitti

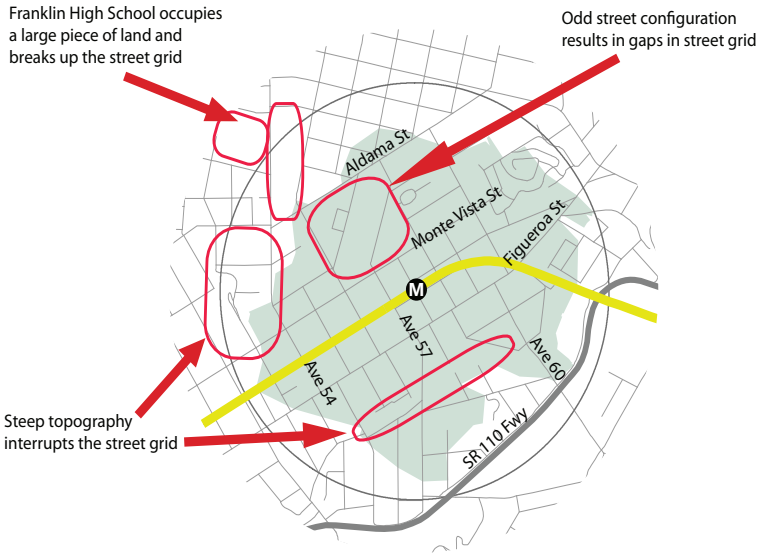
3.8 Fenced wall disconnects linkages to school

SITE 8: Highland Park Gold Line Station

CSPP Place Type: **Cluster C; High Residential/Medium Centrality**
City: **Los Angeles**
Special Considerations: **SL**

Safety Rating: 3.13/5 (Good*)
Aesthetics Rating: 3.6/5 (Good*)
Accessibility Rating: 3.38/5 (Good*)

*Based on Checklist Rating Matrix



Opportunities Observed at Highland Park Gold Line Station

The Highland Park station serves a largely residential community just 7 miles outside of the Downtown Los Angeles, and is connected by the Gold Line to Pasadena. The Highland Park Gold Line Station is neighborhood-scaled, and located off of a heavily trafficked arterial street. With such a large residential population with potential for traffic in both directions, (southwest to Downtown Los Angeles and northeast to Pasadena) first/last mile users would likely travel to both the east and west from the Highland Park station.

Just off of the main arterial, the Highland Park Station is located parallel to a bustling retail corridor, offering visitors with a diverse array of eateries, and local shops to visit.

Issues Observed at Highland Park Gold Line Station

Safety
- Lack of bicycle infrastructure
- High traffic speeds along Figueroa

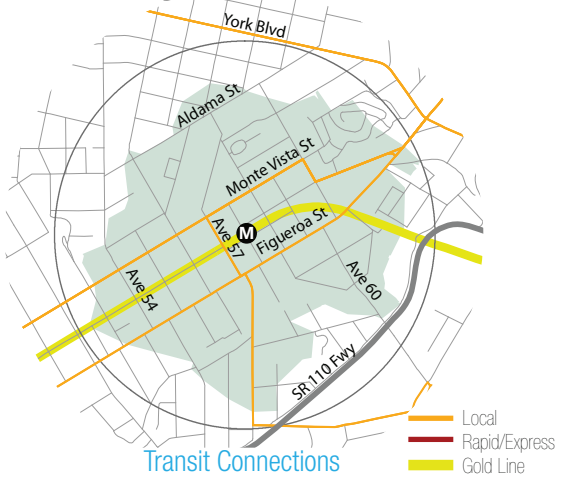
Aesthetics
- No special signage

Accessibility
- Lack of bicycle infrastructure (same as in safety category)
- Limited sidewalk width

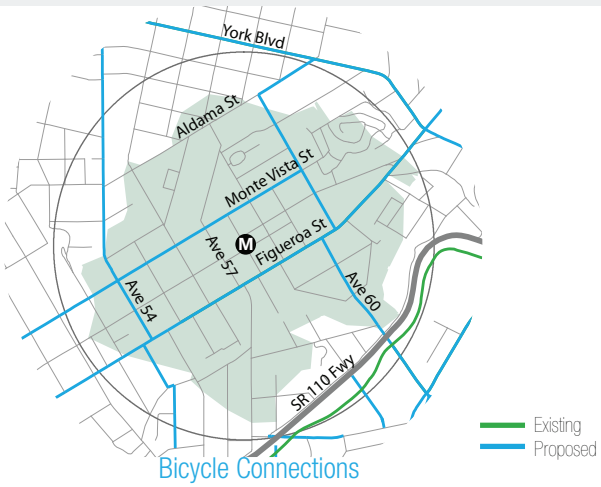
SITE 8: Highland Park Gold Line Station

Points of Interest

SITE 8: Highland Park Gold Line Station



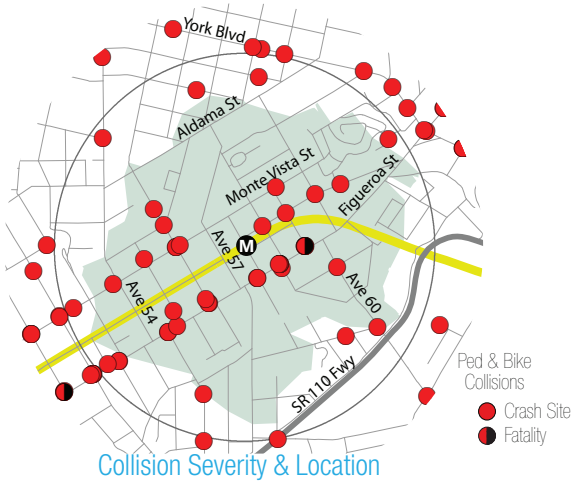
Transit Connections



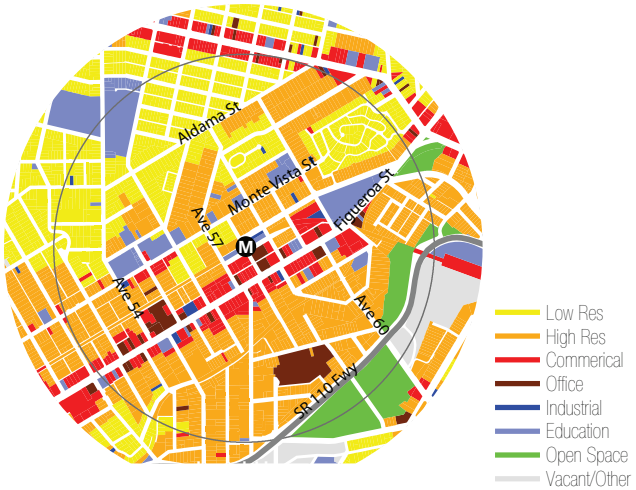
Bicycle Connections

High Vehicular Speeds

Key Transit Access Corridors



Collision Severity & Location



Walk Score: 83 / Overlay Zones: Highland Park-Garvanza Historic Preservation Overlay Zone / Density: 16,311 total population / Employment: 2.84 jobs per acre / Journey to Work: 19.5% take transit/bike/walk to work

SITE 8: Highland Park Gold Line Station

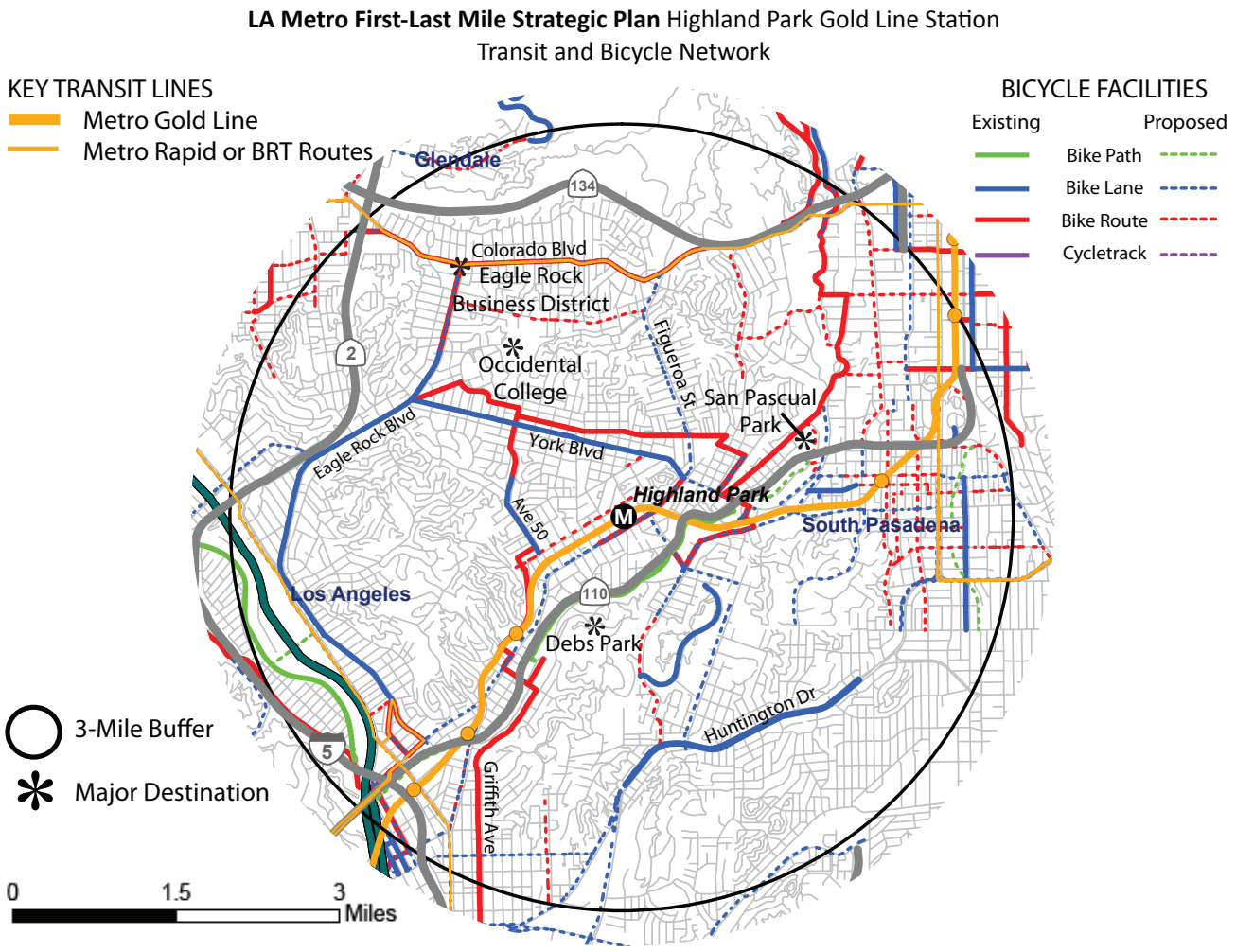


PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 8: Highland Park Gold Line Station

1.2/2.4 Vacant lots / grafitti / no special signage

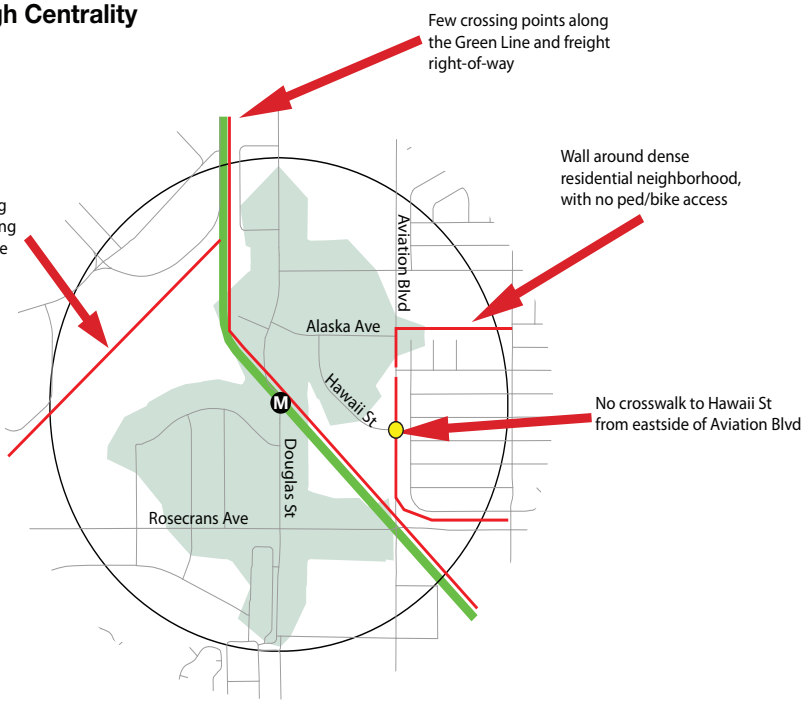
3.1Buckling sidwalks / inadequate sidewalk width

SITE 9: Douglas Green Line Station

CSPP Place Type: **Low Residential/High Centrality**
City: **El Segundo**
Special Considerations: **EL/PnR**

Safety Rating: 1.38/5 (Poor*)
Aesthetics Rating: 1.2/5 (Poor*)
Accessibility Rating: 1.63/5 (Poor*)

*Based on Checklist Rating Matrix



Opportunities Observed at Douglas Green Line Station

Located in an industrial zone, the Douglas Green Line is located in a large employment center. The station itself prominently elevated above vehicular traffic.

The station's physical proximity to Los Angeles International Airport provides a strong potential to connect air travellers Los Angeles County Light Rail network. Future Metro expansions will extend the Green Line directly to the airport. In the meantime, the Douglas station has the opportunity to highlight vistor's initial experience of Los Angeles transit options. With strong connections to the airport and surrounding industrial job centers, the Douglas Station is encapsulated by trip generating activity, and has high potential to increase first/last mile ridership.

Issues Observed at Douglas Green Line Station

Safety
- No pedestrian lighting
- No eyes-on-the-street or transparent walls
- No bicycle infrastructure
- Narrow sidewalks
- Speeding traffic
- Lack of safety signage

Aesthetics
- No sense of place
- Lack of pedestrian amenities
- Vacant lots

Accessibility
- Narrow sidewalks
- Unclear crossings
- Lack of transit transfer signage
- Limited bicycle parking
- Unclear navigation of public realm

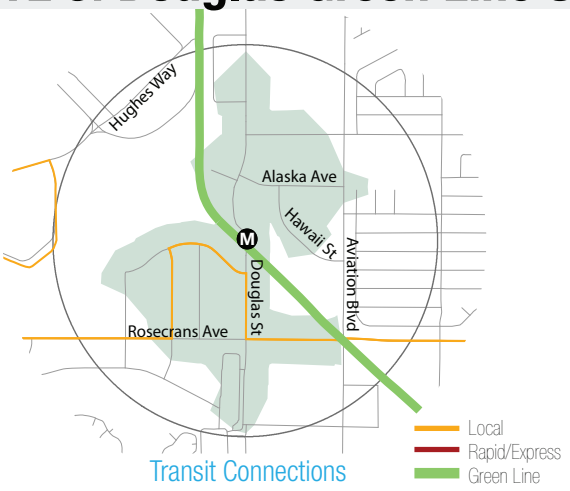
SITE 9: Douglas Green Line Station

Points of Interest

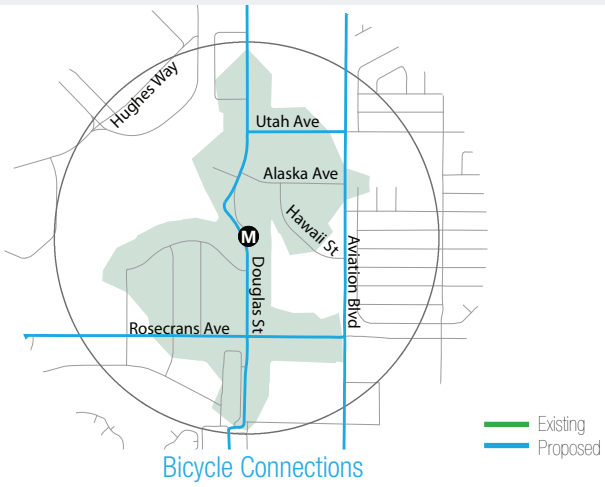
SCHOOLS

- Vistamar School
- Richard Henry Dana Middle School
- Da Vinci Schools
- Peter Burnett Elementary School

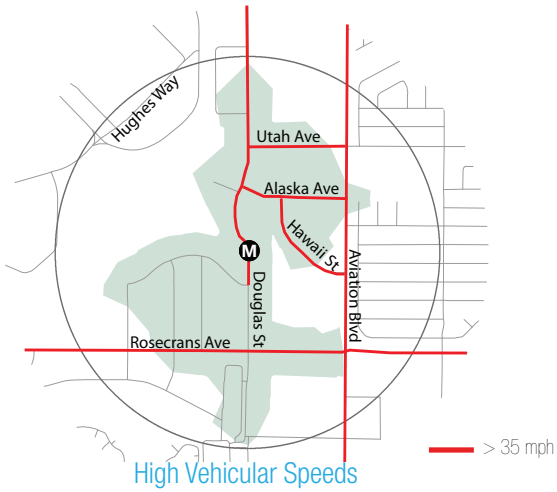
SITE 9: Douglas Green Line Station



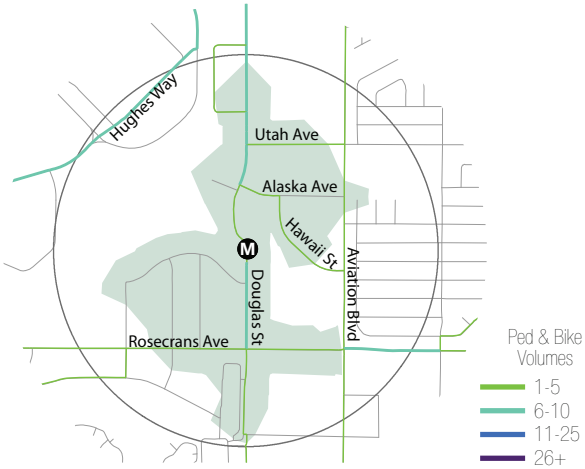
Transit Connections



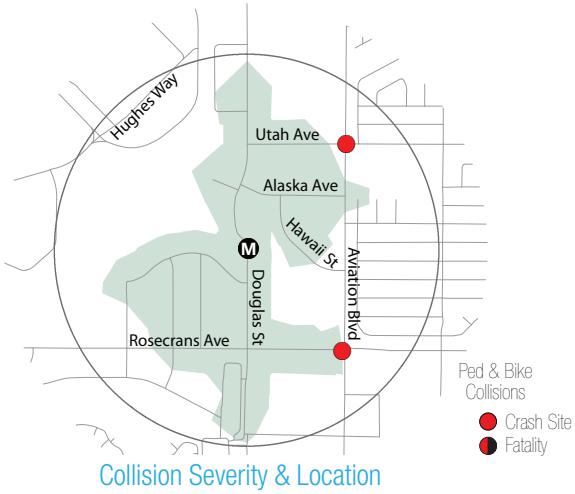
Bicycle Connections



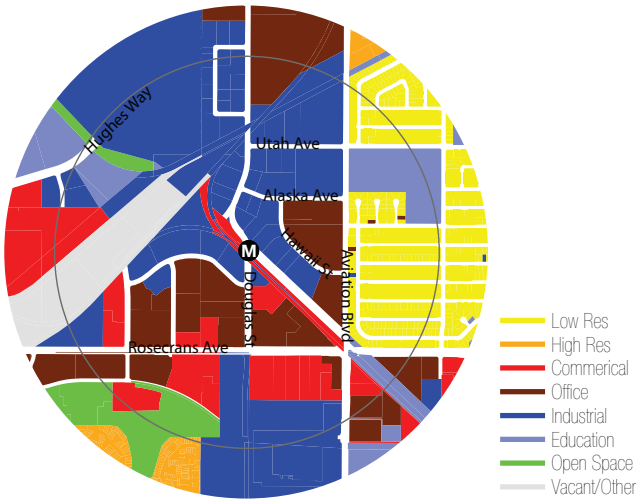
High Vehicular Speeds



Key Transit Access Corridors



Collision Severity & Location



Land Use

Walk Score: 85 / Overlay Zones: N/A / Density: 732 total population / Employment: 21.11 jobs per acre / Journey to Work: 1.2% take transit/bike/walk to work

SITE 9: Douglas Green Line Station

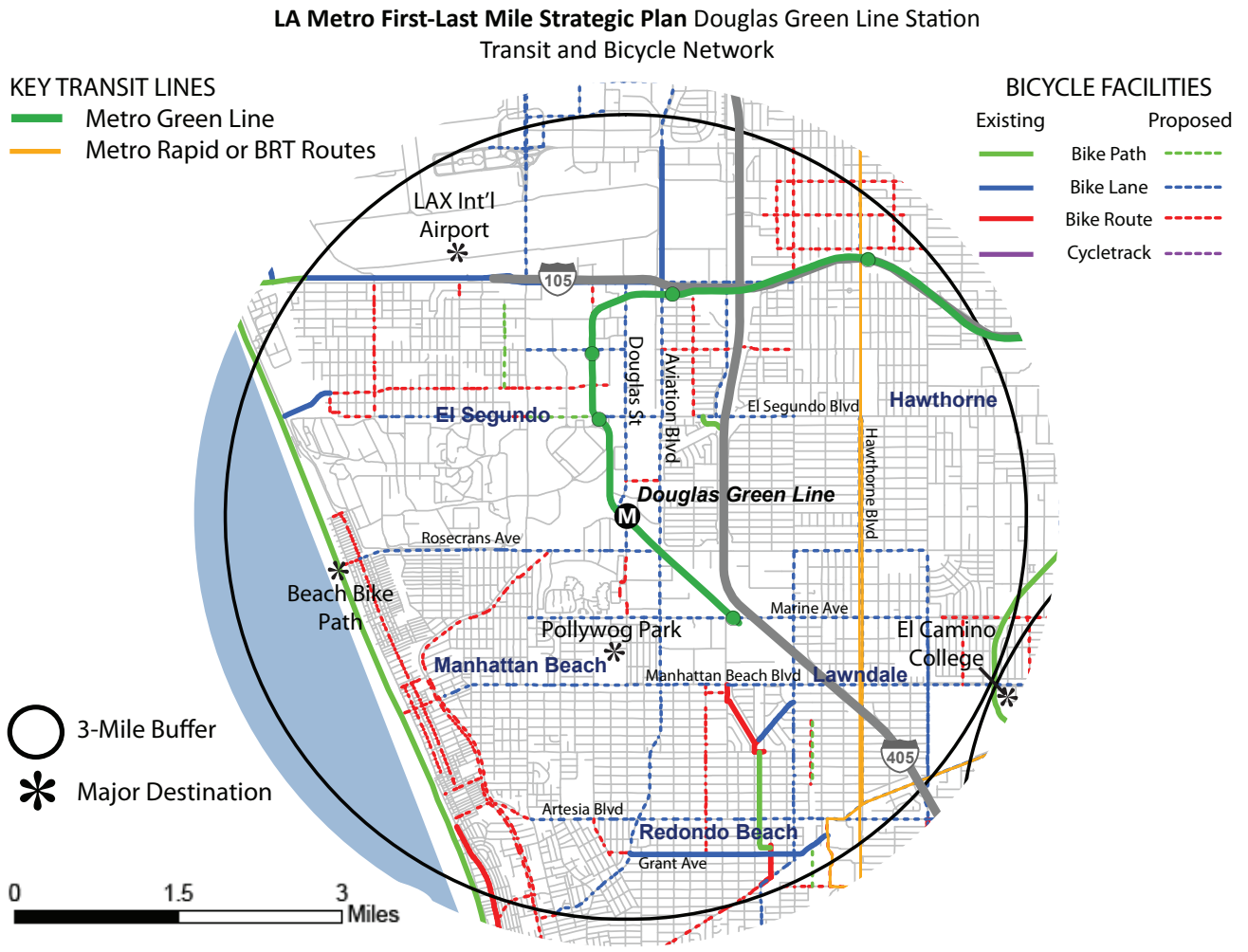
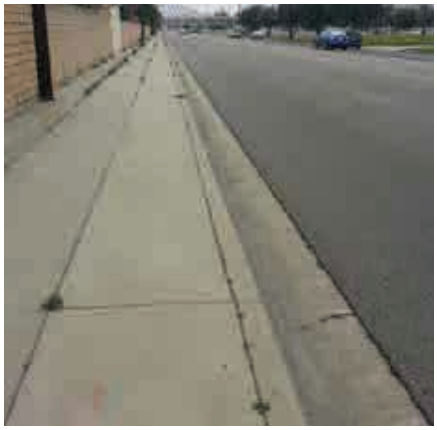


PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 9: Douglas Green Line Station

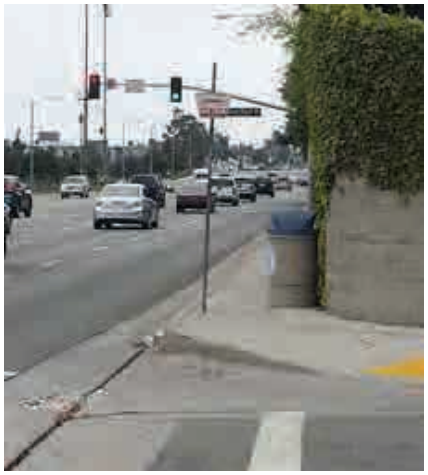


1.1/2.3/3.3 No pedestrian lighting, limited landscaping, limited crossings

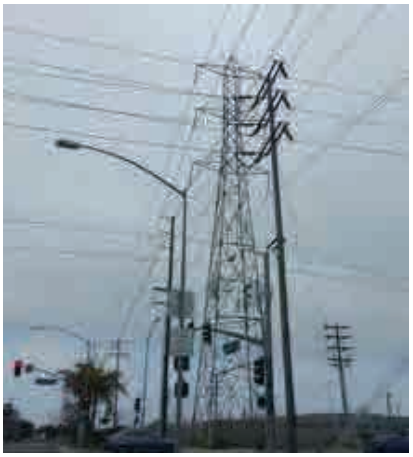
1.6/3.5 No sidewalks / no facilities for bicyclists

2.3 Need for landscaping maintenance

2.1 Unfriendly street conditions



2.4 Pedestrian amenities in the right-of way



2.5 Visual clutter - not obscured by landscape

3.2/3.3 Small sidewalks, and unsafe, speeding traffic

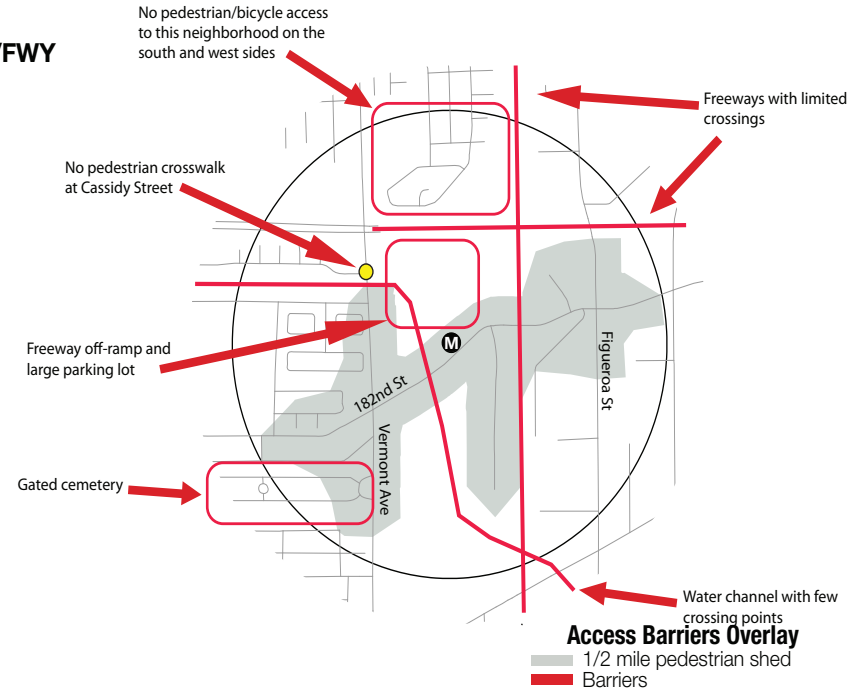
3.1/3.4/3.6 Unclear navigation of station, lack of transit mode transfer signage & unclear safety signage

SITE 10: Harbor Gateway Transit Center (Artesia Transit Center) Silver Line Station

CSPP Place Type: **Cluster C; Medium Residential/High Centrality**
City: **Los Angeles**
Special Considerations: **SL/T/MM/PnR/FWY**

Safety Rating: 1.29/5 (Poor*)
Aesthetics Rating: 1/5 (Poor*)
Accessibility Rating: 2.34/5 (Fair*)

*Based on Checklist Rating Matrix



Opportunities Observed at Harbor GTC

The Harbor Gateway Transit Center is the southern terminus of the Silver Line, and a transfer station for a number of other Metro bus, municipal bus and miscellaneous coach line services. The hub is integrated with a 900+ car park-and-ride lot and bounded on all sides by freeways, drainage infrastructure, and parking lots.

More densely-developed residential areas can be found at the edge of the ½ mile pedestrian shed to the east, and further out to the west. These areas are difficult to walk to due to the hostile design of the associated urban environment. To the west of the station there is a low and dark underpass that would prove intimidating for most pedestrians. To get to the station by foot from the east, one must cross Vermont (heavy traffic, 120' wide crossings) and then proceed down ¼ mile of 182nd Street that is flanked by blank walls and industrial properties, and cross a bridge over a drainage culvert.

Issues Observed at Harbor GTC

Safety

- Unsafe traffic volumes and speeds along Vermont
- Lack of pedestrian design amenities combined with harsh industrial landscape and extensive parking lots contribute to concern for security

Aesthetics

- Station is sparse and devoid of visual interest
- Freeway noise from 110 and 405 significant
- Blocks are long and intimidating, underpasses are dark and foreboding
- Drainage infrastructure attracts large amount of bird activity

Accessibility

- Lack of pedestrian crossings along Vermont.
- Pedestrian link to station from NW is hard to find
- Crossing at Gardena Freeway seems dangerous
- Large block lengths
- Lack of shade trees along sidewalks
- Unclear pathways

SITE 10: Harbor Gateway Transit Center (Artesia Transit Center) Silver Line Station

Points of Interest

SCHOOLS

1. Gardena High School
2. American Institute of Technology

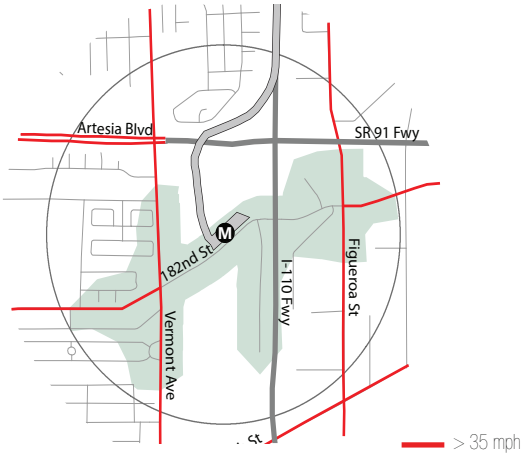
PARKS

3. South Golden Park

SITE 10: Harbor Gateway Transit Center (Artesia Transit Center) Silver Line Station

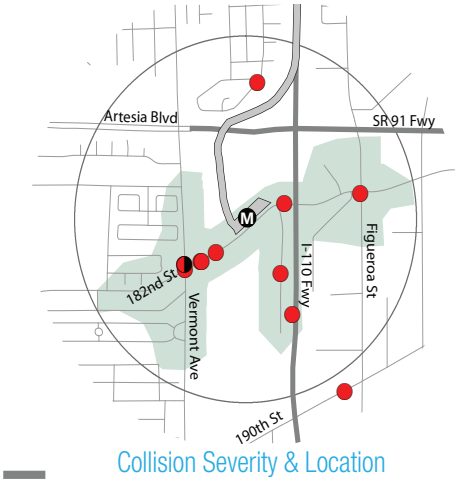
Transit Connections

Bicycle Connections

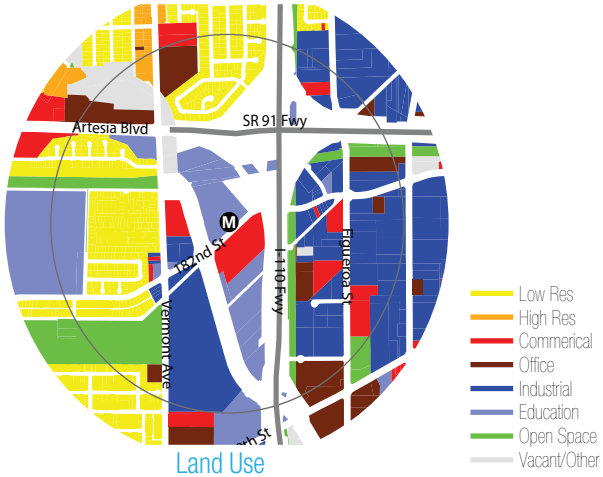


High Vehicular Speeds

Key Transit Access Corridors



Collision Severity & Location



Land Use

Walk Score: 52 / Overlay Zones: N/A / Density: N/A / Employment: N/A / Journey to Work: N/A

SITE 10: Harbor Gateway/Artesia Silver Line Station

LA Metro First-Last Mile Strategic Plan Harbor Gateway/Artesia Silver Line Station
Transit and Bicycle Network

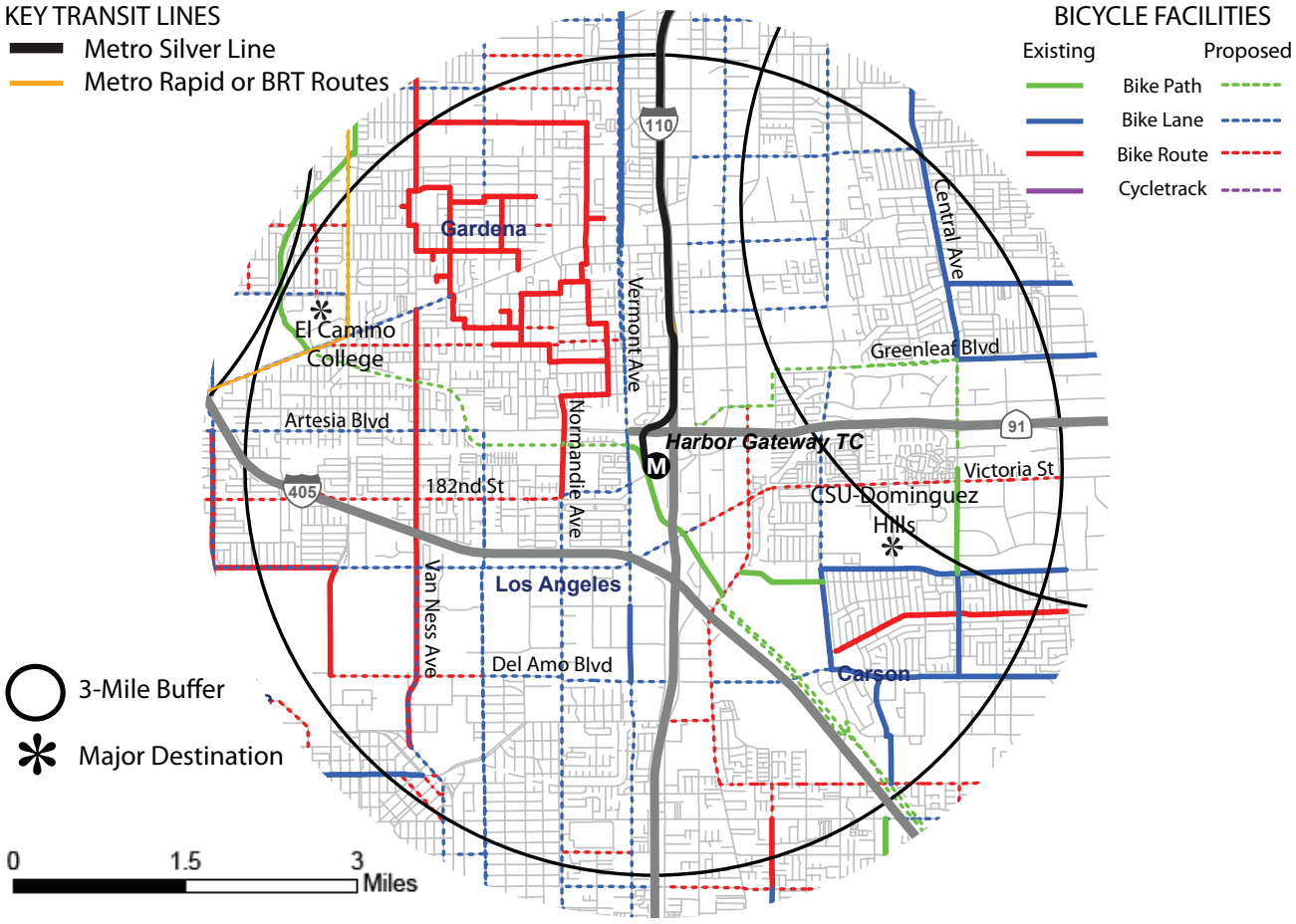


PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 10: Harbor Gateway Transit Center (Artesia Transit Center) Silver Line Station

1.1/1.2/1.8 Unsafe and dark path under on-ramp

1.4/3.4 Unfriendly link to regional bike network

1.8/3.8 Unfriendly pedestrian link to neighborhoods to the north of station

2.4 Garbage strewn along sidewalk

2.5 Problematic drainage infrastructure bordering station

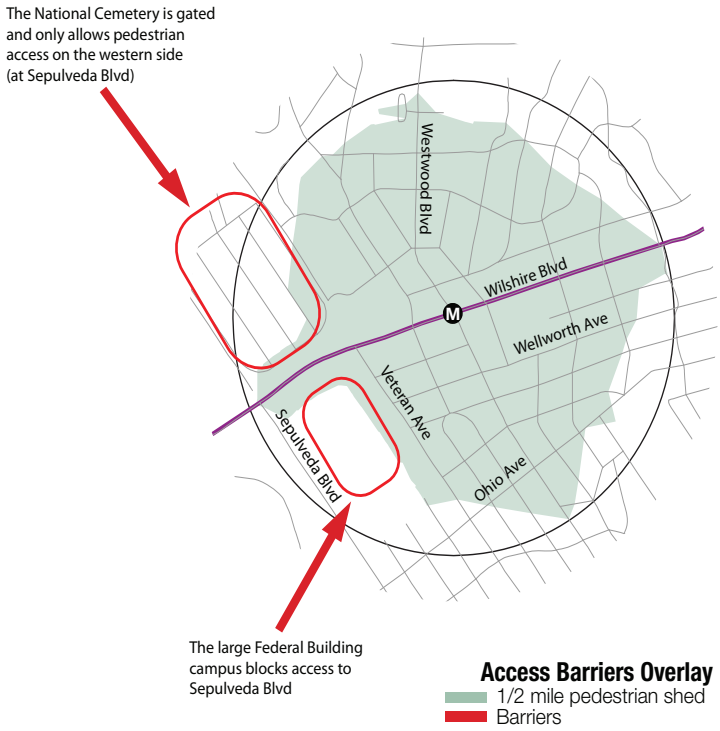
3.5/3.8 Lack of signage and pedestrian pathways to east neighborhoods

SITE 11: Wilshire/Westwood Wilshire LRT

CSPP Place Type: **Cluster C; Medium Residential/Medium Centrality**
City: **Los Angeles**
Special Considerations: **MM/FS/RD/UG&SL**

Safety Rating: 4/5 (Excellent*)
Aesthetics Rating: 4.4/5 (Excellent*)
Accessibility Rating: 3.86/5 (Good*)

*Based on Checklist Rating Matrix



Opportunities Observed at Wilshire/Westwood

Located at the Southern tip of the UCLA campus, the future LRT stop at the Wilshire Westwood station provides a critical connection for students and employees of the University. The Wilshire/Westwood intersection is also located at the center of a highly trafficked retail and commercial zone. Also adjacent to the site is a well-maintained residential community to the east and to the south. As such, there is a strong opportunity to serve this robust population and pull a high number of both incoming and departing users.

Additionally, the Wilshire/Westwood intersection benefits from an active and bustling street life. With numerous multi-modal users, eyes-on-the-street and safety is improved for potential users withinin the 1/2-mile pedestrian shed.

Issues Observed at Wilshire/Westwood

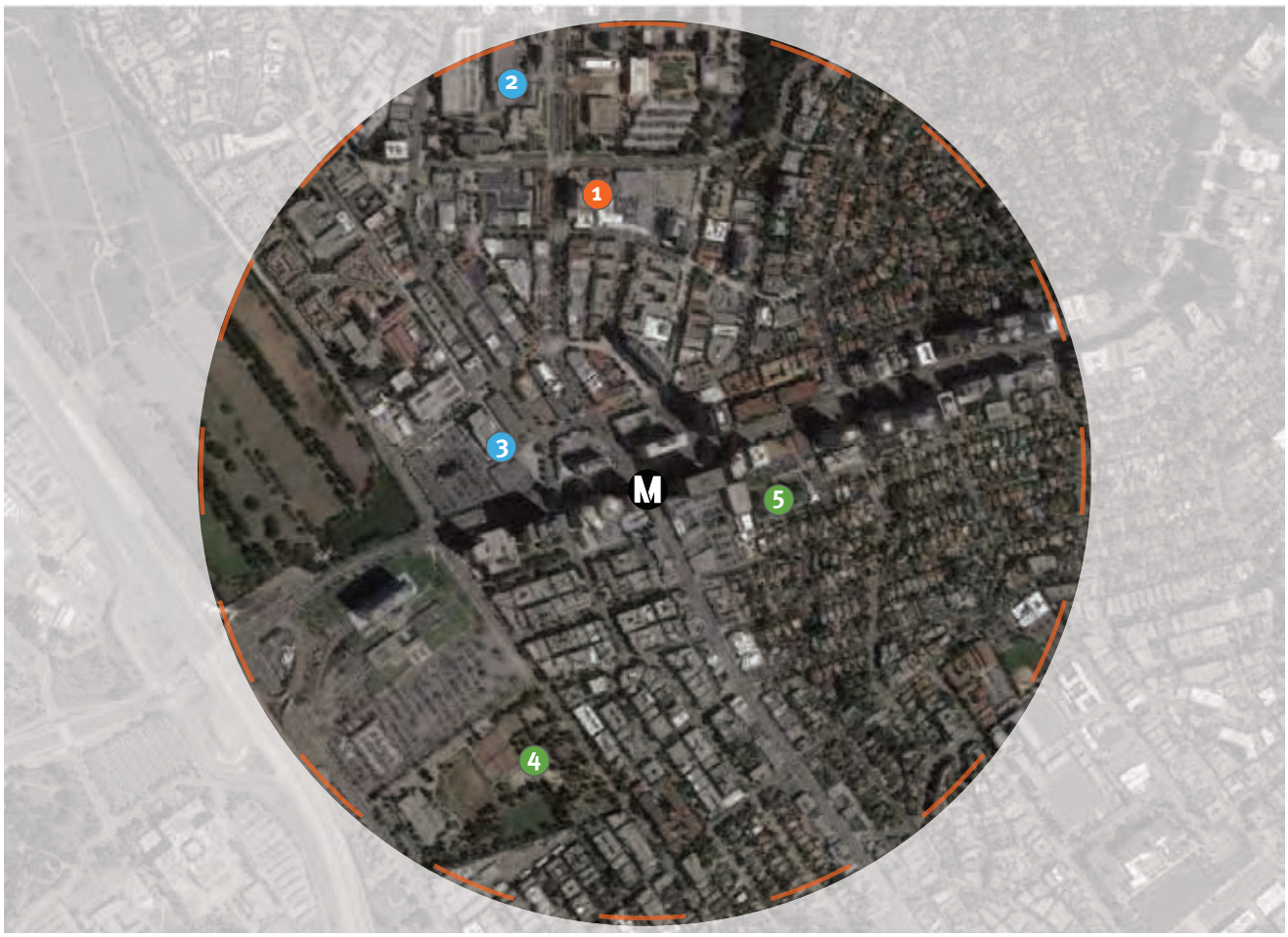
Safety
- Unsafe traffic speeds
- Potential to add more safety signage

Aesthetics
- No issues to report
- Billboards and auto-oriented signage

Accessibility
- Potential to increase transit transfer signage
- Wide streets that are unfriendly to cross
- Lack of directional signage

SITE 11: Wilshire/Westwood Wilshire LRT

Points of Interest



INSTITUTIONS

1. Geffen Playhouse

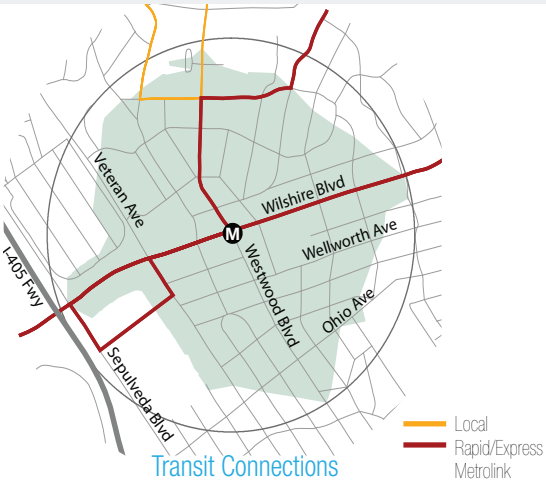
SCHOOLS

2. UCLA
3. Chicago School of Professional Psycology

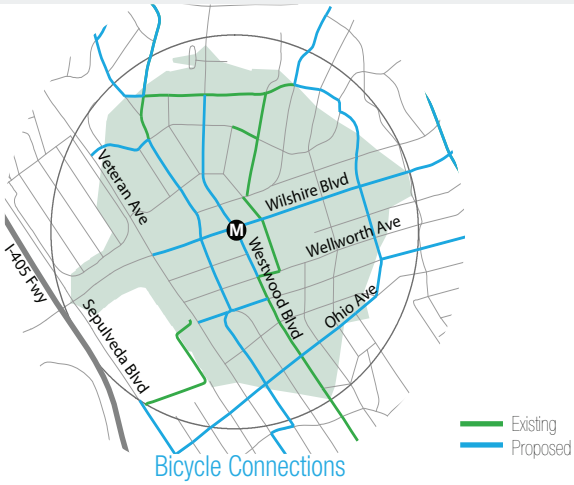
PARKS

4. Veteran Park
5. Westwood Memorial Park

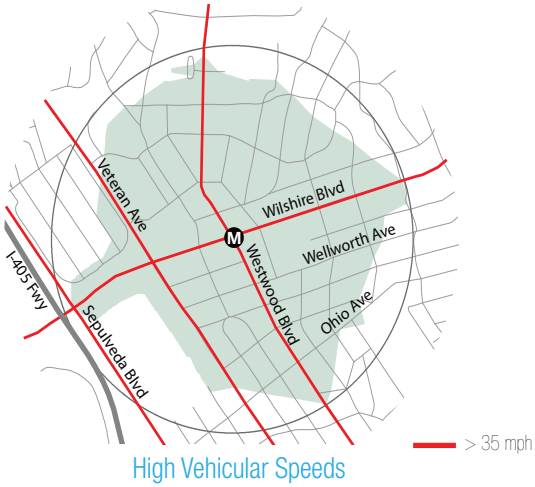
SITE 11: Wilshire/Westwood Wilshire LRT



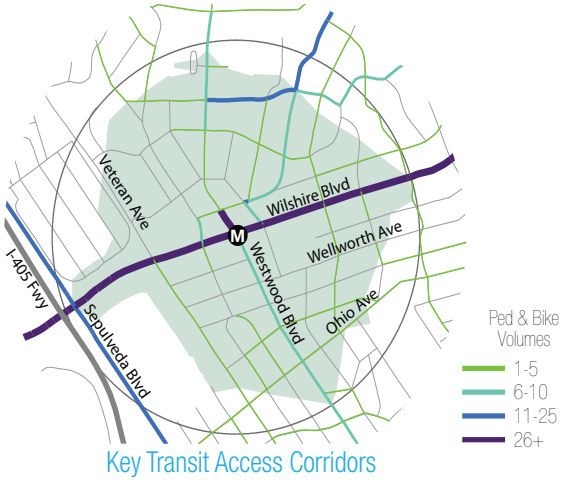
Transit Connections



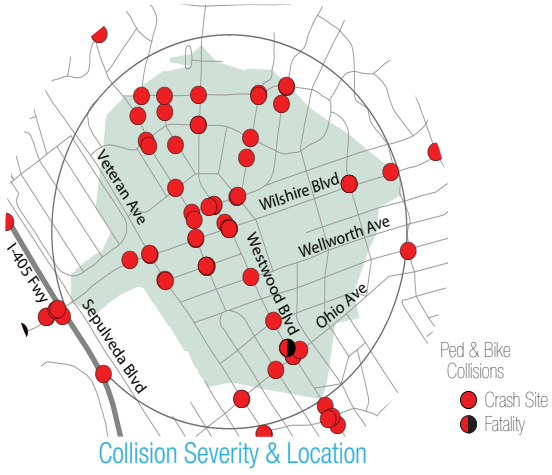
Bicycle Connections



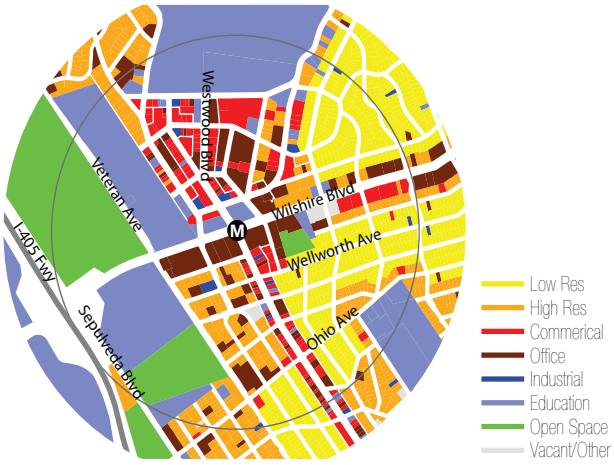
High Vehicular Speeds



Key Transit Access Corridors



Collision Severity & Location



Walk Score: 95 / Overlay Zones: N/A / Density: 11,972 total population / Employment: 94.42 jobs per acre / Journey to Work: 28.5% take transit/bike/walk to work

SITE 11: Wilshire/Westwood Wilshire LRT

LA Metro First-Last Mile Strategic Plan Wilshire/Westwood Purple Line Station (*future*)
Transit and Bicycle Network

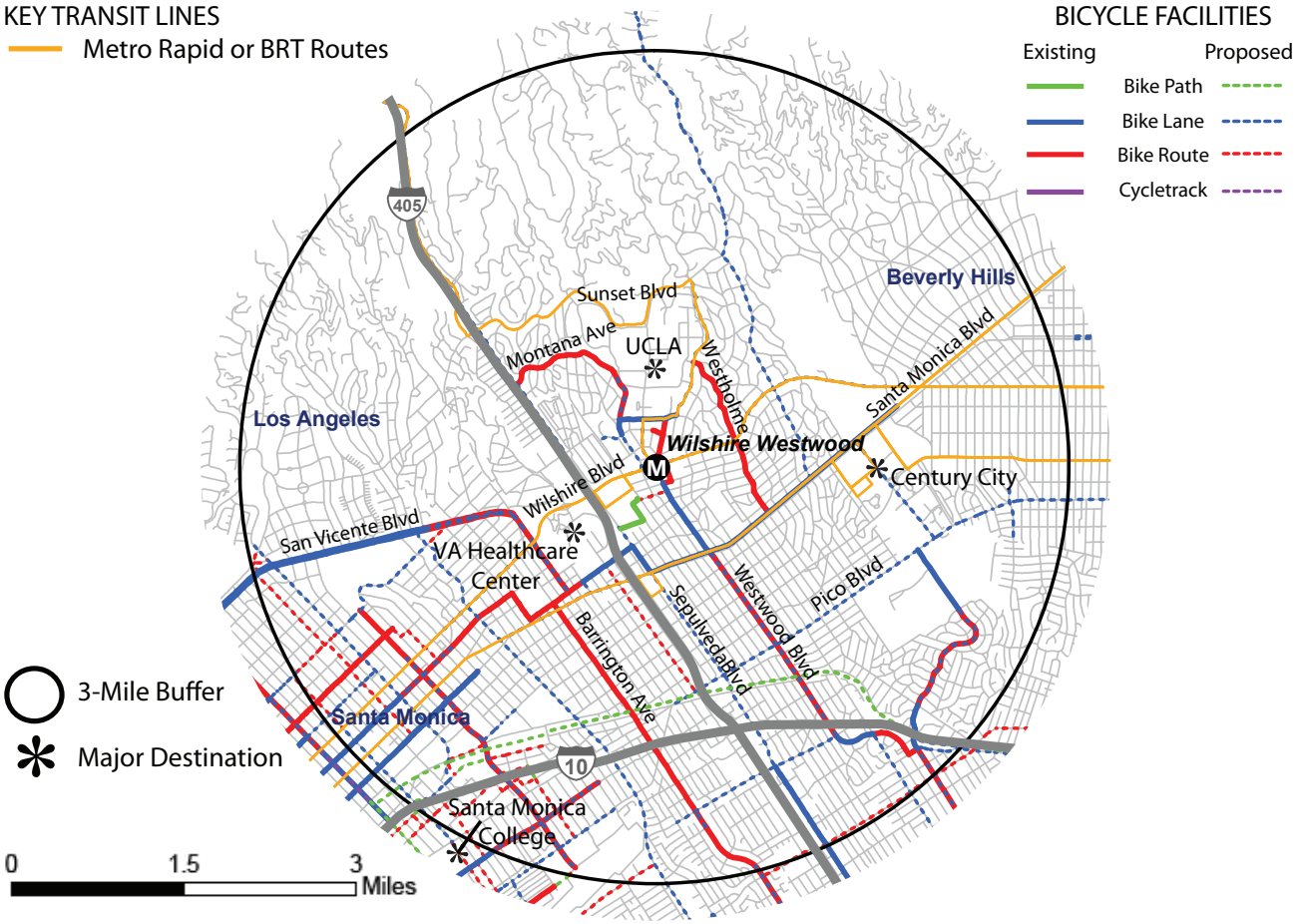


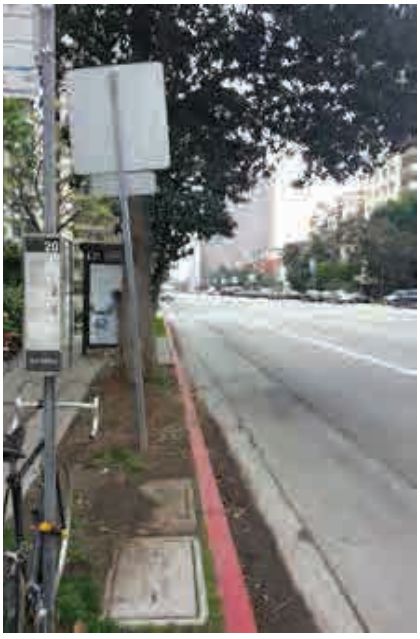
PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 11: Wilshire/Westwood Wilshire LRT

1.6 Speeding traffic

3.2 Broken sidewalks



3.3 Long blocks/limited crossings

3.3 No pedestrian refuge at large crossings

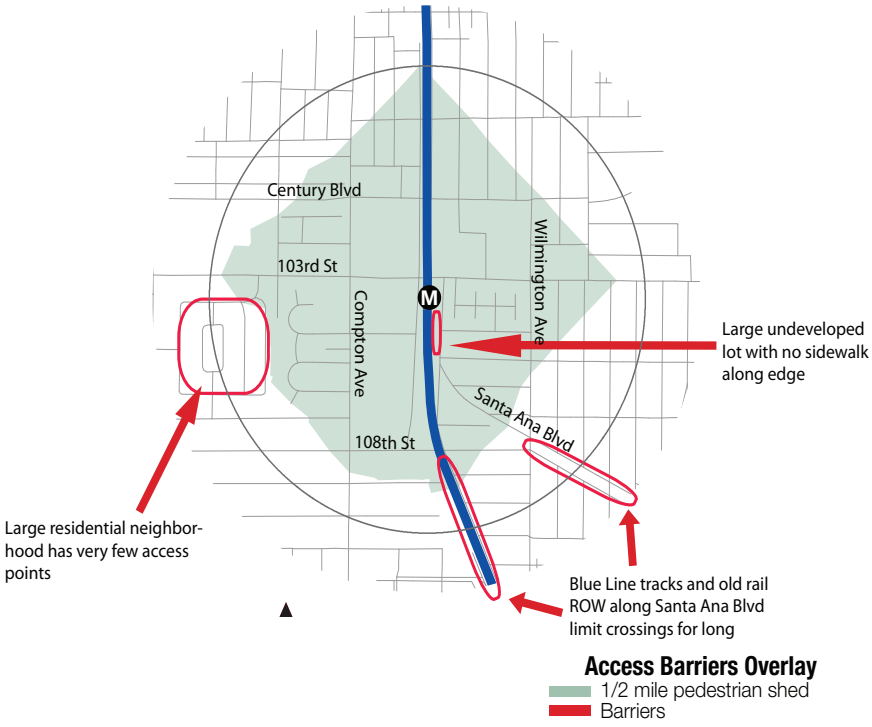
3.5 Need for bike facilities

SITE 12: 103rd/Watts Blue Line Station

CSPP Place Type: **Cluster C; Medium Residential/Medium Centrality**
City: **Los Angeles**
Special Considerations: **SL/PnR**

Safety Rating: 1.38/5 (Poor*)
Aesthetics Rating: 1.2/5 (Poor*)
Accessibility Rating: 1.38/5 (Poor*)

*Based on Checklist Rating Matrix



Opportunities Observed at 103rd/Watts Blue Line Station

The 103rd/Watts station is conveniently located adjacent to a the Watts Towers. The Watts Towers attract approximately 300,000 visitors annually, and are designated as a U.S. National Historic Landmark and a Los Angeles Historic-Cultural monument. The Watts/103rd Station is also surrounded by a large residential population. The station, which directly connects residents in South L.A. to the Downtown 7th/ Metro terminous station, creates potential for first/last commuters originating in Watts.

Issues Observed at 103rd/Watts Blue Line Station

Safety

- Lack of pedestrian lighting
- Lack of eyes-on-the-street and transparent walls
- Buckling sidewalks
- Lack of bicycle infrastructure
- Lack of pedestrian buffer
- Unsafe traffic speeds
- Limited safety signage
- Unsafe station area

Aesthetics

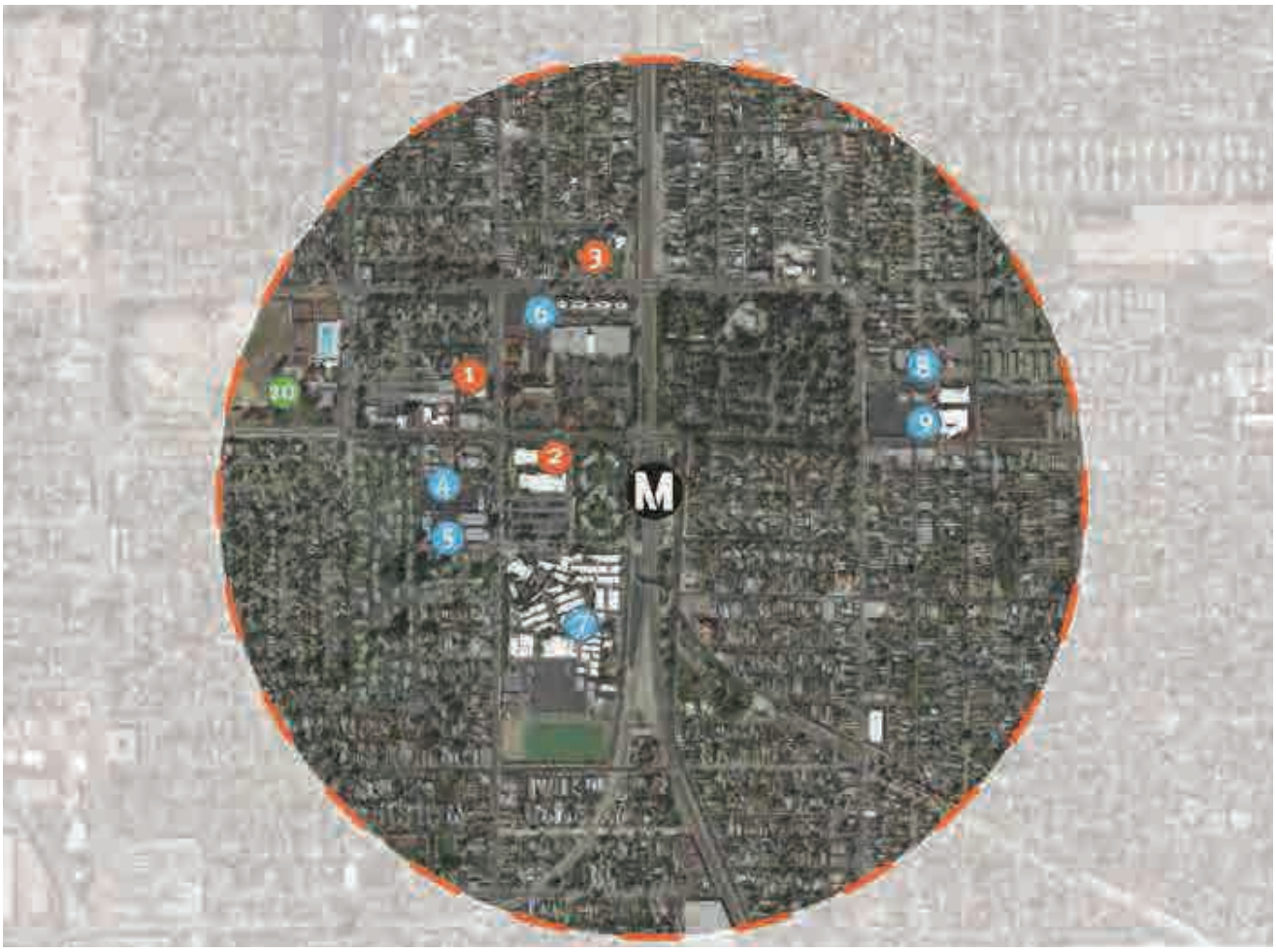
- No sense of place
- Lack of pedestrian amenities
- Lack of maintenance - trash abundant
- Unpleasant walking experience

Accessibility

- Unclear transit mode transfer
- Lack of bicycle facilities
- Limited signage
- Unclear navigation of the public realm

SITE 12: 103rd/Watts Blue Line Station

Points of Interest



INSTITUTIONS

1. Watts Branch Library
2. Watts Health Center
3. Watts Senior Center Rose Garden

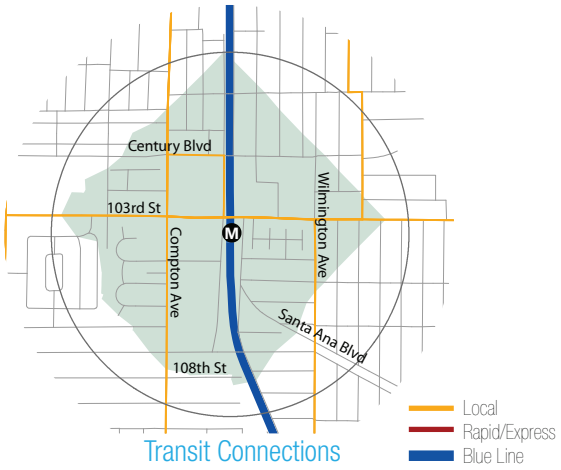
SCHOOLS

4. Thomas Riley School
5. Compton Avenue Elementary
6. St. Lawrence of Brindisi School
7. Markham Middle School
8. 102nd Street Early Education Center
9. Florence Griffith Joyner Elementary

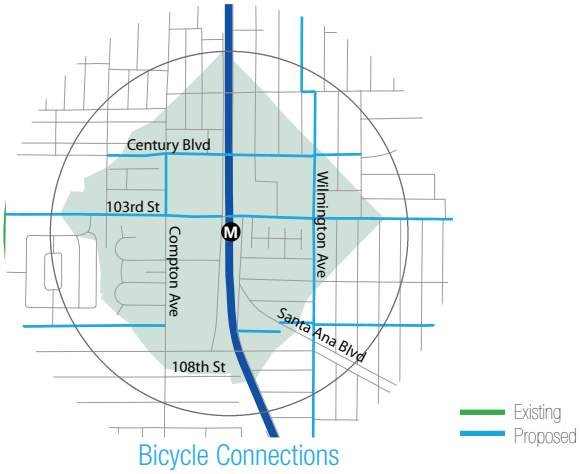
PARKS

10. Will Rogers Memorial Park

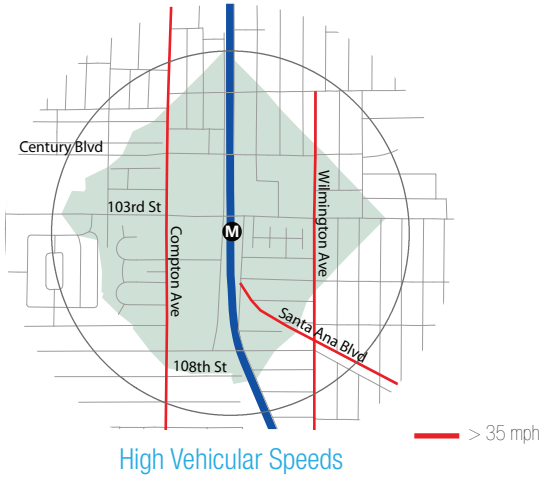
SITE 12: 103rd/Watts Blue Line Station



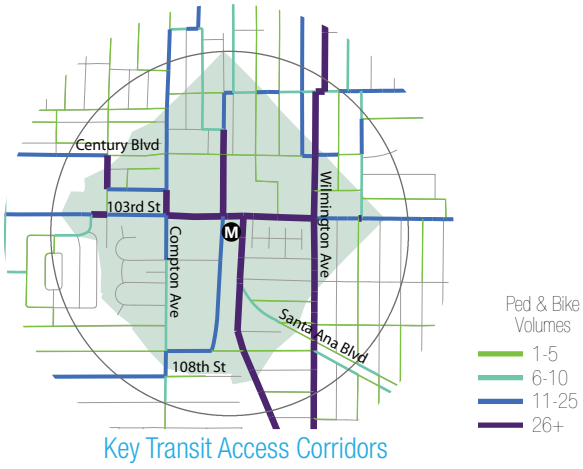
Transit Connections



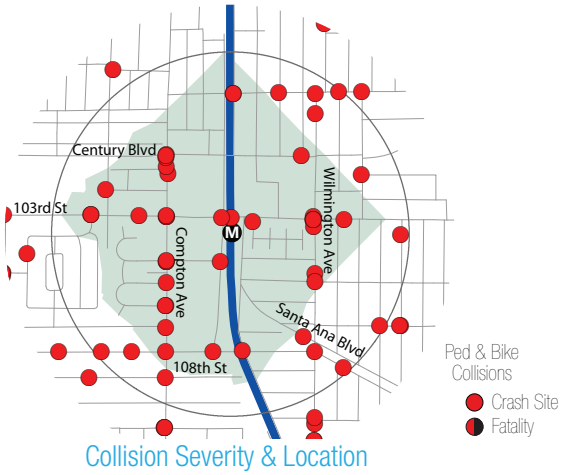
Bicycle Connections



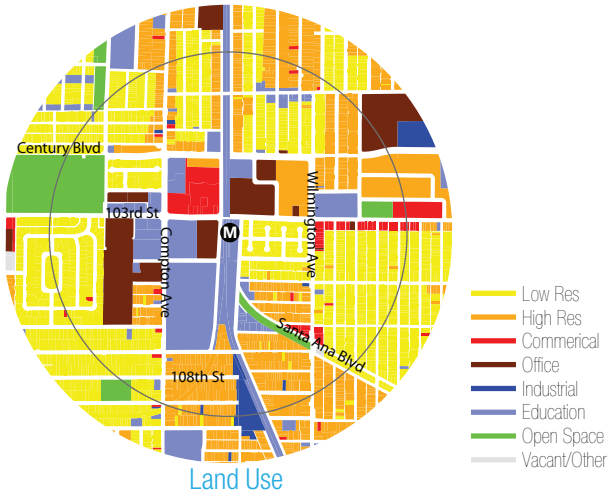
High Vehicular Speeds



Key Transit Access Corridors



Collision Severity & Location



Land Use

Walk Score: 66 / Overlay Zones: N/A / Density: 12,891 total population / Employment: 2.18 jobs per acre / Journey to Work: 8.2% take transit/bike/walk to work

SITE 12: Compton Blue Line Station

LA Metro First-Last Mile Strategic Plan Compton Blue Line Station
Transit and Bicycle Network

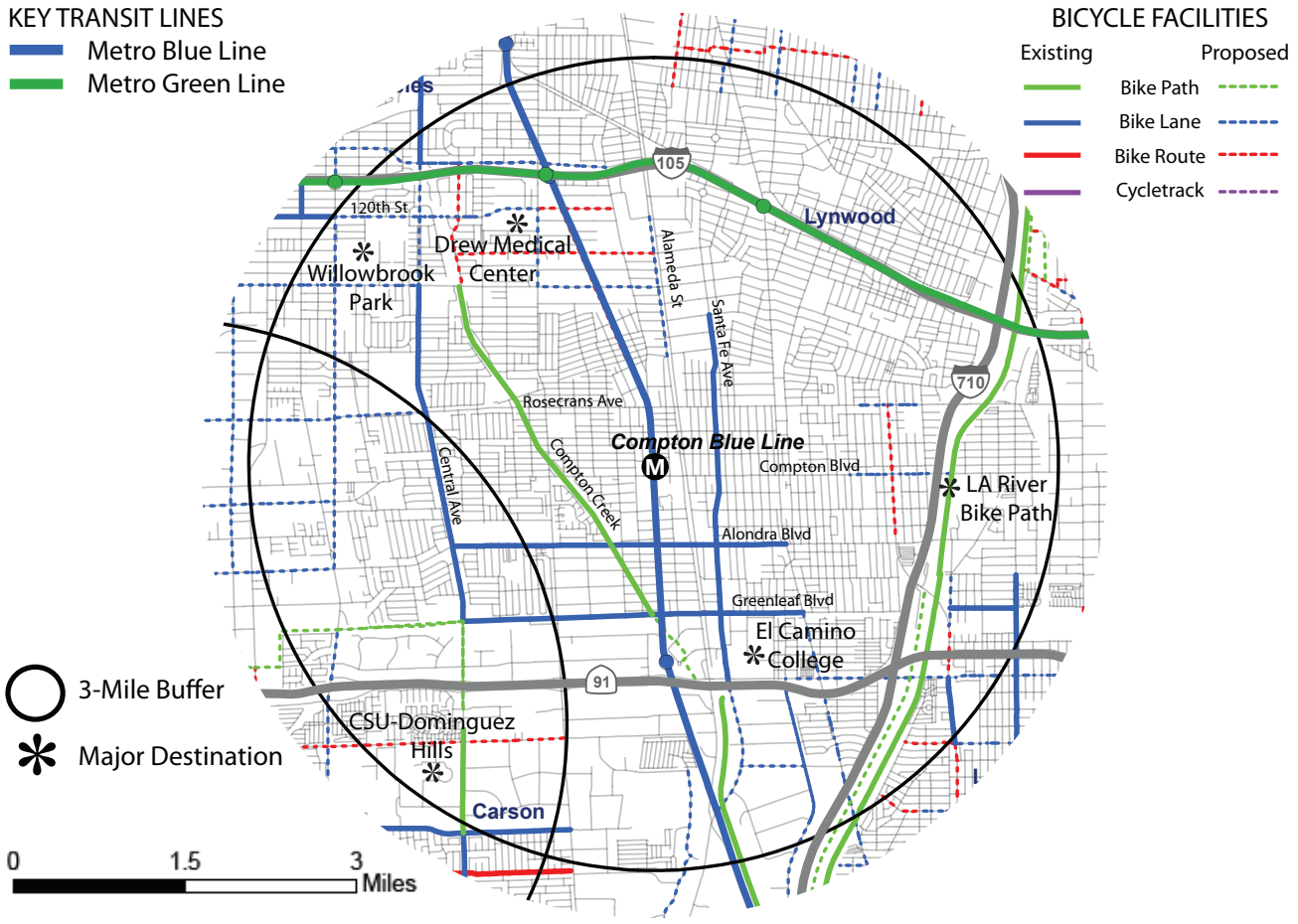


PHOTO DOCUMENTATION

*Photos are keyed to checklist (see Appendix)

SITE 12: 103rd/Watts Blue Line Station

1.6 Unsafe Traffic Speeds

1.8 Area surrounding station does not feel safe

1.8 Park-and-ride lot surrounding station is underutilized

2.4 Large fences create safety concern

2.4 Lack of maintenance

3.1 Utility obstructions in sidewalk right-of-way

FIRST LAST MILE
STRATEGIC PLAN

Appendix

STATION AREA CHECKLIST

For each of the quality criteria, rank the station area based on how adequately or poorly it provides amenities, connections, and a transit-supportive environment for riders.

» Multiple modes
» Multiple constituencies (gender, age, abilities, etc.)

Name of station: _____
Date/Time/Weather conditions during visit: _____
Station Typology: _____

1. SAFETY

	Disagree/ Lacking		Somewhat/ Adequate		Strongly Agree/Ample
1.1 Adequate lighting. (Night survey required) Regularly spaced and frequent lighting that is directed towards the sidewalk and any bikeways, which provides sufficient illumination. Potential obstacles marked with reflectors or lighting.	1	2	3	4	5
1.2 Eyes-on-the-street. Presence of highly transparent ground-floors, windows, and entries.	1	2	3	4	5
1.3 Well maintained public realm. Sidewalks are smooth and without cracks, vegetation is trimmed, etc.	1	2	3	4	5
1.4 Safety buffer for bikes. Bikes are adequately set back from vehicles. Consider type and quality of buffer -- sufficient width, painted material, vertical separation, such as bollards.	1	2	3	4	5
1.5 Safety buffer for pedestrians. Pedestrians set back from travel lanes via ample sidewalk width, landscaping, and street furniture.	1	2	3	4	5
1.6 People-friendly traffic speeds and manners. Drivers yield to pedestrians and traffic is slowed via narrow roadways, markings, no turn on red lights, etc.	1	2	3	4	5
1.7 Clear safety signage. Signage is clear, legible, and well maintained. Signs promote traffic safety and streamline navigation of the public realm.	1	2	3	4	5
1.8 Overall, the station area feels safe. Overall, there is a feeling of safety as you walk through the station area. Consider the safety of all users -- especially **women, children, and the elderly**. Consider both day and nighttime safety.	1	2	3	4	5

TOTAL SCORE

_____ (sum of answers)
÷
____ (# of questions answered)
=
_____
(Average score on safety)

STATION AREA CHECKLIST

For each of the quality criteria, rank the station area based on how adequately or poorly it provides amenities, connections, and a transit-supportive environment for riders.

» Multiple modes
» Multiple constituencies (gender, age, abilities, etc.)

2. AESTHETICS

	Disagree/ Lacking		Somewhat/ Adequate		Strongly Agree/Ample
2.1 Sense of place. Inclusion of unique street characteristic, landmarks, striping or a navigable streetscape hierarchy that sets this space apart from other areas.	1	2	3	4	5
2.2 Pleasant landscaping. Consistent landscaping that provides ample shade. Trees are well maintained and all tree wells are planted with street trees.	1	2	3	4	5
2.3 Strategically placed pedestrian amenities. There are a variety and sufficiently provided pedestrian amenities (seating, trash cans, water fountains) that are well maintained and inviting. Kiosks and vendors are present on pedestrian paths, are visually pleasing and are located in areas that do not interfere with foot traffic.	1	2	3	4	5
2.4 Pedestrian unfriendly elements are limited. There are a general lack of the following: unpleasant smells, blank walls, vacant lots, fences, noise pollution, unfriendly street conditions, trash.	1	2	3	4	5
2.5 Pleasant experience. Overall, there is a pleasant ambiance as you walk, bike, or use alternative transit throughout the station area. Consider the experience of all users – especially **women, children, and the elderly**. Consider both day and nighttime amenities. Care has been taken to make a nice environment for all users.	1	2	3	4	5

TOTAL SCORE

_____ (sum of answers)
÷
_____ (# of questions answered)
=
_____
(Average score on aesthetics)

STATION AREA CHECKLIST

For each of the quality criteria, rank the station area based on how adequately or poorly it provides amenities, connections, and a transit-supportive environment for riders.

» Multiple modes
» Multiple constituencies (gender, age, abilities, etc.)

3. ACCESSIBILITY

Disagree/Lacking — Somewhat/Adequate — Strongly Agree/Ample

3.1 High quality sidewalks

Sidewalks are large enough for pedestrians to walk, pass, and jog comfortably in opposing directions. There are very few disruptions to the sidewalk quality (e.g. smooth surface paving, signage and poles are set back from the pedestrian right-of-way).

1 2 3 4 5

3.2 Clear, safe crossings.

Signalized intersections allow ample time to cross, frequently allow passage, are a walkable distance (or provide a pedestrian refuge or median), are supplied with functioning push buttons, have minimal street crowns and are painted for safety.

1 2 3 4 5

3.3 Seamless transit mode transfer.

Transferring to alternate modes of transit is streamlined through the presence of well-marked, nearby, and obvious pathways.

1 2 3 4 5

3.4 Operating and sufficient bicycle facilities.

Bicycle facilities allow sufficient room, have a smooth surface, and provide riders with bike lanes, routes, pathways, adequate marking, parking, separated push buttons, bike staions and bike boxes.

1 2 3 4 5

3.5 High quality signage.

Signage is located in clear view for pedestrians, bicyclists, and other transit modes. Signage provides clear directional and locational information, regulatory warnings, and station area identity.

1 2 3 4 5

3.6 Parking and drop-off is streamlined.

Adequate number of parking spaces (in park-and-ride if applicable), room for drop-off (kiss-and-ride) on street parking serves as a buffer for pedestrians, parking time restrictions are in effect where necessary, and vehicles are prohibited from blocking the pedestrian right-of-way.

1 2 3 4 5

3.7 Curbs and curb ramps are provided.

Curbs and curb ramps are present at all crossings and have a gentle slope.

1 2 3 4 5

3.8 Navigating the public realm is intuitive and easy.

Overall, there are a series of passageways that are frequent and well marked as you walk through the station area. Consider the experience of all users -- especially **women, children, and the elderly**. Consider both day and nighttime linkages.

1 2 3 4 5

TOTAL SCORE

_____ (sum of answers)
÷
____ (# of questions answered)
=
_____
(Average score on accessibility)

STATION AREA CHECKLIST

For each of the quality criteria, rank the station area based on how adequately or poorly it provides amenities, connections, and a transit-supportive environment for riders.

» Multiple modes
» Multiple constituencies (gender, age, abilities, etc.)

ROUTE TAKEN

Include a blank map and note route taken during site visit

Additional opportunities & constraints:

Insert additional narrative from site findings.

PHOTO DOCUMENTATION

Description of photo, keyed to issue number (e.g. 2.5) in checklist

Description of photo, keyed to issue number (e.g. 2.5) in checklist

IBI Group
18401 Von Karman Avenue – Suite 110
Irvine CA 92612 USA

tel 949 833 5588
fax 949 833 5511

Memorandum

To/Attention	Sarah Jepson, LA Metro	**Date**	August 20, 2013
From	IBI Group	**Project No**	32903
cc	Neha Chawla	**Steno**	
Subject	**Metro Path Initial Draft Cost Estimate for Three Selected Metro Rail Stations**		

Introduction

The goal of this memo is to provide an overview of the high-level planning cost estimates prepared for proposed first-last mile improvements (Metro Path) at three case study sites within Metro Rail and BRT station areas. The three stations selected for analysis include Wilshire / Normandie (Metro Purple Line), 103rd / Watts (Metro Blue Line) and North Hollywood (Metro Red and Orange Lines). Network and design improvements follow guidelines set forth in the draft *Metro Path Planning Guidelines*.

Development of the Metro Path concept is an ongoing process. Path components currently proposed have been largely accounted for in this cost estimate, however added components and refinements that will take place as part of concept development are unaccounted for in this cost estimate at this time. This estimate begins to frame a baseline that can be refined in concert with concept development. Furthermore, when reviewed against projected ridership changes resulting from Metro Path improvements, future evaluation can be undertaken to review the effectiveness of the strategy from a *ridership/cost* perspective.

This Memo presents key findings from the analysis, the methodology used to develop cost estimates, a high-level cost estimate from each of the three stations (including a network map and cost summary tables for each), and source cost data used to generate quantity estimates. Contingencies have been applied to account for potential cost unknowns given the current level of design.

Key Findings

- Cost estimates assume that work is being done specifically to implement Path improvements. If improvements are made during normal street re-construction as part of routine roadway maintenance, cost savings could be achieved.
- Any improvement that involves curb and gutter re-configuration and re-construction is relatively expensive. Examples include bulb-outs at intersections and protected rolling lanes that utilize permanent curbs. These improvements can be achieved as short term low-cost improvements utilizing temporary barriers and street paint. These low-cost solutions have been accounted for in our low-cost estimate for each scenario.
- The low-cost variations suggest as much as 40% savings over more permanent options, but generally lack the same degree of permanence.
- Three sample sites are insufficient to generate a system-wide cost estimate with any form of accuracy. Important variables include level of intervention at different place-types, overlap (some facilities accounted for in one station area overlap with adjacent

station areas), and economies of scale. The second two points noted suggest measurable reduction in costs if implementing along entire corridors or system-wide.
- The range of employment and residential centrality in the three case study sites reviewed suggest that higher densities equate to a denser network of improvements, but similar extension and length of Path Arterials.

Methodology

High level cost estimates for the Metro Path at the three stations were developed by multiplying bundled groups of improvements by either linear or quantity measures. Measurements and quantities were taken and aggregated working off Path network maps, and developed utilizing the methodology outlined in the *Metro Path Planning Guidelines*.

Groups of improvements were structured around intersections and street segments and included;

- **Type 1 Intersection** - Intersection improvements where Path Arterials cross other Path Arterials at or adjacent to subject station portals. Scramble intersections utilized.
- **Type 2 Intersection** – Intersections where Path Arterials cross Path Collectors.
- **Type 3 Intersection** – Intersections along Path Collectors (crossing other Collectors or non-Path network streets).
- **Mid-Block Crossings** – Can occur along any long block Path Arterial or Collector.
- **Type 1 Arterial** (250' segment) – Occurs within 1/2 mile of the station portal.
- **Type 2 Arterial** (250' segment) – Extends beyond 1/2 mile of the station portal some distance not to exceed 3 miles.
- **Collector** (250' segment) – Occurs within the one half mile of stations along identified routes.

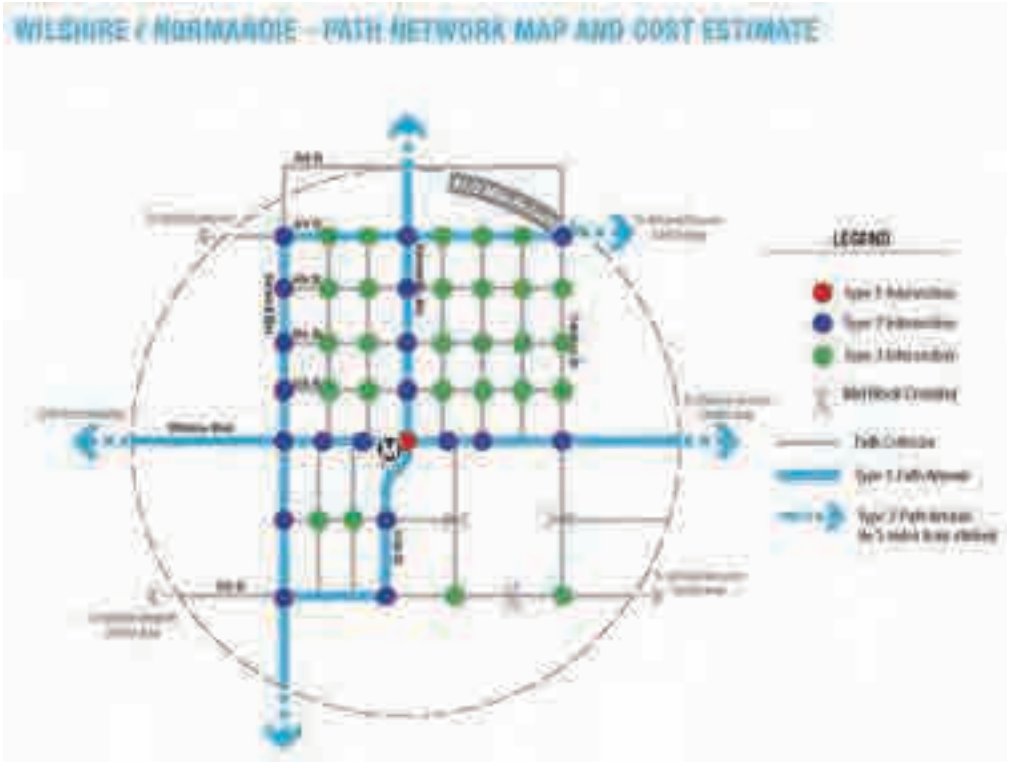
The high level cost of each of the elements noted above was prepared by aggregating the various component costs that together formed the subject unit. Using the *Metro Path Planning Guidelines* as a reference, assumptions were made about what components would most likely be included in each element. The Metro Path has been planned as a flexible structure that can be applied in varying forms to respond to local conditions, funding availability and local inputs, therefore what is proposed here may in truth be affected by inputs not known at this time.

For each site, a high-cost and a low-cost estimate is provided ('Complete Path' and 'Path Lite' respectively). Differences between the two are attributed to the permanence of improvements (i.e. fixed bollards vs. paint buffers along Path Arterials) or the level of security and comfort of components (i.e. provision of in street LED flashers or street furniture). Items are tabulated for each site.

For each site, a network map is presented that visually highlights the different cost units noted above along with summary cost tables. Cost Assumptions follow these as back-up reference.

Sarah Jepson, LA Metro – August 20, 2013

Wilshire / Normandie Cost Estimate



Complete Path Station Cost Table

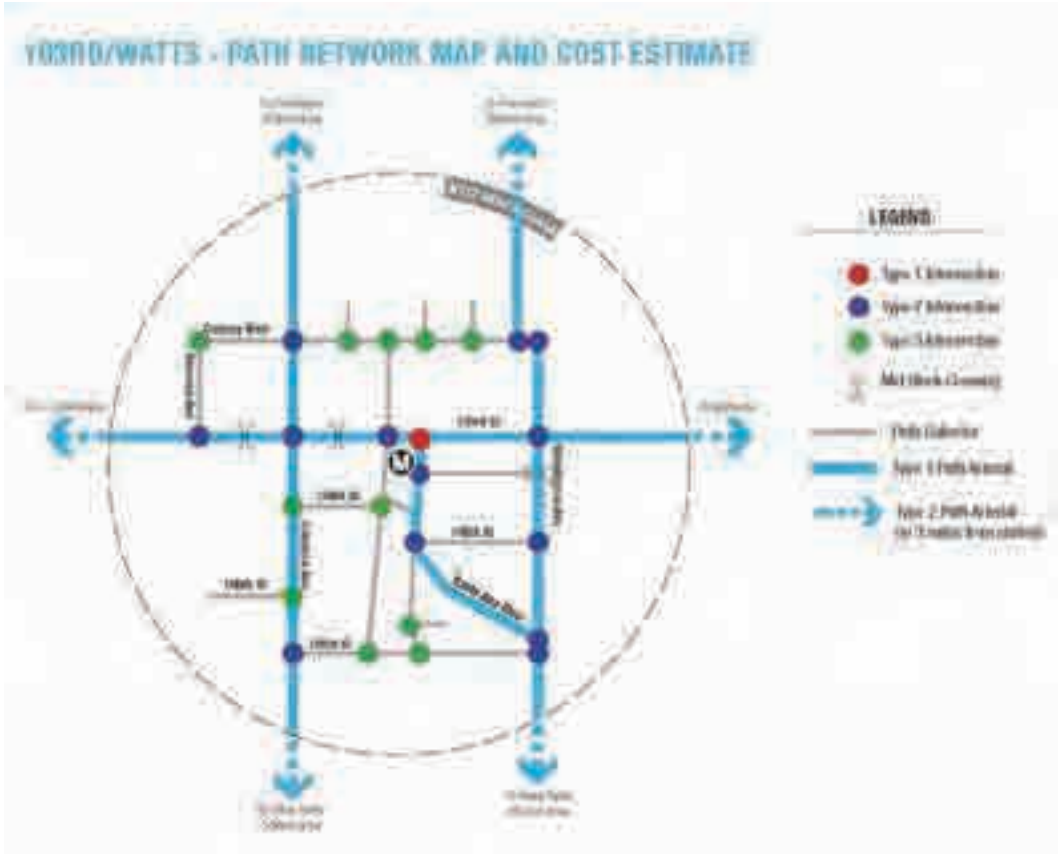
Wilshire Normandie Station	Linear Feet	Qnt.	Cost
Type I Arterial	17,817		$ 2,904,071
Type II Arterial	24,035		$ 2,631,833
Collector	28,089		$ 1,315,380
Mid Block Crossing		5	$ 962,140
Intersection Type I		1	$ 218,342
Intersection Type II		20	$ 4,366,850
Intersection Type III		27	$ 145,200
Complete Path Station Total			**$ 12,543,816**

Path Lite Station Cost Table

Wilshire Normandie Station	Linear Feet	Qnt.	Cost
Type I Arterial	17,817		$ 2,110,680
Type II Arterial	24,035		$ 1,228,890
Collector	28,089		$ 1,315,380
Mid Block Crossing		5	$ 743,140
Intersection Type I		1	$ 24,128
Intersection Type II		20	$ 386,050
Intersection Type III		27	$ 145,200
Path Lite Station Total			**$ 5,953,468**

Sarah Jepson, LA Metro – August 20, 2013

103rd / Watts Cost Estimate



Complete Path Station Cost Table

103rd/ Watts Station	Linear Feet	Qnt.	Cost
Type I Arterial	17,140		$ 2,793,724
Type II Arterial	32,727		$ 3,583,607
Collector	13,006		$ 609,058
Mid Block Crossing		3	$ 577,284
Intersection Type I		1	$ 240,848
Intersection Type II		13	$ 2,838,452
Intersection Type III		13	$ 69,911
Complete Path Station Total			**$ 10,712,884**

Path Lite Station Cost Table

103rd/ Watts Station	Linear Feet	Qnt.	Cost
Type I Arterial	17,140		$ 2,030,480
Type II Arterial	32,727		$ 1,673,305
Collector	13,006		$ 609,058
Mid Block Crossing		2	$ 297,256
Intersection Type I		1	$ 24,128
Intersection Type II		13	$ 250,932
Intersection Type III		13	$ 69,911
Path Lite Station Total			**$ 4,955,071**

Sarah Jepson, LA Metro – August 20, 2013

North Hollywood Cost Estimate

Complete Path Station Cost Table

North Hollywood Station	Linear Feet	Qnt.	Cost
Type I Arterial	16,978		$ 2,767,319
Type II Arterial	43,338		$ 4,745,511
Collector	17,652		$ 826,626
Mid Block Crossing		5	$ 962,140
Intersection Type I		2	$ 481,696
Intersection Type II		14	$ 3,056,795
Intersection Type III		12	$ 64,533
Complete Path Station Total			**$ 12,904,620**

Path Lite Station Cost Table

North Hollywood Station	Linear Feet	Qnt.	Cost
Type I Arterial	16,978		$ 2,011,289
Type II Arterial	43,338		$ 2,215,837
Collector	17,652		$ 826,626
Mid Block Crossing		5	$ 743,140
Intersection Type I		2	$ 48,256
Intersection Type II		14	$ 19,302
Intersection Type III		12	$ 5,378
Path Lite Station Total			**$ 5,869,828**

Sarah Jepson, LA Metro – August 20, 2013

Cost Assumptions

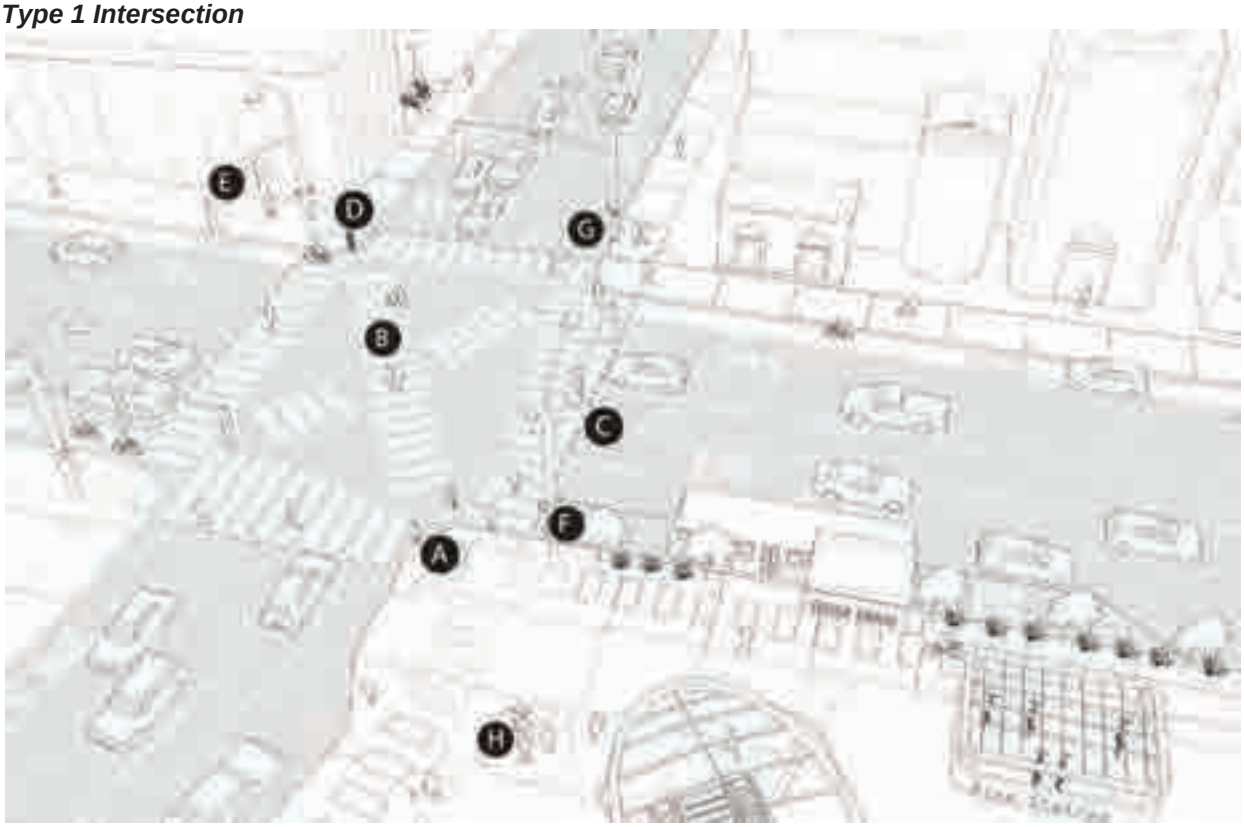
These cost estimates provided are based on previous public cost estimates for similar roadway and streetscape enhancements. This estimate is high level and includes the following assumptions in total costs of all components;

- **Contingency** - All cost estimates include a contingency for unforeseen incurred costs. This contingency is assumed to be 15% for planning purposes.
- **Engineering and Design** - 30% cost is included in each item for Engineering and Design of the elements; this covers additional design development and final design and engineering services.
- **Public Art** - A 1% cost is assumed for inclusion of art treatments that will increase aesthetics and enhance local community identity along the Path network.

As noted above in the Methodology section, improvements were bundled in the following units, source material is shown in the appendix;

Sarah Jepson, LA Metro – August 20, 2013

Type 1 Intersection



Legend	Complete Path Type I Intersection - Arterial&Arterial (Scramble)	Total Cost	Path Lite Type I Intersection - Arterial&Arterial (Scramble)	Total Cost	Source*
A	Bulbouts (Curb reconstruction, dual curb ramps)	$ 146,000	Paint and Landscape Bulbouts	$ 9,860	21
B	Crosswalks	$ 3,728	Crosswalks	$ 3,728	12
C	LED Flashers	$ 24,480	LED Flashers *(Not Included in Path Lite)*	$ -	13
D	Ped Detection padding	$ 5,440	Ped Detection Padding *(Not Included in Path Lite)*	$ -	17
E	Resignalize Signal for Pedestrians	$ 40,800	Resignalize Signal for Pedestrians *(Not Included in Path Lite)*	$ -	18
F	Ped buttons and Audio Chirp	$ 14,144	Ped buttons and Audio Chirp	$ 14,144	19
G	Medallion Signage	$ 2,176	Medallion Signage	$ 2,176	15
H	Information Kiosk (1 per Metro Stop)	$ 4,080	Information Kiosk (1 per Metro Stop)	$ 4,080	20
	Total	**$ 240,848**	**Total**	**$ 33,988**	

*For Source information, Refer to Appendix A

Sarah Jepson, LA Metro – August 20, 2013

Type 2 & 3 Intersection

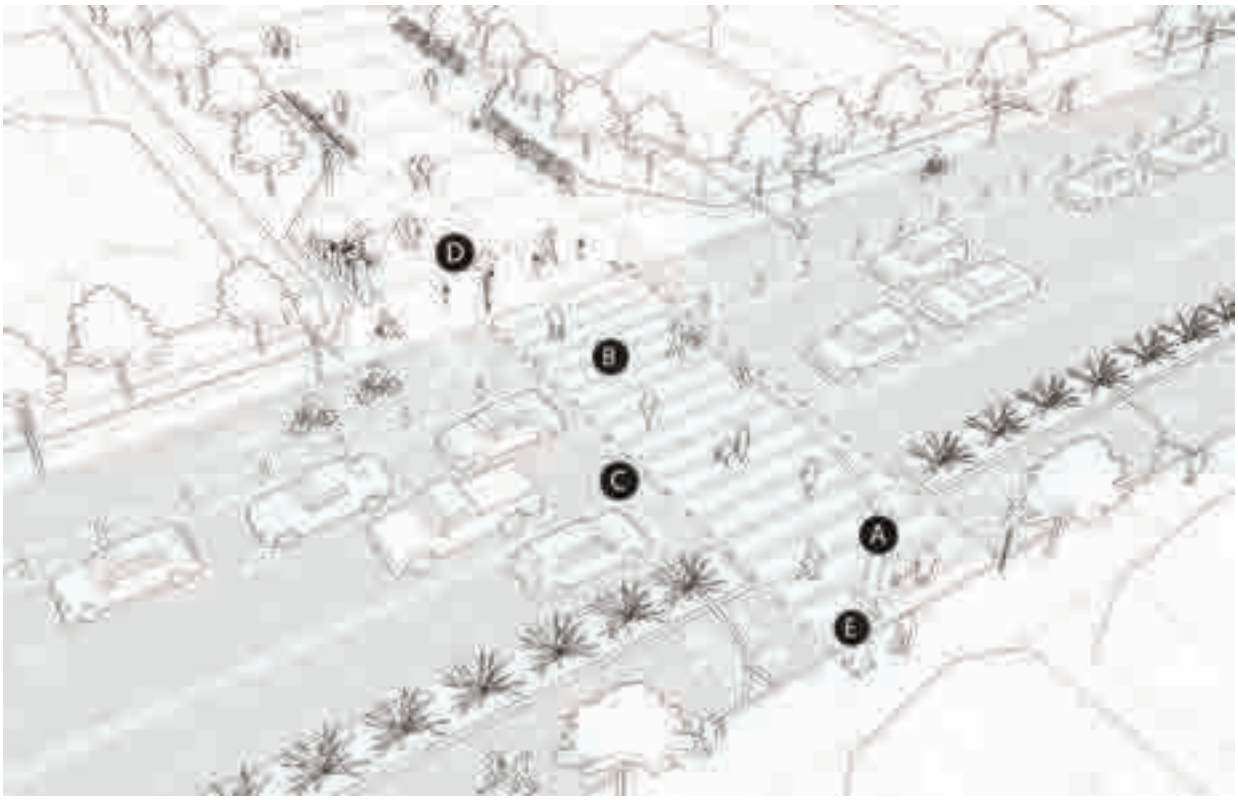
Legend	Complete Path Type II Intersection - Arterial&Collector	Total Cost	Path Lite Type II Intersection - Arterial&Collector	Total Cost	Source*
A	Bulbouts (curb reconstruction, dual curb ramps)	$ 146,000	Bulbouts *(Not Included in Path Lite)*	$ -	16
B	Crosswalks	$ 2,982	Crosswalks	$ 2,982	12
C	LED Flashers	$ 12,240	LED Flashers *(Not Included in Path Lite)*	$ -	13
D	Resignalize Signal for Pedestrians	$ 40,800	Resignalize Signal for Pedestrians *(Not Included in Path Lite)*	$ -	18
E	Ped buttons and Audio Chirp	$ 14,144	Ped buttons and Audio Chirp	$ 14,144	19
F	Medallion Signage	$ 2,176	Medallion Signage	$ 2,176	15
	Total	**$ 218,342**	**Total**	**$ 19,302**	

Legend	Complete Path Intersection Type III – Collector&Collector	Total Cost	Source*
B	Crosswalks	$ 3,202	12
F	Medallion Signage	$ 2,176	15
	Total	**$ 5,378**	

*For Source information, Refer to Appendix A

Sarah Jepson, LA Metro – August 20, 2013

Mid-Block Crossing

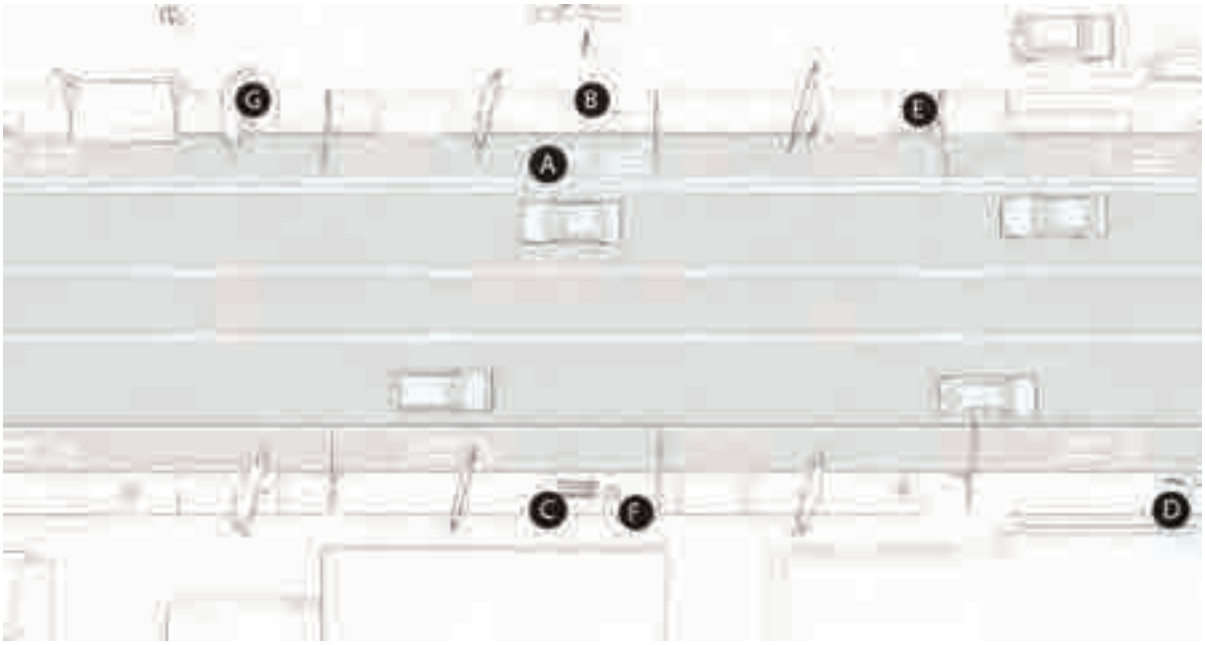


Legend	Complete Path Midblock Crossing	Total Cost	Path Lite Midblock Crossing	Total Cost	Source*
A	HAWK Signal	$ 146,000	HAWK Signal	$ 146,000	11
B	Crosswalk Paint (50')	$ 876	Crosswalk Paint (50')	$ 876	12
C	LED Flashers	$ 43,800	LED Flashers *(Not Included in Path Lite)*	$ -	13
D	Safety Signage	$ 584	Safety Signage	$ 584	14
E	Medallion Signage	$ 1,168	Medallion Signage	$ 1,168	15
	Total	**$ 192,428**	**Total**	**$ 148,628**	

*For Source information, Refer to Appendix A

Sarah Jepson, LA Metro – August 20, 2013

Type 1 & 2 Arterial



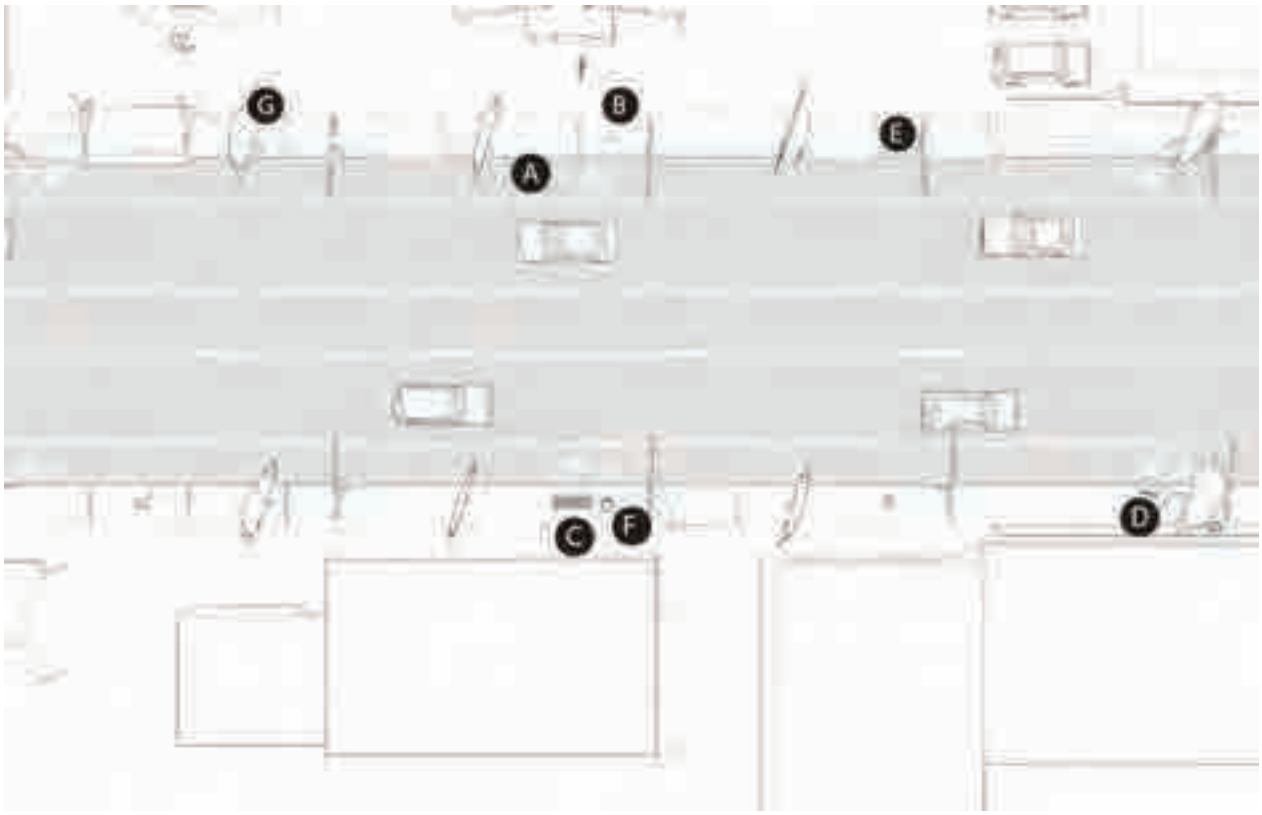
Legend	Complete Path Arterial Type I (250')	Total Cost	Path Lite Arterial Type I (250')	Total Cost	Source*
A	Protected Rolling Lane (Bollards, Green Paint, Painted Stripe)	$ 20,805	Rolling Lane (Painted Stripe)	$ 11,863	2
B	Bike Racks (every 500')	$ 876	Bike Racks (every 500')	$ 876	4
C	Sidewalk Furniture (every 500')	$ 2,190	Sidewalk Furniture (Not Included in Path Lite)	$ -	5
D	Signage (every 250')	$ 1,168	Signage (every 250')	$ 1,168	6
E	Lighting (every 100')	$ 13,286	Lighting (every 100')	$ 13,286	7
F	Garbage Cans (every 500')	$ 1,095	Garbage Cans (every 500')	$ 1,095	8
G	Landscaping (every 500')	$ 1,329	Landscaping (every 500')	$ 1,329	9
	Total	**$ 40,749**	**Total**	**$ 29,616**	

Legend	Complete Path Arterial Type II (250')	Total Cost	Path Lite Arterial Type II (250')	Total Cost	Source*
A	Rolling Lane (Painted Stripe)	$ 11,863	Bike Lane	$ 1,460	3
B	Bike Racks (every 1000')	$ 438	Bike Racks *(Not Included in Path Lite)*	$ -	4
C	Benches (every 1000')	$ 1,095	Benches *(Not Included in Path Lite)*	$ -	10
D	Signage (every 1000')	$ 146	Signage (every 1000')	$ 146	6
E	Lighting (every 125')	$ 10,629	Lighting (every 125')	$ 10,629	7
F	Garbage Cans (every 1000')	$ 548	Garbage Cans (every 1000')	$ 548	8
G	Landscaping (every 1000')	$ 2,657	Landscaping (every 1000')	$ 2,657	9
	Total	**$ 27,375**	**Total**	**$ 12,782**	

*For Source information, Refer to Appendix A

Sarah Jepson, LA Metro – August 20, 2013

Collector



Legend	Complete Path Collector (250')	Total Cost	Source*
A	Bike Lane	$ 1,460	3
B	Bike Racks (every 2500')	$ 175	4
C	Benches (every 2500')	$ 438	10
D	Signage (every 500')	$ 292	6
E	Lighting (every 150')	$ 8,857	7
F	Garbage Cans (every 2500')	$ 219	8
G	Landscaping (every 2500')	$ 266	9
	Total	**$ 11,707**	

*For Source information, Refer to Appendix A

Appendix A - Cost Estimate Sources

Reference #	Element	Quantity	Cost	Source	Link
1	Protected Rolling Lane	LF	$ 57.00	LA DOT Case Study	http://ladot.lacity.org/pdf/PDF255.pdf
2	Rolling Lane	LF	$ 26.51	Chicago Case Study	http://www.suntimes.com/news/metro/14267923-418/more-bike-lanes-planned-for-city.html
3	Bike Lane	LF	$ 4.00	LA County Appendix	http://dpw.lacounty.gov/pdd/bike/docs/bmp/Appendix%20H.pdf
4	Bike Rack	Each	$ 1,200.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
5	Sidewalk Furniture	Each	$ 3,000.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
6	Signage	Each	$ 400.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
7	Lighting	Each	$ 3,640.00	Bicycling Info Report	http://www.bicyclinginfo.org/bikecost/docs/NCHRP_7-14_Final_Report_5.pdf
8	Garbage Can	Each	$ 1,500.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
9	Landscaping	Each	$ 1,820.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
10	Bench	Each	$ 3,000.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
11	Hawk	Each	$ 100,000.00	Case Study	http://www.kcrg.com/home/top-9/Traffic-Engineers-Push-Drivers-to-Pay-Attention-to-New-HAWK-Signals-188140591.html
12	Crosswalk Paint	LF	$ 6.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
13	LED Flashers	Intersection	$ 120,000.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
14	Safety Signage	Each	$ 200.00	Bicycling Info Report	http://www.bicyclinginfo.org/bikecost/docs/NCHRP_7-14_Final_Report_5.pdf
15	Medallion Signage	Each	$ 400.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
16	Bulbouts	Intersection	$ 100,000.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
17	Ped Detection Padding	Intersection	$ 8,000.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
18	Resignalize Intersection for Pedestrians	Intersection	$ 30,000.00	Walking Info	http://www.walkinginfo.org/pedsafe/pedsafe_curb1.cfm?CM_NUM=37
19	Ped buttons and audio chirp	Intersection	$ 10,400.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
20	Information Kiosk	Intersection	$ 3,000.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
21a	Paint	400 LF	$ 2,400.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
21b	Low Height Planter Boxes	4	$ 7,280.00	CA MTC	http://www.mtc.ca.gov/planning/bicyclespedestrians/Ped_Districts/04-Generic-Cost-Estimating-Tool.pdf
21	Painted Bulbout	Intersection	$ 9,680.00	Source in 21a,21b	

IBI Group
18401 Von Karman Avenue – Suite 110
Irvine CA 92612 USA

tel 949 833 5588
fax 949 833 5511

Memorandum

To/Attention	Sarah Jepson	**Date**	August 20, 2013
From	IBI Group	**Project No**	32903
cc		**Steno**	CDF

Subject **Task 4.1 Modal Access Targets Summary Memo**

This memorandum provides a summary of the evaluation of available analytical tools, models, and methodologies that could assist the Los Angeles County Metropolitan Transportation Authority (Metro) and the Southern California Association of Governments (SCAG) in determining or calculating modal access targets for different time horizons (for example 5 to 10 years) as well as different station types. The objective of this sub-task was to identify not only the modal access targets, but also to identify a single tool that could be used to evaluate multi-modal strategies and the magnitude of potential model access changes.

This technical memorandum builds on the findings of Task 3.4 Case Study Analysis, as well as discussions conducted between the consultant team, Metro and SCAG. Our analysis incorporates the agreed upon site typologies and available data regarding first-last mile access modes. New research was conducted by IBI to identify and assess the potential use of predictive tools that could be used to assess the implementation of first-last mile improvement strategies.

During the course of this research, it became apparent that there is limited existing information and a limited number of models and/or methodologies focused on assessing how improvements to transit station accessibility for non-motorized and active transportation modes could result in mode share changes for a particular station. Instead, many of the existing methodologies and sources focus on either quantifying ridership in total for transit systems or assessing the quality or performance of the transportation environment and infrastructure for pedestrians or bicyclists. The linkages between these two assessments are currently tenuous at best.

This technical memorandum includes the following elements:

- Existing Modal Access – A summary of the existing modal access information available from the Metro Origin-Destination Study
- Tools Analyzed – A review and summary of each tool researched and analysis for this task
- Findings – A summary of the findings and conclusions of this analysis
- Application of the proposed metrics to three case study sites

Summary of Key Findings

- Based on our review of the most recent O-D data provided by Metro, there is significant variation in the observed existing modal access percentages from station to station and from place type to place type. This variation makes it difficult to identify or recommend a system-wide modal access target. Instead, identifying modal access targets, or more

appropriately goals percentage increase in active transportation access, by place type would appear to be a more achievable goal.

- A wide range of station access models, ridership models, and pedestrian and bicycle environment assessment tools were reviewed and evaluated as part of this memo. This evaluation revealed that there is no current single tool that provides the analysis capability sought by Metro in the original scope of work for this project. Selected tools, in particular the First & Last Mile (FLAM) Strategic Model tool being tested in Portland, OR could provide applicability to Los Angeles County in the future.
- In the absence of single tool for assessing changes to modal access targets, IBI Group developed a separate interim tool that could be used by Metro to analyze station access and the potential changes to ridership based on improvements to the active transportation network.
- This tool was applied at three station areas and was used to assess the potential benefits of the implementation of the Metro Path at each station. Using the tool, forecasted increases in ridership resulting from the Metro Path improvements ranged from 1.5% to 3% based on existing ridership numbers.

Existing Modal Access Data

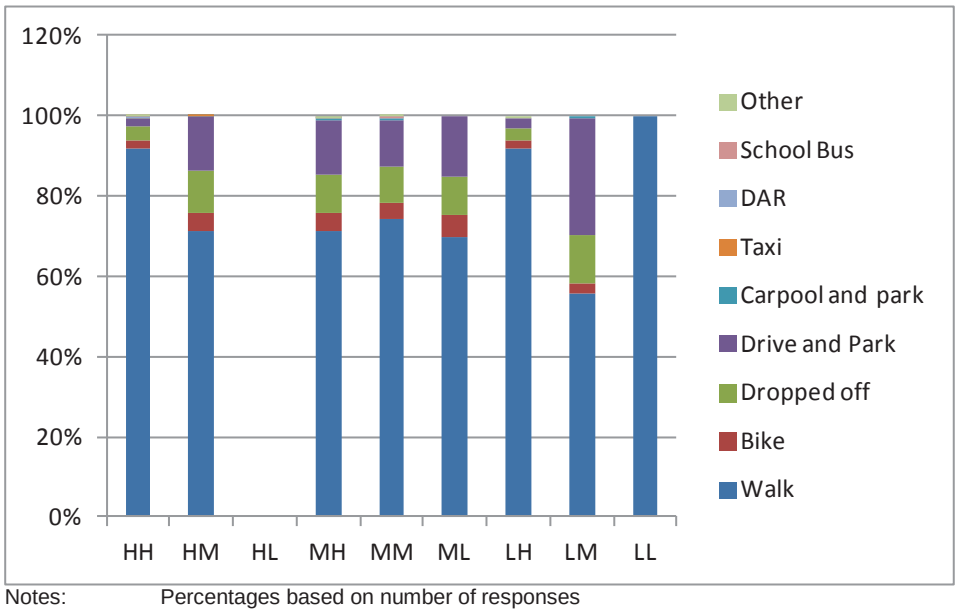
The data provided through the Metro Origin-Destination (O-D) Study conducted in 2011 was analyzed through the perspective of modal access at high capacity transit stations within Los Angeles County. The O-D data was collected from the universe defined in the Case Study Site selection Report, which corresponds to the nine different station typologies (four different CSPP Accessibility Clusters) as defined in previous tasks. It should be noted that while transit line information was available, the number of responses by line or by station was not always significant. For example, the high density residential and low centrality station typology is not represented in this analysis because the only station in this category is part of the Metrolink system, not the Metro transit network, and therefore O-D data was not available for that specific site.

In reviewing the O-D data, it was observed that no direct or consistent correlations existed between station types and modal access, as illustrated in Figures 1 through 3.

Figure 1 presents the modal access shares according to each of the nine station typologies, with highest auto access observed in the Low Residential and Medium Centrality station typology. The highest non motorized access with a significant number of records is observed in two of the High Centrality typologies (Low and High Residential).

Sarah Jepson – August 20, 2013

Figure 1 – Modal Access Share for Station Typologies

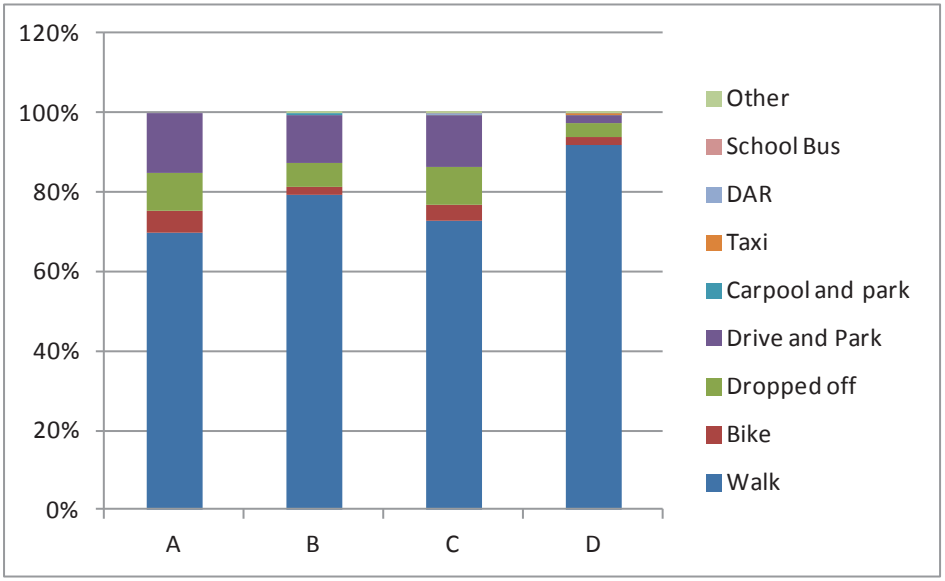


Notes: Percentages based on number of responses
Number of responses for LL not statistically significant

The aggregation of the data to CSPP Accessibility Cluster types reduces the variation related to modal access, but differences are still present among the categories, as can be observed in Figure 2.

Sarah Jepson – August 20, 2013

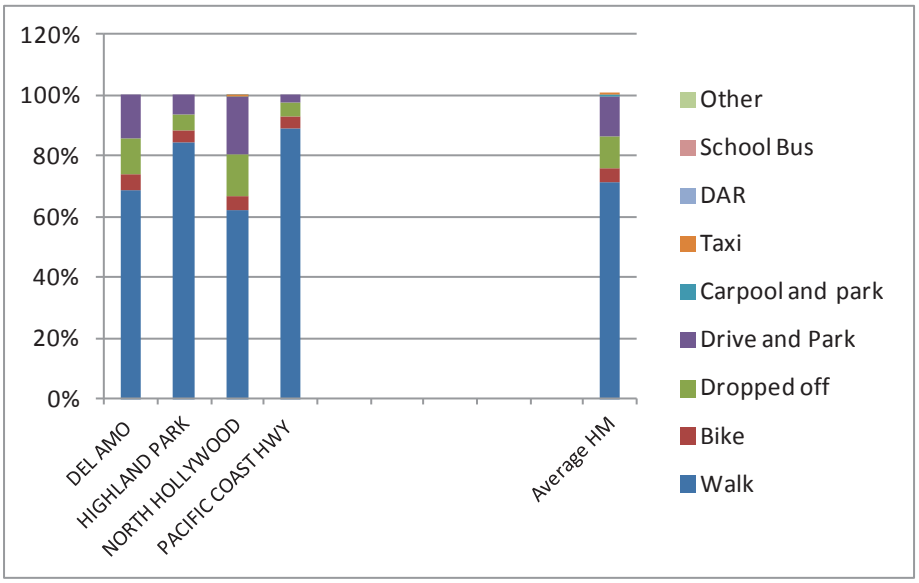
Figure 2 – Modal Access Share for Station Clusters



Notes: Percentages based on number of responses
Cluster A (HL, ML), Cluster B (LH, LL, LM), Cluster C (MH, MM, HM), Cluster D (HH)

Further variation is observed within each station typology. For example, in the High Residential and Medium Centrality typology, the modal access share for the stations that had the most responses varies as shown in Figure 3.

Figure 3 – Modal Access Share for Stations within the High Residential and Medium Centrality Typology



Notes: Percentages based on number of responses
Stations with low response are not shown, but included in the average for the station typology

Sarah Jepson – August 20, 2013

The differences in access mode shares can be explained by station access, station characteristics and also differences in the mix of trip generators. For example, both Highland Park and North Hollywood are stations included as Case Study Sites, and were evaluated according to a set of categories observed during a site visit. These two stations had similar ratings regarding safety and aesthetics, but the North Hollywood Station was given a lower rate for accessibility than the Highland Park station, consistent with the modal access share obtained from the survey.

Motorized access to the station is more dependent on the convenience of the station (location within a route for drop-off) and parking availability, than the network itself. These types of users also have, in general, a longer commute to reach the desired station.

The majority of transit users access their routes through non-motorized modes, and the size of the active transportation shed varies according to the network around the desired station. As identified in previous documents, the size of this shed is dependent on the existence of connections, but also on the quality of these conditions, given that not all types of users have the same mobility.

Due to the observed variation in modal access shares between stations and between the nine place types, a regional modal access target is not recommended as an adequate goal to be included in the First-Last Mile Strategic Plan. Instead, a possible alternative approach to the countywide access targets would be to set improvement targets per station type, improving the non-motorized access performance of the stations, so the average shifts towards the maximum shares observed by station place type.

Table 1 illustrates the observed pattern of modal access by station place type. This information was obtained through tabulation of the data for the Metro stations that had more than 100 responses or a response rate at or above 2% of the station's daily boardings.

Table 1 – Modal Access Ranges per Place Type - Metro OD Survey 2011

Place Type	Expected Modal Access	Walk	Bike	Dropped off	Drive and Park	Carpool and park	Taxi	DAR	School Bus	Other
High Residential High Centrality	Maximum	99%	10%	12%	24%	2%	2%	1%	1%	2%
	Average	90%	2%	4%	3%	0%	0%	0%	0%	0%
	Minimum	70%	0%	0%	0%	0%	0%	0%	0%	0%
High Residential Medium Centrality	Maximum	93%	7%	15%	19%	0%	0%	0%	0%	0%
	Average	77%	4%	8%	11%	0%	0%	0%	0%	0%
	Minimum	60%	0%	3%	0%	0%	0%	0%	0%	0%
High Residential Low Centrality	Maximum	100%	3%	9%	0%	3%	0%	0%	0%	0%
	Average	97%	1%	2%	0%	0%	0%	0%	0%	0%
	Minimum	91%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Residential High Centrality	Maximum	91%	9%	18%	41%	5%	1%	1%	0%	3%
	Average	71%	4%	9%	14%	0%	0%	0%	0%	0%
	Minimum	45%	2%	0%	1%	0%	0%	0%	0%	0%
Medium Residential Medium Centrality	Maximum	95%	7%	15%	54%	1%	0%	3%	1%	2%
	Average	74%	3%	9%	14%	0%	0%	0%	0%	0%
	Minimum	30%	0%	3%	0%	0%	0%	0%	0%	0%

Sarah Jepson – August 20, 2013

Place Type	Expected Modal Access	Walk	Bike	Dropped off	Drive and Park	Carpool and park	Taxi	DAR	School Bus	Other
Medium Residential Low Centrality	Maximum	70%	13%	13%	19%	0%	0%	0%	0%	0%
	Average	68%	8%	11%	13%	0%	0%	0%	0%	0%
	Minimum	67%	3%	8%	7%	0%	0%	0%	0%	0%
Low Residential High Centrality	Maximum	96%	4%	6%	16%	0%	0%	0%	0%	4%
	Average	89%	2%	3%	5%	0%	0%	0%	0%	1%
	Minimum	80%	2%	0%	0%	0%	0%	0%	0%	0%
Low Residential Medium Centrality	Maximum	76%	3%	13%	41%	1%	0%	0%	0%	0%
	Average	60%	2%	12%	25%	0%	0%	0%	0%	0%
	Minimum	44%	1%	11%	9%	0%	0%	0%	0%	0%
Low Residential Low Centrality	Maximum	100%	4%	4%	0%	0%	0%	0%	0%	0%
	Average	97%	1%	2%	0%	0%	0%	0%	0%	0%
	Minimum	93%	0%	0%	0%	0%	0%	0%	0%	0%

Note: Modal access ranges were estimated considering bus stop data for the Low Residential/Low Centrality and High Residential/High Centrality to improve number of responses

Stations with a large park and ride infrastructure are likely to have a different behavior in regards to access shares than stations with smaller or no park and ride infrastructure. In this case, as the motorized access comprises a larger share of station access, improvements to non-motorized access to these stations may not produce substantial changes in non-motorized access percentages that are as noticeable as for other stations. The place types with the largest amount of park and ride facilities and number of parking spaces will most likely contribute to a lower average in non-motorized access shares. An example of target could be to improve the non-motorized average share as follows:

- 5% - 10% for the place types with average shares below 70%
- 2.5% - 5% for the place types with average shares between 70% and 85%
- Up to 2.5% for the place types with average shares over 85%

It must be noted that the O-D Survey was designed to focus on the bus and rail lines as a whole, and does not always provide enough entries for each station or stop along the lines analyzed. It is recommended that the information contained in Table 1 be refined through the conduction of a future O-D survey at the stations in order to obtain mode share statistics that are statistically representative of universe of stations analyzed.

Tools Analyzed

The scope calls for assessment of potential tools and methodologies for establishing modal access targets by place types. However, given the conclusion of the previous section, it has become apparent that the examination of tools that can evaluate modal access and active transportation access on a station to station basis is also warranted for this assessment.

The variation in modal access by station within individual place types is a result of numerous factors, which would be difficult to harmonize across stations. Additionally, stations that currently have high pedestrian and cyclist mode splits may have greater potential for ridership gains from these modes than stations with mode splits below an arbitrary target. Given this condition, we

think that the focus of these tools should be on measuring how overall access, and consequently ridership, can improve, more than modal access percentages.

All documents analyzed as part of this research suggests or shows that transit ridership is directly affected by accessibility, as well as use/urban design variables (population density, employment density, land use mix, land use balance).

Each of the five tools reviewed for this assessment is discussed below.

TCRP Report 153

The Transit Cooperative Research Program Report 153: Guidelines for Providing Access to Public Transportation Stations provides a process and a tool to assist in planning for access to high capacity transit stations. The methodology has been developed considering data and input from several agencies throughout the country, and the eight-step process identified for station access is illustrated in Figure 4.

Figure 4 – Eight-step station access planning flowchart

Source: TCRP Report 153, 2012

Station access is in general multi-modal, and the research has found that the predominant access travel modes are dependent on several characteristics:

- Type of land use
- Street spacing
- Development density
- Station infrastructure and connection to surroundings

TCRP Report 153 developed a set of station typologies that would illustrate the general characteristics of typical transit stations, and therefore allow for the analysis of the attributes of access/egress mode characteristics. Individual typologies relate to physical factors present at the station and in a 0.5 mile area around the station. The typologies were defined considering housing density, building scale, distance from CBD, supporting transit network, pedestrian/bike access, parking facilities, and access/egress, as illustrated in Figure 5.

One drawback with the potential use of this tool is that the stations are evaluated according to their access typology and not to their place type classification. Therefore, in order to use this methodology, there would need to be a reallocation of stations based on access instead of place type. The report also provides an average station access mode share for each station type, illustrated in Figure 6.

Sarah Jepson – August 20, 2013

Figure 5 – Station Access Typology

Station Area Type	Housing Density	Scale (# of stories)	Dist. from CBD	Supporting Transit Network	Ped/Bike Access	Surrounding Land Use	Access/ Egress	Parking Facilities	Example Stations	Rapid Transit Modes
Urban Commercial	High	>5	0-10 miles	Intermodal facility/transit hub	High-quality network; good connectivity	Office, residential, institutional, retail, entertainment, and civic uses	Both	No off-street parking	16th Street/Mission (BART) Lloyd Center (TriMet) East Liberty (Port Authority)	Heavy Rail Light Rail BRT
High-Density Urban Neighborhood	High	>5	0-10 miles	Subregional hub	High-quality network; good connectivity	Residential, neighborhood retail, limited office	Access	No/limited off-street parking	Kingsbridge Road (NYCT)	Heavy Rail
Medium-Density Urban Neighborhood	Medium	2-5	5-10 miles	Some local bus connections	High-quality network; good connectivity	Residential, neighborhood retails	Access	No/limited off-street parking	Western – Pink Line (CTA) West Baltimore (MARC) Othello Station (Sound Transit) Euclid Ave/71st St (Cleveland RTA) Hoboken – 14th Street (NY Waterway)	Heavy Rail Commuter Rail Light Rail BRT Ferry
Urban Neighborhood with Parking	Medium	2-5	5-10 miles	Subregional hub	High-quality network; high-volume roadways may limit connectivity	Residential, neighborhood retail	Access	Off-street parking available	Anacostia (WMATA)	Heavy Rail
Historic Transit Village	Medium-High	2-5	10-40 miles	Some local bus connections	High-quality network; good connectivity	Residential, neighborhood retail, limited office	Access	Some off-street parking	Greenwich Station (Metro North)	Commuter Rail
Suburban TOD	Medium-High	2-8	5-15 miles	Some local bus connections	Good network within station area some high-volume roadways	Residential, neighborhood retail	Both	Some off-street parking	Bethesda (WMATA) Davis Street (Metra) Orenco Station (TriMet) Tunney's Pasture (OC Transpo)	Heavy Rail Commuter Rail Light Rail BRT
Suburban Village Center	Medium-High	2 – 5	5-15 miles	Subregional hub	Limited connectivity, some high-volume roadways	Residential, neighborhood retail, commercial	Access	Some off-street parking available	Downtown Littleton (RTD) Van Nuys (LA Metro)	Light Rail BRT
Suburban Neighborhood	Low-Medium	1 – 3	5-15 miles	Some local bus connections	Limited connectivity, some high-volume roadways	Residential, retail, limited office	Access	Some off-street parking available	South Bank (PAT) Pleasant Park (OC Transpo) Route 915 - Columbia (MTA) Quincy (MBTA)	Light Rail BRT Commuter Bus Ferry
Suburban (Freeway)	Low	0-2	10-20 miles	Employer shuttles, limited bus connections	Isolated, difficult connections	Varies	Both	Park-and-ride prioritized	Owings Mills (MTA)	Heavy Rail
Suburban Employment Center	Low	1 – 3	5-15 miles	Some local bus connections, employer shuttles	Poor connectivity, high-volume roadways	Office, retail and limited residential	Egress	Park-and-ride prioritized	McCormick Road (MTA) Maple Island (Lane Transit)	Light Rail BRT
Suburban Retail Center	Low	1 – 3	5-15 miles	Some local bus connections	Poor connectivity, high-volume roadways	Retail, limited office	Egress	Park-and-ride prioritized	Great Mall Transit Center (VTA) Warner Center (LA Metro)	Light Rail BRT
Intermodal Transit Center	Low-Medium	1-3	5-15 miles	Intermodal facility/transit hub	Good connections between systems; isolated	Varies	Both	Park-and-ride often prioritized	Forest Hills (MBTA) Mukilteo (Sound Transit) Bellevue Transit Center (Sound Transit)	Heavy Rail Commuter Rail Commuter Bus Ferry

Sarah Jepson – August 20, 2013

Station Area Type	Housing Density	Scale (# of stories)	Dist. from CBD	Supporting Transit Network	Ped/Bike Access	Surrounding Land Use	Access/ Egress	Parking Facilities	Example Stations	Rapid Transit Modes
									Hoboken Transit Terminal (NY Waterway)	
Freeway/ Highway Park& Ride	Low	0-2	15-40 miles	Employer shuttles, limited bus connections	Isolated, difficult connections	Varies	Both	Park-and-ride prioritized	Golden Glades (TriRail) I-485/South Blvd (CATS) Eagleson (OC Transpo) Sammamish Park & Ride (Sound Transit)	Commuter Rail Light Rail BRT Commuter Bus
Busway	Varies	Varies	10–30 miles	Subregional hub	High-volume roadways, difficult connections	Varies	Access	Park-and-ride prioritized	El Monte Bus Station (LA Metro)	Commuter Bus
Special Event/Campus	Low-Medium	1 – 3	Varies	Some local bus connections	Limited connectivity with emphasis on special facility	Entertainment, airport, and/or civic uses	Egress	Limited off-street parking available	Hartsfield Airport (MARTA) Hamburg Street (MTA) Airport Station (MBTA)	Heavy Rail Light Rail BRT
Shuttle Station	Low	0-2	15–40 miles	Employer, airport, special event shuttles	Isolated, difficult connections	Varies	Egress	Some off-street parking	Great America (ACE)	Commuter Rail
Satellite City	Low-Medium	1-3	>30 miles	Subregional hub	High-quality network; good connectivity	Residential, retail, limited office	Both	Park-and-ride prioritized	Elgin (Metra) Port Townsend (WSDOT Ferry)	Commuter Rail Ferry
Legacy	Low	0-2	Varies	Limited connections	Isolated, difficult connections	Varies	Access	Some off-street parking	St. Denis (MARC)	Commuter Rail

Source: TCRP Report 153, 2012

Sarah Jepson – August 20, 2013

Figure 6 – Average station access mode share by station type

Station Type	Average Access Mode Percentage				
	Walk (%)	Bicycle (%)	Feeder Bus (%)	Auto (Drop-off) (%)	Auto (Park-and-Ride) (%)
Urban Commercial	82	1	10	2	5
High-Density Urban Neighborhood	72	2	14	4	10
Medium-Density Urban Neighborhood	80	1	9	4	7
Urban Neighborhood with Parking	35	3	21	10	31
Historic Transit Village	25	1	3	17	53
Suburban TOD	32	2	13	14	39
Suburban Village Center	30	2	16	12	40
Suburban Neighborhood	29	1	11	13	46
Suburban Freeway	10	1	12	12	65
Suburban Employment Center	29	3	25	9	36
Suburban Retail Center	30	2	19	11	39
Intermodal Transit Center	27	1	36	6	30
Special Event/Campus	55	2	24	6	13
Satellite City	7	6	12	16	59

Source: TCRP Report 153, 2012

The guidelines regarding station access can be used for existing and for new stations. The TCRP Report 153 is accompanied by a spreadsheet tool that can be used to estimate station ridership and mode access share. The station typology is used to govern the arrival modes that should be encouraged or discouraged at particular types of stations. The model does not focus on active transportation access, and the tool does not estimate the benefits for non-motorized/active transportation access improvements to the station. The tool provides an estimate of new walk trips based on transit-oriented development, as well as target bicycle access boardings, but these are not linked to non-motorized access improvements.

The spreadsheet is straightforward, and the data needed for the analysis includes station characteristics, demographics in 0.5 mile radius, station daily boardings, access mode split (existing or by station type – default values), and other station data related to parking and management strategies. The analysis is focused on the assessment of impacts of changing parking supply/costs and the implementation of TOD on ridership. Improvements to walk access to a station are suggested to be effective if the mode share is a lot smaller than the mode share considered for the typology standard, and the user is referred to the Guidebook for a list of potential pedestrian improvements. A similar approach is used in the analysis of bicycle access, where improvements are considered likely to be effective only if the bicycle mode share is less than 1.5 times the bicycle commute mode share. In terms of bicycle commute mode share, it must be noted that the input data is for Census Place (American Communities Survey), which means that data would be aggregated for an area much larger than a typical station area.

Station access improvement opportunities listed for pedestrians and bicyclists include:

- Provide paved sidewalks at least 5 feet wide
- Remove sidewalk clutter near station entrances
- Provide station entrances through the buildings
- Build pedestrian overpasses and/or underpasses
- Provide weather-protected connections to adjacent land use
- Install traffic signals at busy junctions
- Improve night visibility
- Install intersection safety improvements (e.g., crosswalks)
- Install wayfinding on approaches to station
- Install bicycle lanes
- Provide bicycle paths
- Provide secure bicycle storage at stations

The strengths of this tool include the representation of a variety of station types, but the application relies heavily on data collection on access mode shares, as no improvements to non-motorized modes are considered to be effective if the defaults existing in the tool are used. This tool is useful to assess changes to ridership given changes to parking configuration and management, as well as the implementation of transit-oriented development in the station area, but does not provide an assessment of the impacts of changes to the non-motorized access to the station.

Direct Ridership Model of Bus Rapid Transit in Los Angeles County

The direct ridership model proposed by Cervero, Murakami and Miller (University of Berkeley Center for Future Transport, 2009) estimates boardings at a BRT stop or station as a function of three sets of variables:

- Service attributes: frequency, operating speeds, feeder bus connections, dedicated lanes, vehicle brand/marketing, etc.
- Location and Neighborhood attributes: population and employment densities, mixed land use measures, median household incomes, vehicle ownership, distance to nearest stop, accessibility levels, terminal station, street density, connectivity indices (number of intersections divided by number of links, where a higher number indicates in general a more walkable environment), etc.
- Bus Stop/Site attributes: shelters, next bus passenger information, benches, far-side bus stops, park-and-ride lots, bus bulbs, etc.

The model was proposed considering 50 Metro Rapid stops, 13 Orange Line Stops and 6 Big Blue Bus stops, and the coefficients are shown in Figure 7.

Figure 7 – Direct Ridership Model for BRT in Los Angeles County

	Coefficient	Std. Error	Beta	T Statistic	Sig.
Service Attributes					
Number of Daily Metro Rapid Buses (both directions)	5.103	1.353	.176	.371	.000
Number of perpendicular daily feeder bus lines (both directions)	73.921	36.045	.080	2.051	.045
Number of perpendicular daily rail feeder trains (both directions)	6.722	1.934	.126	3.476	.001
Neighborhood Attributes					
Population Density (1/2-mile buffer)	0.017	0.004	.134	4.303	.000
Distance to nearest BRT stop (in miles)	261.705	150.751	0.060	1.736	.088
Interactive Terms					
BRT & Feeder Bus: Dedicated Lane (0-1)* Number of perpendicular daily feeder bus lines	124.557	62.121	.123	2.005	.050
BRT & Feeder Rail: Dedicated Lane (0-1)* Number of perpendicular daily rail feeder trains	52.891	3.831	.533	13.807	.000
BRT & Parking Capacity: Dedicated Lane (0-1)* Park-and-Ride Lot Capacity	.514	.249	.093	2.067	.043
BRT & Total Density: Dedicated Lane (0-1)*(Population +Employment density within 1/2-mile buffer)	.036	.011	.185	3.202	.002
Constant	-541.164	154.71	--	-3.50	.001
Summary Statistics: R Square = 0.952 F Statistic (prob.) = 129.011 (.000) N=69					

Source: Cervero, R., Murakami, J, Miller, M. - Direct Ridership Model of Bus Rapid Transit in Los Angeles County, UC Berkeley Center for Future Urban Transport: A Volvo Center of Excellence, Institute of Transportation Studies (UCB), UC Berkeley, June 2009

As can be observed in Figure 7, the proposed multiple regression model includes as variables the quality of high capacity service provided in the station area buffer, population and employment densities, presence (or not) of dedicated lane, parking supply and distance to the nearest BRT stop. Even though distance to next stop is used to capture the size of the catchment area, there are no variables related to the walkability within the station area (as connectivity indices are not present in the proposed model). The model captures changes in service, as well as changes in density and parking capacity, but is not designed to capture changes to the active transportation network, which reduces its applicability for the assessment of the impacts of first-last mile strategies.

LRT First & Last Mile (FALM) Strategic Model

Viacity is a GIS-based pedestrian, bicycle and transit connectivity planning service and software developed by the Transpo Group. The software uses Route Directness Index (RDI), which is a comparison of the straight line distance between two points with the actual route between these points. The more direct a route is, the higher the RDI is, with RDI equal to 1.0 if the route is a straight line. These metrics have been packaged to serve as input to a tool, the LRT First & Last Mile (FALM) Strategic Model, which would allow for the estimation of walk connectivity to stations, as well as the increase in station boardings resulting from improvements to walk connectivity. It considers the effect of the built environment variables around the station:

- Density – population and employment
- Diversity – mix of land use
- Design – quality of the urban street network
- Destination accessibility – LRT service frequency
- Distance to transit – walk connectivity

The FALM Strategic Model was developed through the application of multiple regression analysis to determine the "built environment" variables that have the strongest influence on predicting daily walk boardings at 28 non-downtown LRT stations within the Portland urban area. Similar to the tool proposed in the TCRP Report 153, it uses data made available through the Center for Transit Oriented Development (CTOD), but employs a set of measures of land parcel-specific connectivity to LRT stations within a 0.5 mile buffer based on RDI.

Parcel-based RDI measurements for high capacity transit station areas have been applied in recent studies to stations/stops for Sound Transit, Tri-Met and DART.

This tool has great potential to assess the impacts of changes to non-motorized access within the vicinity of the station area, but the efficiency and transferability of the model to other transit systems (other Cities/agencies as well as other modes – heavy rail, commuter rail and BRT) are not contemplated in the existing version, but are considered to be next steps of the process. This is a weakness of this tool, but this could be overcome with the appropriate data collection and calibration to local conditions.

http://www.viacity.info/wp-content/uploads/2012/02/ViaCity_FALM_Model.pdf

Ridership+

Ridership+ is a series of regression-based direct ridership forecasting tools developed by Fehr and Peers. This tool incorporates livability values, and has been used in the development of forecasts for the BART system in San Francisco and also utilized in Los Angeles County in the Westside Subway Extension, Westside Mobility Plan and the Downtown Los Angeles Streetcar Project. The tool has been used in streetcar, bus rapid transit, light rail and heavy rail projects, most of them in California. The model was used to estimate ridership changes on the BART system contains, along with the traditional variables of population, employment and parking supply at the stations, a walkability measure, where the design of the street network and pedestrian environment affect ridership.

The focus of this model has been high capacity transit. This model has been developed as a forecast model for future stations and estimates ridership for new stations based on existing patterns and behavior rather than estimating changes to demand at existing stations, which reduces its applicability in the assessment of the anticipated impacts to ridership at existing transit stations due to the implementation of first-last mile strategies at these stations. Therefore, this model does not meet the requirements of this study.

Pedestrian Environmental Quality Index/ Bicycle Environmental Quality Index (PEQI/BEQI)

The Pedestrian Environmental Quality Index (PEQI) is a tool developed by the San Francisco Department of Public Health and used to prioritize improvements in pedestrian infrastructure during the planning process. The PEQI is an observational survey that quantifies street and intersection factors empirically known to affect people's travel behaviors. Thirty-one empirical indicators are organized into five categories: intersection safety, traffic, street design, land use

and perceived safety. The data collected is entered into a customized Microsoft Access table, and a score is produced reflecting the quality of the pedestrian environment.

Bicycle Environmental Quality Index (BEQI), also developed by the San Francisco Department of Public Health, is a quantitative observational survey developed to assess the bicycle environment on roadways and evaluate what streetscape improvements could be made to promote bicycling in San Francisco. Twenty-one indicators are organized into 5 categories for this tool.

These two tools can be used to help assess the quality of the infrastructure along access routes to the station and further refine the access sheds for each station. It is a very time consuming process, as data has to be entered for each stop and each segment considered, but is a valuable tool to understand the anticipated perceived changes to the non-motorized environment

These tools are good for assessing improvements to infrastructure, but are not applicable for assessing the how these improvements would change ridership. Combined with a quantitative tool like FALM, they could provide for the adequate assessment of accessibility and ridership.

Proposed Metrics

The proposed metrics to analyze the impact of first-last mile strategies on station ridership are a combination of the tools analyzed on the previous pages. The assessment of the impact of adding or changing the parking conditions at the station as well as the implementation of transit-oriented development can be assessed through the use of the tool provided in the TCRP Report 153, and the metric analyzed should be the estimated passenger gain given the cost of implementation of the strategy.

For non-motorized access, it is suggested that the change in ridership be estimated given the change in the access shed. FALM, the most elaborate tool available, is currently not calibrated for Los Angeles County, and therefore it is proposed that initially, the shed be calculated considering the population and employment that can reach the station in a 15 minute timeframe, given the existing network, and the existing access share for the station being analyzed, and that the metric analyzed should be the estimated passenger gain given the cost of implementation of the strategy. This provides for a comparison, if need be, to the implementation or increase in parking at stations.

Changes to walking time can be implemented by providing adequate and accessible sidewalks which increases the average walking speed, providing more crossing points as well as improved crossing at heavy pedestrian traffic intersections, providing bike paths and signalization, as well as improving bicycle facilities at the stations that are operating at capacity.

Tool Analysis Findings

Access conditions vary significantly between motorized and non-motorized modes from station to station and place type to place type. Therefore, it is recommended that Metro consider the application of a hybrid approach to determine the likely impact of changes to station ridership given changes to accessibility in the station area. One tool would be focused on changes regarding parking and TOD strategies and one on active transportation strategies.

The identification of modal access targets for transit stations and stops is a task that can be best accomplished after the data regarding existing mode access is compiled for the several types of stations that exist in the County of Los Angeles. The O-D survey provides a good set of data, but the sampling plan was developed according to Metro routes, and not Metro stations. The survey also only captures the users that are already in the system, and not those that could be part of the system if access conditions compatible with their needs were provided to stations.

Instead of regional access targets, due to variation observed in the station access mode shares for the various station types (and also within station types) it is proposed that Metro consider a range of access shares as a reference point and test and implement strategies that can change the average share for the place type to reflect Metro's active transportation policies. In regards to metrics, non-motorized and motorized related access improvements to stations can be assessed through:

1. Non-motorized access: The increase of the active transportation shed around the stations, with the goal of increasing the number of riders as the shed expands. For example, the expected increase in ridership can be defined given the change between the population/employment within a 0.5 mile buffer around the station and the population/employment that can actually reach the station given the characteristics of the active transportation network available and the network with the proposed improvements.

2. Motorized access: The changes to ridership given parking strategies as well as implementation of transit-oriented developments in the station area.

All models identified as potential candidates rely heavily on station data. Some of the data regarding socioeconomic variables surrounding the station/stop can be obtained from the United States Census or from other sites such as the Center for Neighborhood Technology's TOD Database (toddata.cnt.org), but the data gathering is labor intensive and time consuming, which increases as further geographic detail is needed.

In the near future, the benefits of the proposed active transportation projects can be assessed through station surveys, while existing models identified in this memo are refined to reflect the access behavior within Los Angeles County and therefore be suitable to be used as predictive of the anticipated changes in station mode access.

Most research has been conducted on high capacity transit stations or stops. The TCRP Report 153 provides for standard mode splits according to several station types, but it must be noted that the use of this tool regarding the assessment of changes to station area access is heavily dependent on the use station specific data. The TCRP Report 153 also is more focused on the changes to ridership given changes to parking and TOD characteristics, and does not consider non-motorized access improvements directly in the model. The model can be used for predicting changes to ridership given changes to land use (TOD development) as well as changes to parking supply and strategies, but is not effective in predicting the changes in mode access and ridership given improvements to the non-motorized network.

The methodology proposed in the LRT First & Last Mile (FALM) Strategic Model captures the benefits of adding or improving non-motorized connections to the station area, but this model has to date only been tested on a small number of stations, and needs to be further enhanced to incorporate a larger data set, with a greater variety of locations and access modes in order to provide portability. The most important feature of this model is the incorporation of the possibility of changing the built environment and the anticipated increase in non-motorized access modes. It must be noted that this methodology requires parcel-level data in order to compute the RDI. It is recommended that Metro monitor the further development of this tool, as it can provide quantitative benefits to connection improvements, but it is unlikely that this tool can be immediately applied to stations in Los Angeles County. In the meantime, the overlay of the access shed and the available socioeconomic data (Census 2010 and other) can provide for an assessment of the likely impact of changes to non-motorized station access.

It must be noted that improvements should not be guided solely by the changes predicted to ridership, given that some improvements to station access area cannot be captured directly by the proposed models, and a more holistic approach is recommended to augment the information available for decision makers.

Sarah Jepson – August 20, 2013

Application of Interim Station Access Assessment Tool

This section presents the application of the interim tool recommended to analyze station access. The application is focused on the non-motorized access to the station, and the methodology and results are presented in the following pages. This interim tool has been developed by IBI to provide Metro with an evaluation tool in the interim timeframe while other tools (in particular to FLAM tool profiled above) are further developed and refined by others to provide better measurements of ridership changes resulting from changes to station accessibility.

The methodology for the interim tool is straightforward, and relies heavily on GIS data, with the most time consuming task being the coding of the network for the conditions to be analyzed. The shed size and shape is cross-referenced spatially with socioeconomic data to obtain input for the calculation of access increase and expected increase in ridership.

The increase in ridership relevant to the ridership for the station must be carefully analyzed, as many stations have high percentage of transfers. The implementation of active transportation improvements does increase the quality of the transfer for those already in the system, as the system becomes more efficient in terms of overall time for a trip.

When assessing the impacts of the implementation of first-last mile strategies in areas where station density is such that the half-mile bands overlap, caution should be exercised in order to not double count the changes in socioeconomic data, which can lead to an overestimate of the potential new riders.

The methodology is not capable of measuring the effect of the improvements on the choice of people that live or work within the existing shed. To capture this shift in behavior, pre- and post-implementation surveys should be conducted at the stations where the Metro Path is implemented. The proposed methodology yields numerical results that are considered conservative in terms of the potential change in modal access.

Methodology

The proposed interim methodology was applied to the three station areas that were selected as case study sites for the Path Network: North Hollywood, Watts/103rd and Wilshire/Normandie. This methodology is GIS-based, and the software used was TransCAD, developed by Caliper Corporation, a widely used software, and the same software utilized to develop SCAG's regional travel demand model. The procedure uses the TransCAD's GIS and network functions.
Inputs to the procedure consisted of:

- Census Data
    - Census block geographic database
        - Population 2010 (Source: Census)
        - Total employment 2010 (source: Census - LEHD Origin-Destination Employment Statistics (LODES))
- Street Network
    - Street network geographic database (source: Caliper)
- Metro Rail Stations (source: Metro, complemented by IBI)
    - Geographic database containing all Metro stations

The following paragraphs outline the step-by-step procedure followed to assess the impact of the Metro Path network on the non-motorized access shed around a given rail station, as well as a high-level estimate of the potential ridership increase that can be associated with the increase of the size of the access shed.

First, a half-mile band was generated around each station to be analyzed, and the street and sidewalk network within the area was detailed to represent the existing pedestrian infrastructure.

The pedestrian infrastructure includes the representation of sidewalks on each side of the street, striped crossings and crossings at non-striped locations, as well as other pedestrian connections such as overpasses. Travel time was allocated for each link, based on the following assumptions:

- Sidewalks or pedestrian paths with no interaction with traffic – speed of 2 mph
- Pedestrian crossings at signalized intersections – speed of 2.4 mph, plus 27s delay (average estimated time that pedestrians would have to wait for the walk signal)
- Pedestrian crossings at striped non-signalized intersections or locations – 2.4 mph (no delay was added as it was assumed that vehicles would be more aware of pedestrians, and the latter would be able to cross the street shortly after arriving)
- Pedestrian crossings at non-striped locations – 2.4 mph, plus 30s delay (average estimated time that pedestrians would wait for a break in traffic before crossing)

Freeways and other express roadways included in the GIS database were not considered as pedestrian infrastructure and were coded to ensure that these links, even though part of the database, were not a viable option for the pedestrian to use when walking to and from the station.

Once the base pedestrian infrastructure was coded, TransCAD was used to generate a transportation network, and then network bands were built around the station and overlaid with the Census layer, providing the base assessment of the non-motorized access shed. The bands were built considering 5-minute travel intervals and represent the distances that can be reached from the station within 15 minute time period. The shape of the band is an indicator of how the pedestrian infrastructure affects accessibility to the station.

The street database was modified to include the changes proposed by the Metro Path concept for the station being analyzed. New network and associated network bands were then generated, providing the assessment of the applied Path Network shed. Changes to infrastructure included the inclusion of new connections and improvement of existing connections such as the consideration of shorter crossing distances at signalized intersections as well as the striping of crosswalks. Travel time allocated for each link was recalculated considering the input above, with the exception of the time to cross the street at signalized intersections, where the added time (delay) was reduced from 27s to 24s to account for signal phasing improvements.

The socioeconomic data for each of the infrastructure configurations was then input into a Microsoft Excel spreadsheet to estimate the net change in access to station and the potential benefits in terms of ridership that the increase in access could provide.

The following pages contain the results obtained for the three stations analyzed.

Sarah Jepson – August 20, 2013

North Hollywood Station

North Hollywood is the terminus station for the Metro Red Line and for the Metro Orange Line. The two station areas are separated by Lankershim Boulevard, and the station area to the east (Metro Red Line) has a park-and-ride lot located next to it, as well as a small bus terminal. This station is among the Metro stations with the highest boardings. For purposes of analysis, the location of the Red Line station was considered as the origin for the time analysis. Socioeconomic data within a 0.5 mile (15-minute walk without any interference) from the station is as follows:

- Population – 11,675
- Workers – 5,130
- Jobs – 4,535

It is important to note that the urban fabric and street layout play a strong role in the definition of access routes to the station. Considering the same average speed for walking on sidewalks (2 mph), the existing infrastructure, the number of street crossings (signalized, striped only or not marked), in a 15-minute period of time, it is anticipated that the number of residents (population), workers and jobs reached would be about half of the amount existing in the circular 0.5 mile band around the station. The shape of the existing 15-minute access shed is shown in Figure 7.

Sarah Jepson – August 20, 2013

Figure 7 – Existing 15-minute walk access shed – North Hollywood Station

The analysis of the area surrounding the station indicated that there were numerous active transportation connections that could be improved. Figure 8 illustrates the Metro Path concept for the North Hollywood station area.

Sarah Jepson – August 20, 2013

Figure 8 – Metro Path Concept – North Hollywood Station

The implementation of the Metro Path concept in the network surrounding the North Hollywood station includes the following elements:

- Inclusion of a pedestrian cut-through in the parking lot in order to streamline the connection from the area north-east of the station
- Inclusion of a pedestrian cut-through in the North Hollywood Park to increase the shed in the southwest direction
- Time gains regarding improvements at signalized intersections
- Time gains due to improvements at pedestrian crossings along the Path Arterial connections

These improvements to pedestrian access and travel time in the area surrounding the station expanded the 15-minute access shed, as can be seen in Figure 9.

Sarah Jepson – August 20, 2013

Figure 9 – Metro Path 15-minute walk access shed – North Hollywood Station

The Metro Path enhancements increase the access shed within the half-mile boundary, but there is still a pocket northwest of the station that is out of reach of the 15-minute travel time period. This is because there is no outlet for the street to connect to Lankershim Boulevard. If a connection could be established, the observed gap would close. It was also observed that there are a number of intersections that do not have pedestrian crossing treatments in the vicinity of the station, many of them located on Path Collectors. A second network including these extra connectivity enhancements was tested, and the results regarding the access shed are displayed in Figure 10.

Sarah Jepson – August 20, 2013

Figure 10 – Enhanced Metro Path 15-minute walk access shed – North Hollywood Station

The application of the additional improvements to the pedestrian network increased the overall accessibility to the station, and it is estimated that the population and employment levels within a 15 minute walk increases about 5% in the first scenario tested, and over 15% for the enhanced access scenario. Assuming a similar magnitude change in ridership, these improvements could result in a ridership increase of as high as 100 to 200 boardings per day at the station above current levels. However, the ridership survey indicates that North Hollywood is a station with a large number of transfers, with about 70% of the riders boarding the Metro Red Line at that location coming from other bus lines or from the Orange Line. Under these circumstances, the resulting forecast increase in ridership given the change in accessibility to the station would range from about 2% to 4% above current levels.

Sarah Jepson – August 20, 2013

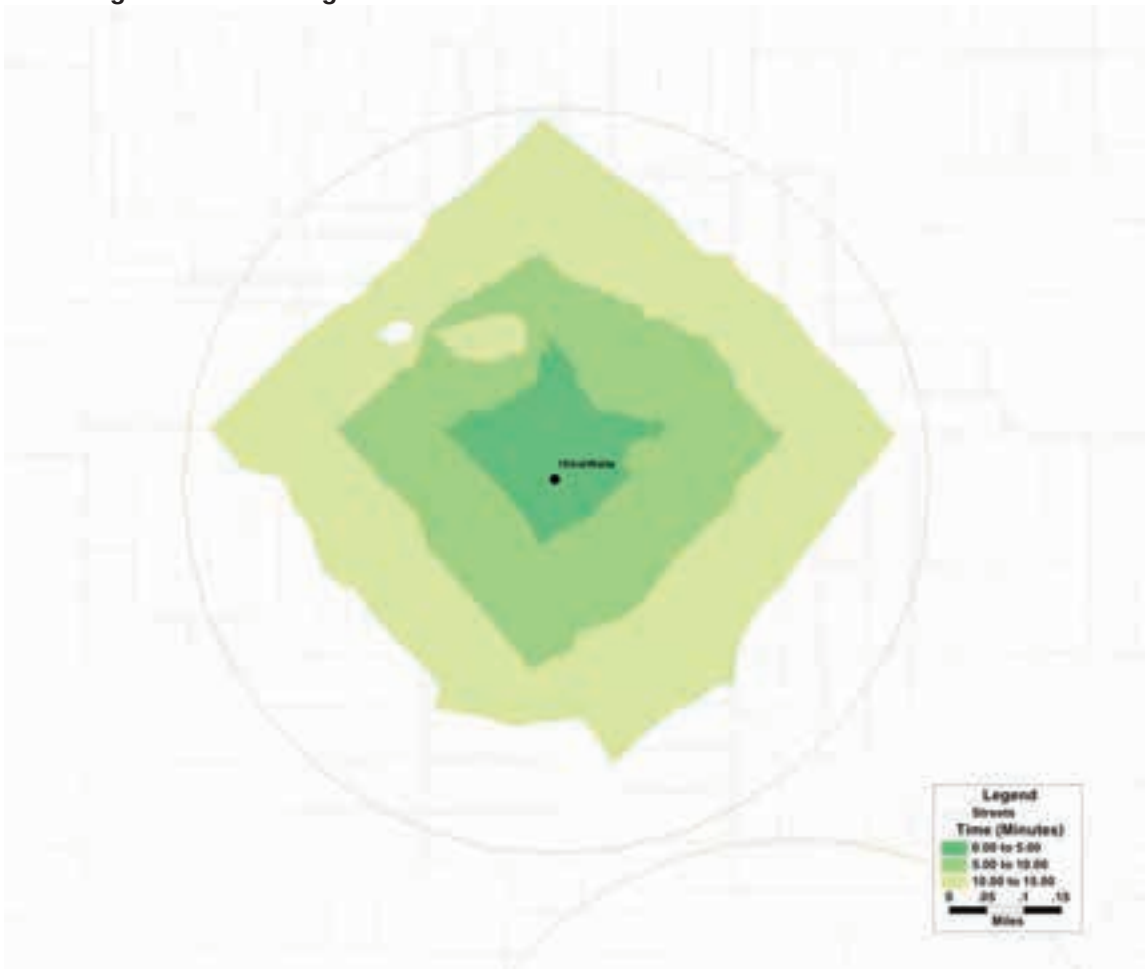
103rd Street/Watts Station

The 103rd Street/Watts Station is a station located along the Metro Blue Line, in the vicinity of Grandee Avenue and 103rd Street. Socioeconomic data within a 0.5 mile (15-minute walk without any interference) from the station is as follows:

- Population – 12,672
- Workers – 3,170
- Jobs – 1,529

The pedestrian network in the area is constrained by gated communities, as well as by the rail tracks. Considering the same average speed for walking on sidewalks (2 mph), the existing infrastructure, the number of street crossings (signalized, striped only or not marked), in a 15-minute period of time, it is anticipated that the number of residents (population), workers and jobs reached would be about half of the amount existing in the circular 0.5 mile band around the station. The shape of the existing 15-minute access shed is shown in Figure 11.

Figure 11 – Existing 15-minute walk access shed – 103rd Street/Watts Station



Sarah Jepson – August 20, 2013

Figure 12 illustrates the Path concepts proposed for the street network surrounding the 103rd Street/Watts Station. The resulting forecast change in the access shed shape is illustrated in Figure 13.

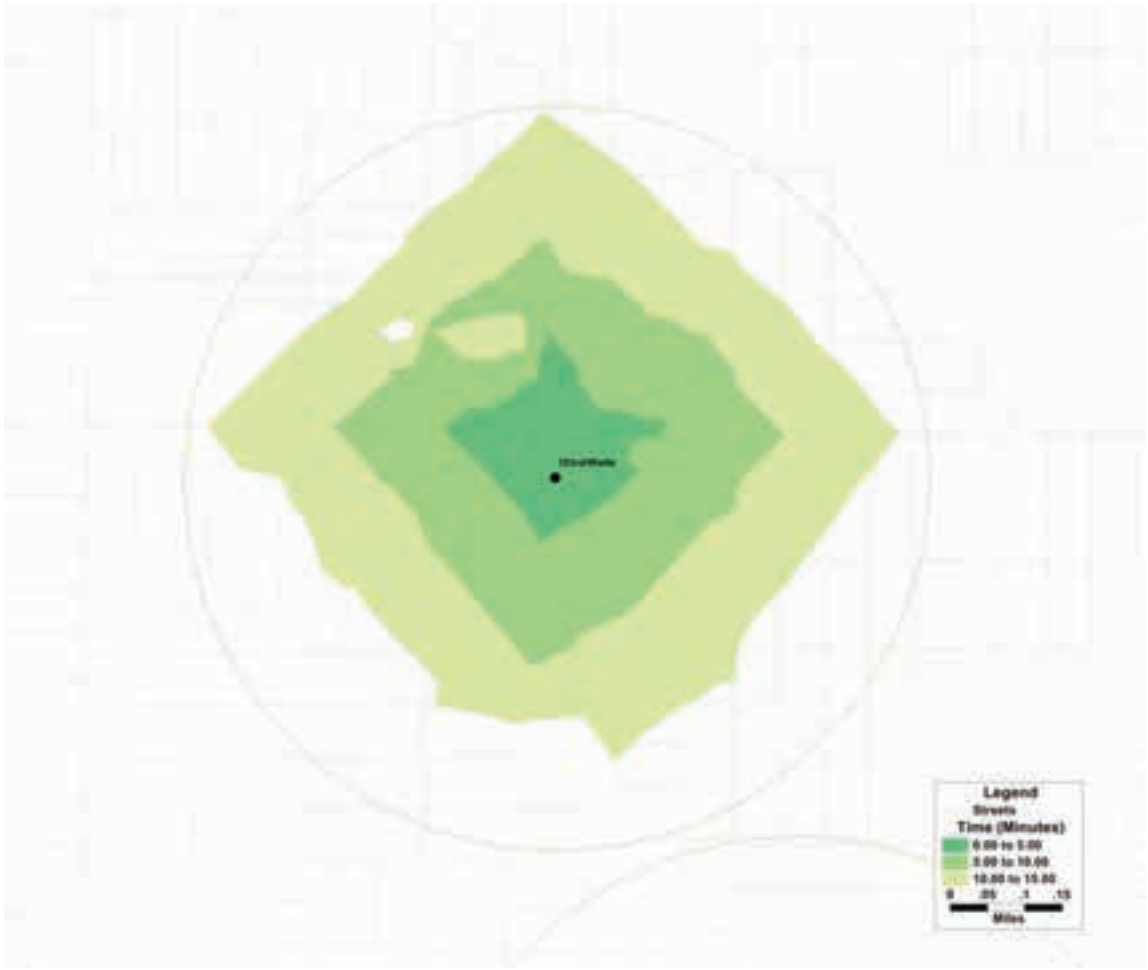
Figure 12 – Metro Path Concept – 103rd Street/Watts Station

The implementation of the Metro Path concept in the network surrounding the 103rd Street/Watts station includes the following elements:

- Improvement of the east-west connection to the station
- Time gains regarding improvements at signalized intersections
- Time gains due to improvements at crossings along the Path Arterial connections

Sarah Jepson – August 20, 2013

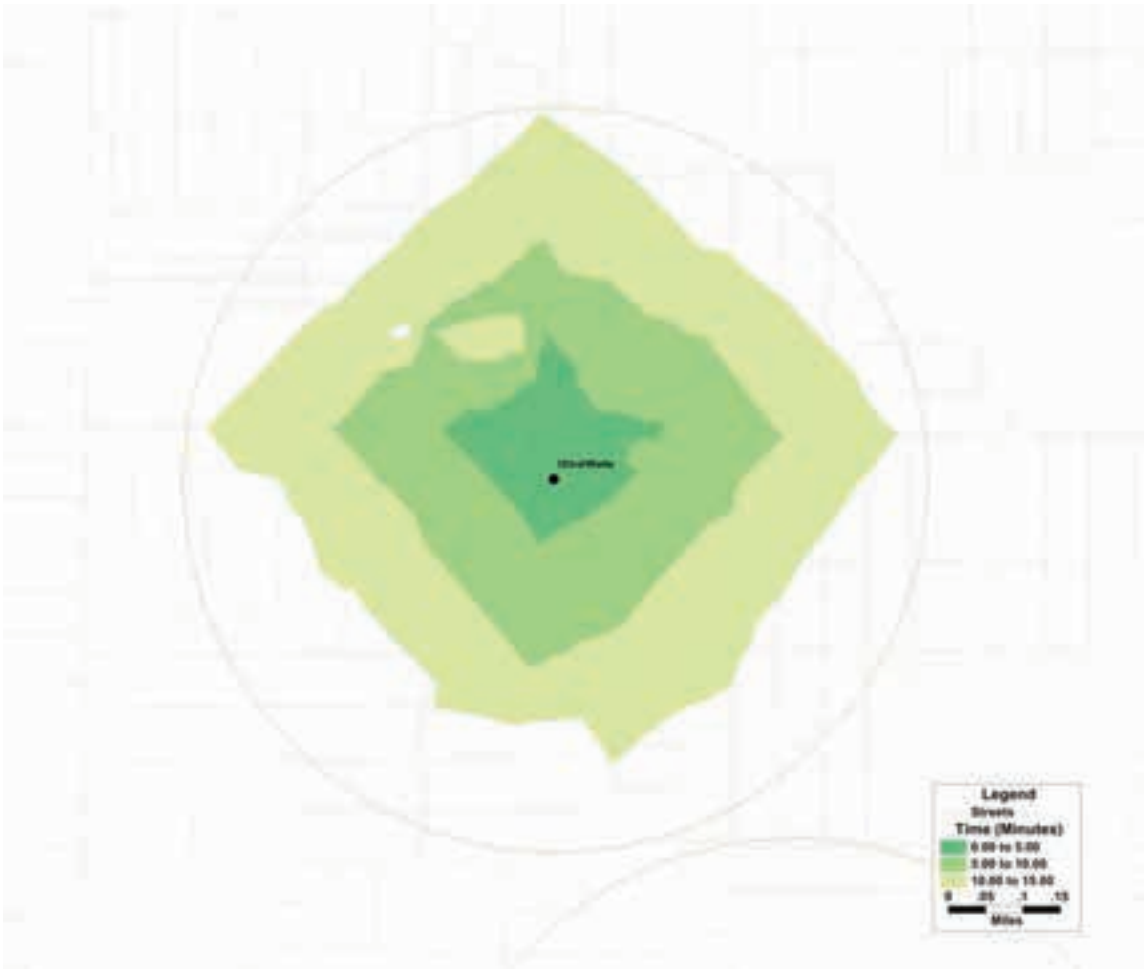
Figure 13 – Metro Path 15-minute walk access shed – 103rd Street/Watts Station



Additional improvements to the street network resulted in a slight increase in shed size, as can be seen in Figure 14.

Sarah Jepson – August 20, 2013

Figure 14 – Enhanced Metro Path 15-minute walk access shed – 103rd Street/Watts Station



The access to the station from the south is one of the constraints that impacts the size and shape of the access shed. The application of the improvements to the pedestrian network increased the overall access to the station, and it is estimated that the population and employment within a 15 minute walk increases about 2% in the first scenario tested, and 4% for the enhanced access scenario, which could result in a ridership increase of 15 to 30 boardings per day at the station. The ridership survey indicates that 103rd Street/Watts is a station with a small number of transfers, with only 25% of the riders boarding the station from other transit lines. The resulting forecast increase in ridership given the change in accessibility to the station would range from about 1.5% to 3%.

Sarah Jepson – August 20, 2013

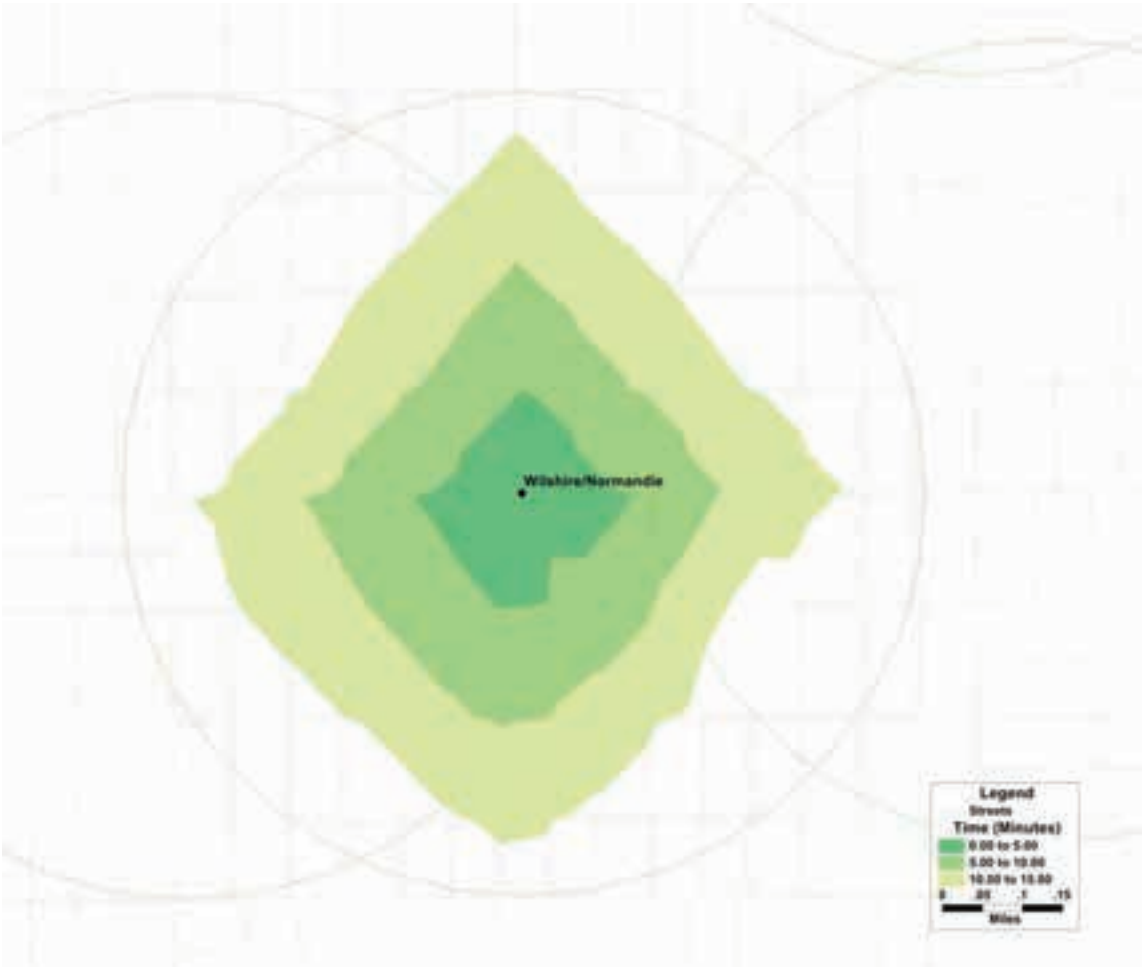
Wilshire/Normandie Station

The Wilshire Normandie Station is a station located along the Metro Purple Line, in the vicinity of Wilshire Boulevard and Normandie Avenue. This station is located in a high density area, as can be observed from the socioeconomic data within a 0.5 mile (15-minute walk without any interference) of the station:

- Population – 38,838
- Workers – 12,278
- Jobs – 23,302

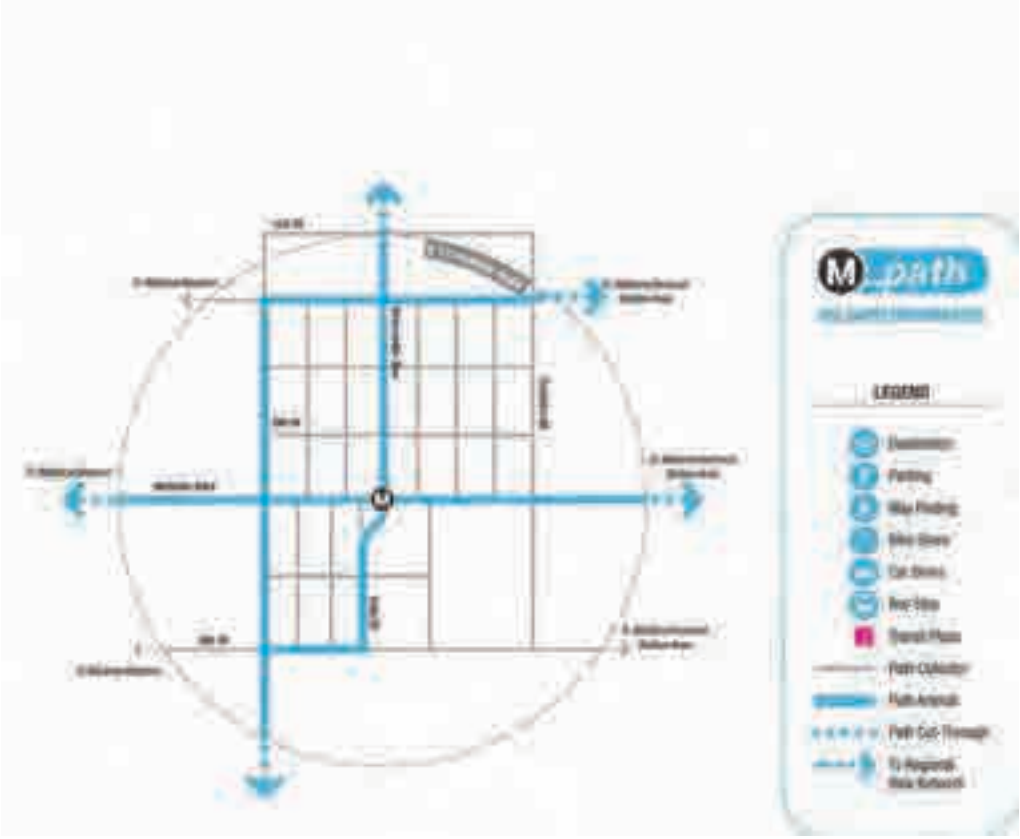
The street grid in this station area is regular and closely spaced. Considering the same average speed for walking on sidewalks (2 mph), the existing infrastructure, the number of street crossings (signalized, striped only or not marked), in a 15-minute period of time, it is anticipated that the number of residents (population), workers and jobs reached would be about half of the amount existing in the circular 0.5 mile band around the station. The shape of the existing 15-minute access shed is shown in Figure 15. The proposed Path concept is illustrated in Figure 16.

Figure 15 – Existing 15-minute walk access shed – Wilshire Normandie Station



Sarah Jepson – August 20, 2013

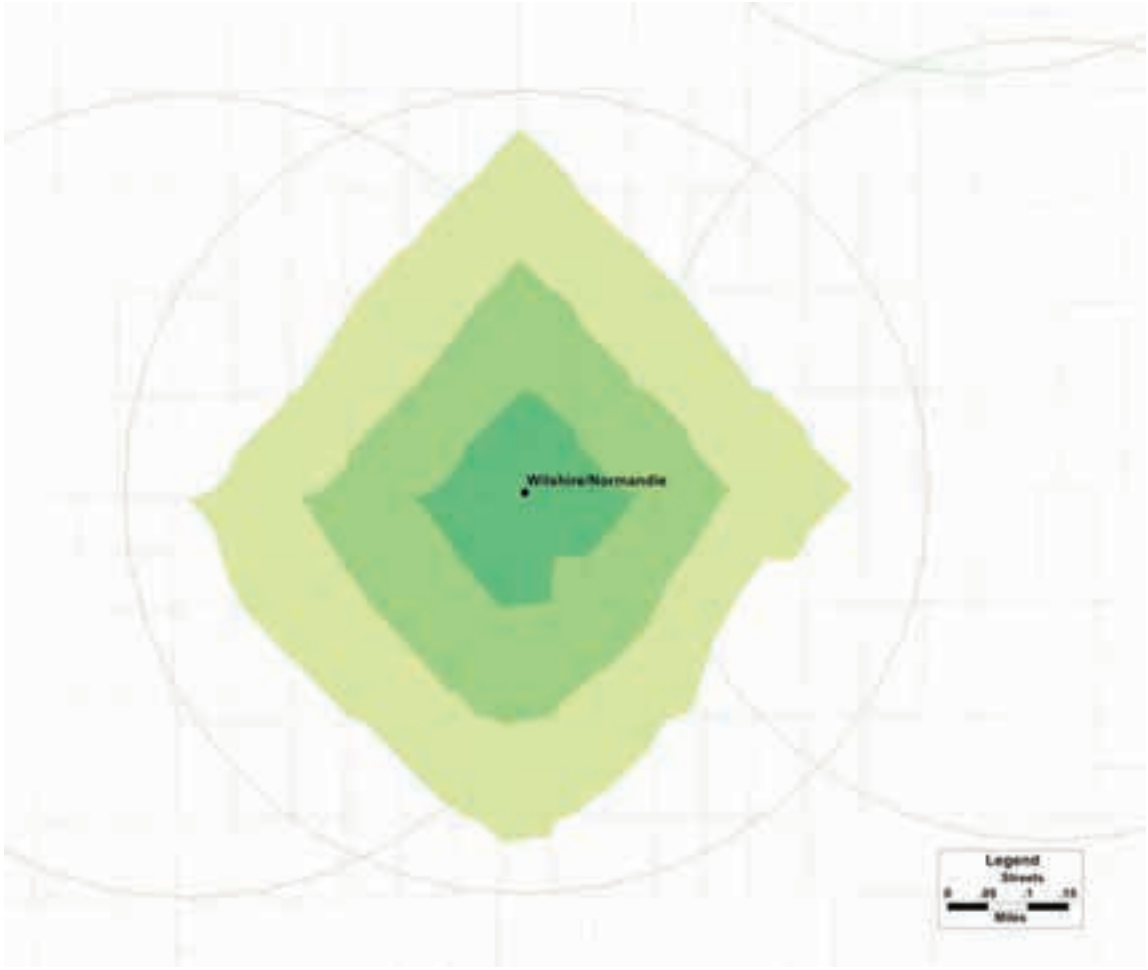
Figure 16 – Metro Path Concept – Wilshire/Normandie Station



It is important to notice that the stations are closely spaced, and that the benefits of the expansion of the shed towards the neighboring stations should be viewed with caution, as there is the potential of considering the benefit more than once. As the network is more consolidated, the changes to the network are not as noticeable as for the other two stations analyzed, and were limited to improvements at signalized intersections and crossings at Path Arterials. The changes in the shape of the access shed are shown in Figure 17.

Sarah Jepson – August 20, 2013

Figure 17 – Metro Path 15-minute walk access shed – Wilshire/Normandie Station



The changes proposed to the pedestrian network increased slightly the overall access to the station, and it is estimated that the population and reached within a 15 minute walk increases about 2%, which could result in a forecast ridership increase of 55 boardings per day at the station. The ridership survey indicates that the Wilshire/Normandie is a station with a small number of transfers, with only 25% of the riders boarding the station from other transit lines. The anticipated potential increase in ridership given the change in accessibility to the station would be about 1.5% to 3%.

Sarah Jepson – August 20, 2013

Summary

The proposed methodology yields numerical results that are considered conservative, given that it does not capture behavioral changes relative to the qualitative improvements in the overall streetscape. This is an especially important feature for the older population, which has limited mobility when compared to adults and young adults. A study published by Daniel Baldwin Hess in the Journal of Transport and Land Use (http://jtlu.org/) indicate that models estimate that in the City of San Jose, California, each additional 5 minutes in perceived walking time to transit decreases ridership frequency by 5% for non-drivers, and by 25% for drivers.

The potential to improve access varies by location (place type), but is also impacted by local configurations such as the street fabric and the location of the population and employment densities relative to the station. Caution should be exercised in areas of high station density (stations closer than 0.5 mile) in order to not double count the changes in socioeconomic data, which can lead to an overestimate of the potential new riders.

FIRST LAST MILE
STRATEGIC PLAN

Appendix
Taxonomy of Mobility Devices

GREEN MODE-HUMAN POWERED-PEDESTRIAN-WALKING

Description & Trends

Walking is not only one of the best forms of exercise, but the most common mode of transportation. Urban planners have focused recent efforts on creating a built environment that allows people to walk; communities with pedestrian-friendly areas, and in some cases partially car-free, allow commuting, shopping, and recreation to be done by walking. Walking, alone, may not meet the needs of all trips, but it is easily combined with other active modes and public transit because it requires no additional facilities or amenities to transition into/out of.

As wheeled active and electric devices grow in popularity, maintaining a safe and comfortable environment for all types of walkers (leisurely shoppers, exercisers, commuters, etc.) will be increasingly important, as many of these other devices utilize sidewalks.

Multi-Modal Access

Walking is an integral part of most trips, and as the base mode of human movement will remain so. The infrastructure that supports this mode includes a range of associated facilities including; sidewalks, street crossings, lighting, signage, technology, landscaping and canopies to name a few. People are more likely to utilize transit if the urban environment is conducive to walking.

Average Speed*

3 mph

Range = 2 - 4 MPH

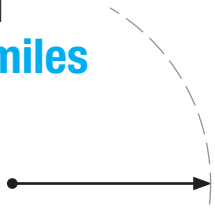
Dynamic Envelope

3 ft

(Minimum width)

Average Ten Minute Access Shed

0.5 miles



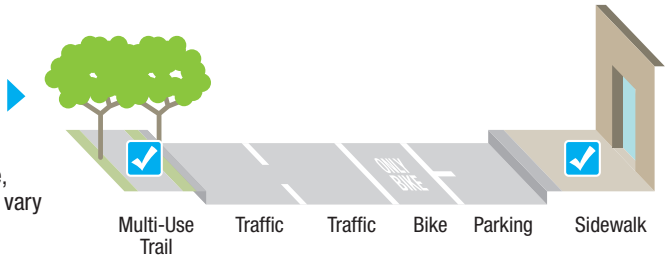
Energy Requirements**

Human powered:

90 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: All Ages

* http://walking.about.com/library/cal/uccalc1.htm

** Based on the National Center for Health Statistics average weight for adult males, in the United States, of 175 lbs. http://walking.about.com/library/cal/uccalc1.htm

GREEN MODE-HUMAN POWERED-PEDESTRIAN-JOGGING/RUNNING

Description & Trends

Typically, jogging/running is a competitive or fitness related activity, that can take place on popular pedestrian and bicycle routes, and therefore should be considered in the design of first/last mile connections. Theoretically, jogging/running for transportation is within the reach of more people than driving a car. It is cheaper than public transit, or purchasing a bicycle, but it is difficult to translate into a reality in some circumstances.

Multi-Modal Access

Like walking, transitioning between jogging/running and other modes of public transit is easy, due to the lack of equipment and facilities required; however, to make it feasible as a transportation option, commuters often have to identify alternative solutions, such as amenities (shower, lockers, etc.) at or near their destination.

Supporting third party programmatic elements such as fitness centers can help commuters fold their exercise routines into their commute and should be explored where possible. Some locations (such as remote low density commuter nodes) could even support integrated shower and changing facilities into the stations themselves.

Average Speed*

6 mph

Range = 5 - 12 mph

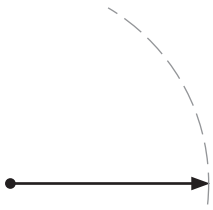
Dynamic Envelope

3 ft

(Minimum width)

Average Ten Minute Access Shed

1 mile



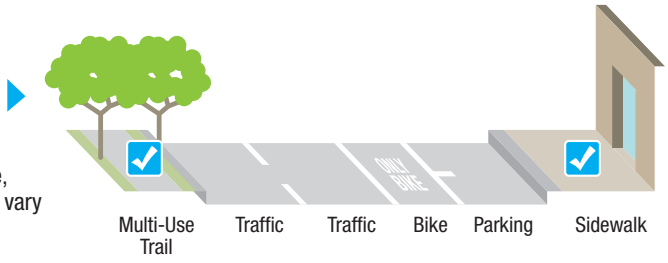
Energy Requirements**

Human powered:

130 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Teens/Adults 12-65 yrs.

Secondary: Adults/Seniors > 45 yrs.

* National Council on Strength & Fitness

** Based on the National Center for Health Statistics average weight for adults males, in the United States, of 175 lbs. http://www.healthstatus.com/calculate/cbc

GREEN MODE-HUMAN POWERED-PEDESTRIAN-PUSH/PULL

Description & Trends

Carts, strollers, and wheelchairs are common on today's sidewalks in urban and suburban environments. These devices are typically associated with critical daily functions, such as transporting groceries, babies, or the disabled. As these devices are wheeled, they require smooth and even rolling surfaces to be effectively used. As sidewalks become more crowded with new mobility devices, these devices which typically require larger spaces to operate become difficult to maneuver efficiently.

Multi-Modal Access

Wheelchairs, when being assisted by an individual, have been accounted for in the design of light rail and bus transit; however, the minimum clearance requirements at boarding and alighting points are not always met.

Furthermore, the varying sizes of strollers and hand carts (for groceries, laundry, freight, etc.) are a challenge to accommodate on busses and trains comfortably, alongside other commuters. Station access routes should be designed to accommodate the use of such devices and elevators, lifts and low incline ramps must be provided to assure easy access to platforms.

Average Speed*

3 mph

Range = 2 - 4 MPH

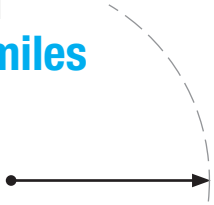
Dynamic Envelope

4 ft

(Minimum width)

Average Ten Minute Access Shed

0.5 miles



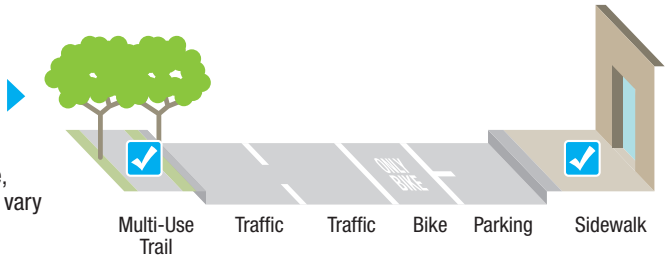
Energy Requirements**

Human powered:

90 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.

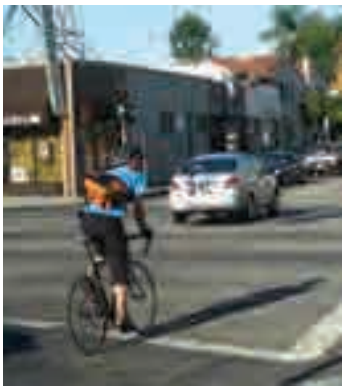


Demographics

Primary: Adults/Seniors

* http://walking.about.com/library/cal/uccalc1.htm

** Based on the National Center for Health Statistics average weight for adults males, in the United States, of 175 lbs. http://walking.about.com/library/cal/uccalc1.htm



GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-ADULT BICYCLES

Description & Trends

There is a vast range of bicycles including; mountain, BMX, utility, folding, road/race, recumbent, and hybrids that are utilized for commuter trips.

Bicyclists can achieve significant commute lengths in reasonable time frames, and if opportunities for showers, changing, and storage facilities are leveraged, that length can be increased even more. Bicycles are becoming an increasingly popular form of urban transportation. A survey of 55 major metropolitan areas in the U.S. found that bicycle commuting rates increased, on average, 70 percent between 2000 and 2009.

Multi-Modal Access

Bicycle transportation has received significant attention in recent years due to its potential to increase mobility, alleviate traffic congestion, reduce negative environmental impacts, and combat public health issues, but bicycle commuting still represents a small percentage of overall commuters. Better bicycle facilities are needed most notably on routes leading to transit nodes. Bike storage solutions are important as are strategies that allow bicyclists to bring their bikes with them on busses and trains. Ramps and lifts that can accommodate bikes are critical when making vertical transitions within stations.

Average Speed*

15 mph

Range = 9 - 20 mph

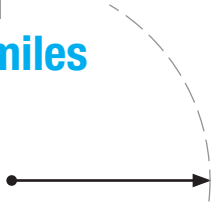
Dynamic Envelope

3ft–4 ft

(Minimum width varies from bicycle - tricycles)

Average Ten Minute Access Shed

2.5 miles



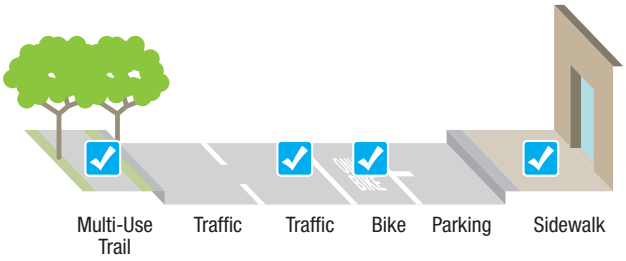
Energy Requirements**

Human powered:

55 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Adults 25-65 yrs.

Secondary: Seniors > 65 yrs.

* The average bicycle speed used in commuter bike lanes, according to "Transportation Infrastructure and Engineering", by Lester A. Hoel.
** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://www.healthstatus.com/calculate

GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-CHILD BICYCLES

Description & Trends

Children's bicycles and tricycles are made of both steel and plastic frames. While typically used in suburban communities, children on bicycles and tricycles have become more common on sidewalks in urban environments, often commuting alongside parents and adults. The age of users being young, requires additional safety precautions, especially given the number of devices also used on sidewalks, and the range of speeds they will be mixed with.

Multi-Modal Access

The most important consideration to make when considering mobility infrastructure for children riding bikes, is they should not be expected to utilize bike facilities that are integrated with the vehicular roadway. Children's bicycles have the same functional requirements when considering access to transit as their adult counterparts, though they are typically too small (or the riders are too small) to be effectively mounted on bus racks. Accommodations should be made to allow the easy transition onto busses and trains especially when considering public transit offers a safe route to schools, and bikes help extend the associated access shed of students.

Average Speed*

7 mph

Range = 5 - 10 mph

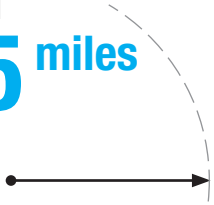
Dynamic Envelope

2ft

(Minimum width)

Average Ten Minute Access Shed

1.25 miles



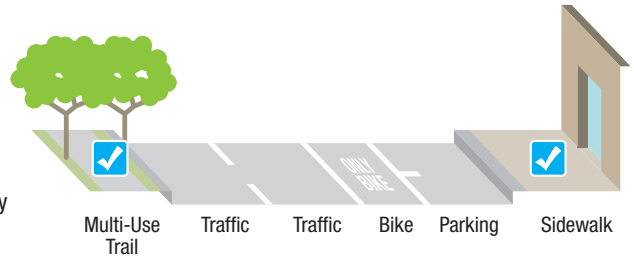
Energy Requirements**

Human powered:

40 cal/mi

Observed Street Use

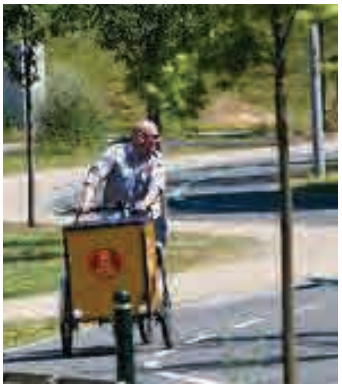
Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Children 2-10 yrs.

* The average bicycle speed, according to "Transportation Infrastructure and Engineering", by Lester A. Hoel.
** Based on the maximum pediatric recommendations for weight of 10 year old, in the United States, of 100 lbs. This number reflects the high end of the demographics that typically use this device. http://www.healthstatus.com/calculate



GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-FREIGHT BICYCLES

Description & Trends

The modern evolution of the cargo-bike as personal transport began in Europe in the 1980s, with Holland and Denmark as epicenters; kid-and-grocery-carrying bakfiets ("box bike") caught on with families. Urbanites and suburban dwellers are swept up in the cargo-bike cult, integrating bicycles into their daily lives. In Brooklyn, cargo-bikes have become the most fashionable means of delivering kids to school.

Freight bicycles come in many varieties including tricycle and tandem style, and store cargo on open platforms, built-in cargo cases, open buckets, and often times homemade contraptions for securing freight.

Multi-Modal Access

While freight bicycles are not typically used as a part of a longer commute, they are a growing trend used for both residents (running errands, transporting children) and businesses (delivering food, mail, and other goods) that will require special consideration to fit into the larger mobility puzzle. Their larger spatial requirements may need special bicycles lockers and parking to keep from over capacitating existing bicycle infrastructure.

Average Speed*

12.5 mph

Range = 9 - 20 mph

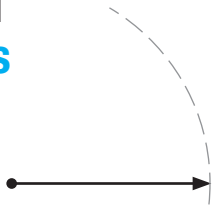
Dynamic Envelope

4 ft

(Minimum width)

Average Ten Minute Access Shed

2 miles



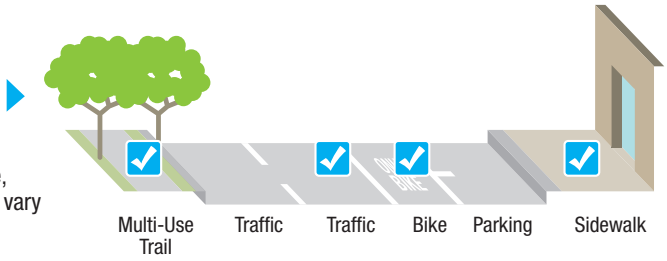
Energy Requirements**

Human powered:

90 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Adults 25-65 yrs.

Secondary: Teens/Young Adults 12-25 yrs.

* http://bikes-as-transportation.com

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs.- weight was multiplied by a factor of 1.5 to account for freight. http://www.healthstatus.com/calculate

GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-WHEELED SHOES

Description & Trends

Heely's were patented in late 2000, and are the most common brand of roller shoes sold in the U.S. (followed by Street Gliders, a similar product that attaches to regular shoes). After becoming popular in Korea, Singapore, and Europe, Heely's, Inc. shipped over 10 million pairs to the U.S. between 2000 and 2007, with sales tripling from 2005-2006. In 2007 sales fell drastically, and roller shoes remain a blip in the market of alternative mobility devices.

An important aspect to consider when considering this mobility device, is the fact that the millions of pairs that have been sold in the U.S. have almost exclusively been sold to today's youth. This suggests a demographic that is being exposed to an alternative mobility device at a young age, and reflects a desire and willingness to use such new devices. As this demographic group ages, it is expected they will continue to do so.

Multi-Modal Access

If Heely style devices became a larger part of the market, they could contribute to pedestrians' commuters' ease and time efficiency, and expand the distance that can be covered comfortably. And as a device that is integrated with shoes, they essentially have no spatial impact on existing infrastructure.

Average Speed*

4 mph

Range = 3 - 6 mph

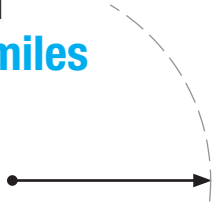
Dynamic Envelope

3ft

(Minimum width varies from bicycle - tricycles)

Average Ten Minute Access Shed

.65 miles



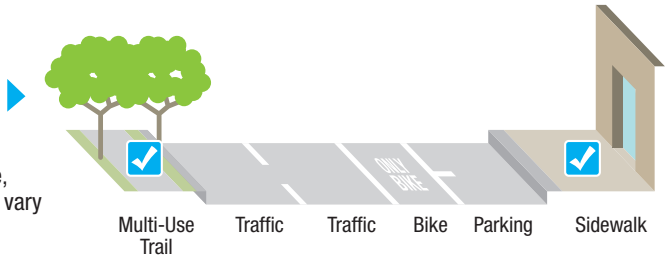
Energy Requirements**

Human powered:

70 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Children/Teens 6-15 yrs.

Secondary: Young Adults 16-20 yrs.

* Recommended safe speeds from manufacturers: Heely

** Based on the maximum pediatric recommendations for weight of 14-15 year old, in the United States, of 125 lbs. This number reflects the high end of the demographics that typically use this device. http://www.healthstatus.com/calculate

GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-ROLLER SKATES

Description & Trends

First patented in 1760, and later reinvented in 1863, Roller skates hit its popularity peak during the disco era, later tapering off in the 1980s and 90s. From speed skating, to roller derby, to Roller skating even making an appearance in the Olympics in 2012, Roller skates are enjoyed today both as a pastime and in competitive sports.

Roller skates are not typically used for commuting, partially due to the speed limitations they face when not on perfectly smooth surfaces, such as new pavement. The width required to build up proper momentum, through the skating motion, is larger than roller blades, because of the larger 4-wheeled base, causing more conflicts on sidewalks where pedestrians and others modes are operating as well.

Multi-Modal Access

The restrictions of roller skates have been addressed through inline skates and roller blades, making them a less likely choice for urban commuters. If utilized as a part of a longer commute, their size makes them easily transported on and off of buses and light rail.

Average Speed*

3 mph

Range = 3-6 mph

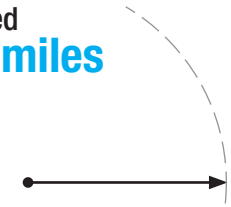
Dynamic Envelope

4-5 ft

(Minimum width/skate-like motion)

Average Ten Minute Access Shed

0.5 miles



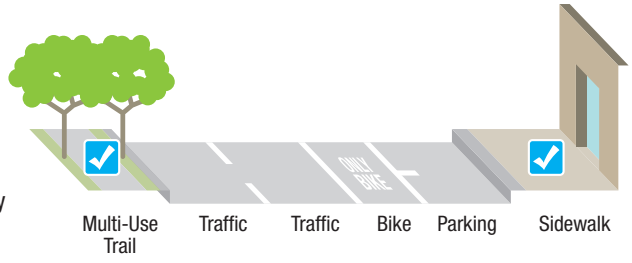
Energy Requirements**

Human powered:

120 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Children/Teens 8-18 yrs.

Secondary: Adults 18-35 yrs.

* http://www.livestrong.com/

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://www.livestrong.com/

GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-ROLLER BLADES

Description & Trends

From the beginning of Roller blade, Inc. in 1984, the inline skating industry has grown to encompass over 30 million participants (as of 1996) and several hundred companies that manufacture a wide variety of skates, safety gear, and other inline merchandise.

According to the International Inline Skating Association (IISA), inline skating participation has increased 630% since 1989, and was the fastest growing sport in the United States in 1996. Although the rate of increase declined slightly in 1997, the sport itself continues to spread and diversify. Manufacturers offer an increasing range of specialized skates, including inline hockey skates, speed skates, aggressive skates, and skates designed specifically for women and fitness skaters.

Multi-Modal Access

Aside from weather conditions, roller blades, while not currently an extremely common choice, do not face many challenges as a commuter mode. They are able to negotiate most surface conditions, except for major potholes, and have a quick breaking/reaction time for maneuvering crowded sidewalks. Expert skaters can utilize them in bike lanes and on multi-use paths at speeds similar to commuter bicyclists. Their size makes them easy to transport on and off of light rail and buses as part of a larger commute length.

Average Speed*

14 mph

Range = 10-20 mph

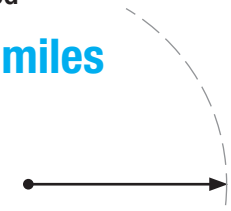
Dynamic Envelope

4 ft

(Minimum width/skate-like motion)

Average Ten Minute Access Shed

2.3 miles



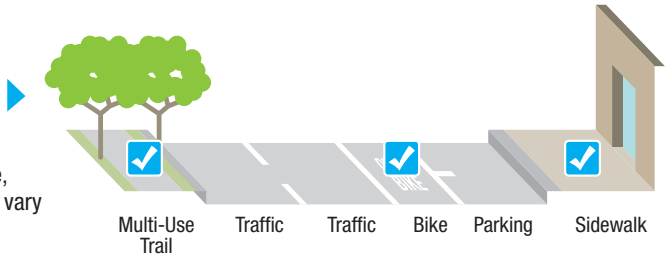
Energy Requirements**

Human powered:

75 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Adults 25-45 yrs.

Secondary: Teens/Young Adults 12-15 yrs.

* http://www.livestrong.com/

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://www.livestrong.com/

GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-KICK SCOOTER

Description & Trends

The foldable aluminum scooter that uses inline skate wheels was created in 1996 by Wim Ouboter, in Switzerland. The first Razor scooter was distributed by The Sharper Image in 1999 (Japan) and became extremely popular in 2000 in the U.S. It was designed as a portable transporter, but is primarily used as a toy for children.

The U.S. marketers of Razor scooter, in California, sell more than 3 million scooters each year. The wheels of kick-scooters are small and they have very low clearances, making sidewalks with potholes, and high curbs difficult to maneuver. Some brands provide limited breaking capabilities; however, many require foot breaking, or dismounting to fully stop.

Multi-Modal Access

Much like children's' bicycles, kick scooters are often used in suburban neighborhoods, where vehicle traffic is slower and there are fewer pedestrians, and they are often observed on routes to school, or alongside parent/adult commuters. Kick scooters low cost and ability to fold up quickly make them a seamless device when transferring between transit modes.

The greatly increased speed of kick-scooters can cause safety concerns on sidewalks, and the young age of most riders precludes the notion of relegating their use to roadway located bike facilities.

Average Speed*

5 mph

Range = 10 mph

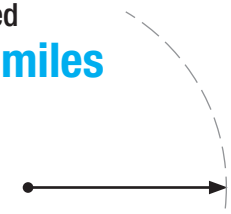
Dynamic Envelope

3 ft

(Minimum width)

Average Ten Minute Access Shed

0.8 miles



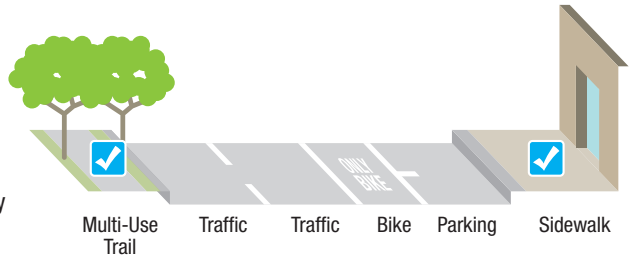
Energy Requirements**

Human powered:

35 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Children < 12 yrs.

Secondary: Teens/Young Adults 13-22 yrs.

* http://www.nycewheels.com/

** Based on the maximum pediatric recommendations for weight of 10 year old, in the United States, of 100 lbs. This number reflects the high end of the demographics that typically use this device. http://www.healthstatus.com/calculate

GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-ADULT SCOOTER

Description & Trends

Push scooters for adults have become popular in the last several years, as active transportation is on the rise in urban environments. They are marketed as "opportunistic" devices that can be used on both roads and footpaths depending on traffic conditions. In 2010 sales in New York City made up 45% of all sales for Xootr, one of the largest manufacturers of adult scooters, up from 35% in 2009. As the trend of adults riding scooters continues to grow with more adults commuting to work, parents scooting with their kids, and college students riding to class, Razor scooter, the popular childrens' brand, has introduced scooters for adult riders with larger wheels, deck and weight limits. As a market that grew out of a childrens' device, they are most commonly used on sidewalks; however, the adult versions can reach much faster speeds and interfere with pedestrian traffic and slower modes that require sidewalks.

Multi-Modal Access

While the folding childrens' and smaller adult scooters can be carried on and off transit, the larger models require little additional infrastructure such as bicycle locking racks or lockers for storage.

Average Speed*

10 mph

Range = 5-20 mph

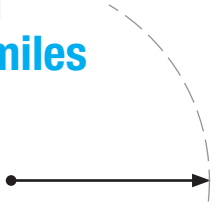
Dynamic Envelope

2 ft

(Minimum width)

Average Ten Minute Access Shed

1.6 miles



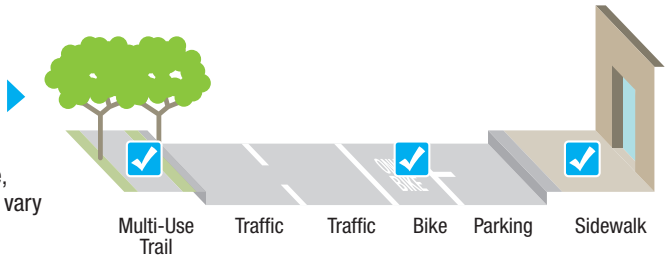
Energy Requirements**

Human powered:

90 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Teens/Young Adults 16-35 yrs.

Secondary: Adults 35-50 yrs.

* http://www.nycewheels.com/

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://www.livestrong.com/

GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-SKATEBOARD

Description & Trends

Skateboarding started in the 1950's when Californian surfers got the idea of trying to surf the streets. It reached the peak of popularity in 1963, but crashed in 1965 and disappeared like many fads. When the urethane skateboard wheels used today where invented in 1972, new interest in skateboarding amongst surfers and other youth took an evolutionary step toward the sport we see today. It took several ups and downs in popularity through the 80's, but remained an underground sport until its inception into the mainstream in the early 90's.

Since 2000, skateboarding has become commercialized and sold as a commuter alternative, with many variations and styles on the market. For commuters, long-boarding is the style most common, because of the greater stability, traction, and durability. Long-boards include features that allow easier lifting to maneuver over bumps, cracks, and obstacles.

Multi-Modal Access

Skateboards and long-boards can achieve relatively high speeds, while being small enough to easily carry on and off transit, and store without additional infrastructure such as locking racks. This mode also requires less effort to operate, making shower and changing facilities less necessary for commuters.

Average Speed*

8 mph

Range = 6-18 mph

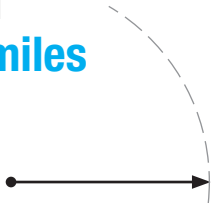
Dynamic Envelope

3 ft

(Minimum width)

Average Ten Minute Access Shed

1.3 miles



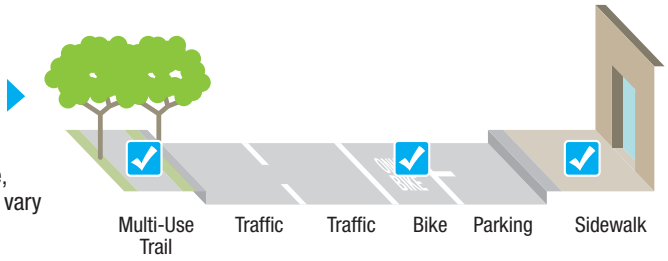
Energy Requirements**

Human powered:

60 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Teens 12-18 yrs.

Secondary: Young Adults 18-30 yrs.

* http://www.livestrong.com/

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://www.livestrong.com/

GREEN MODE-HUMAN POWERED-ACTIVE TRANSPORTATION-INNOVATIONS

Description & Trends

The Elliptigo is a derivative of both a stationary elliptical trainer and a bicycle. While reducing the amount of impact your body sustains. Everyday fitness enthusiasts have turned to the elliptigo in place of bicycles and running for exercise, recreation, and small trips. The elliptigo offers a commute option for those uncomfortable with bicycling; the standing position provides added safety with less resistance to stop and go, being at eye level with pedestrians, and less balance required to operate.

The Trikke is a new mobility device, very similar to the Elliptigo with a few varying features. Trikkes do not use two inline wheels, rather 3-wheels, hinged like a tricycle. The trikke can fold small enough to fit in a car or under a desk, making it a practical option for commuting or as part of a larger commute trip (to be carried). Unlike the elliptigo, trikkes require more balance and skill to learn to operate, and cannot function on unsmooth surfaces. They attain similar speeds, with low impact.

Multi-Modal Access

Both of these emerging innovations are bulky and would be difficult to integrate directly on rolling stock (bus or train) but could be accommodated at stations through provision of lockable storage. These devices reflect an on-going interest in new modes of active transportation that combine exercise with commuting.

Average Speed*

12 mph

Range = 10 - 17 mph

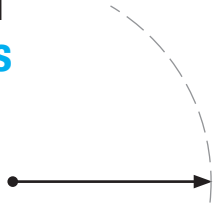
Dynamic Envelope

4-8 ft

(Minimum width)

Average Ten Minute Access Shed

2 miles



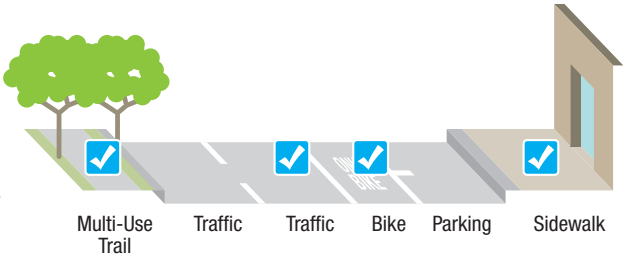
Energy Requirements**

Human powered:

40 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



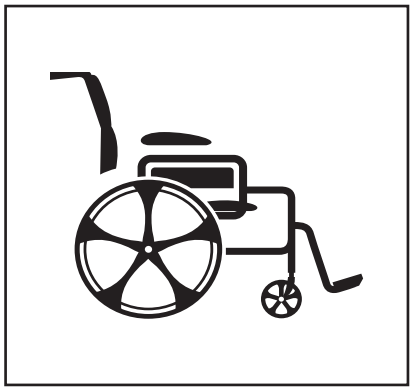
Demographics

Primary: Adults 25-65 yrs.

Secondary: Teens/Young Adults 12-25 yrs.

* www.commutebybike.com

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://www.trikketampastore.com



GREEN MODE-HUMAN POWERED-UNIVERSAL ACCESS DEVICE-CANE

Description & Trends

A cane (or walking stick) is a device most commonly used to help a person with a disability balance while walking, similar to a crutch. They are typically used as a mobility or stability aide, in the opposite hand of the injury or weakness.

Canes help redistribute weight from the lower leg that is weak or painful, improve stability by increasing the base of support, and provide tactile information about the ground to improve balance. Ten percent of adults older than 65 use canes, a much larger group than those using walkers.

Multi-Modal Access

Along with the demographic of users requiring additional safety precautions, especially amongst faster mobility devices being operated on sidewalks, facilities such as drop off sites, and ADA compliant designs at transit stations should be updated to accommodate the growing population of those using canes.

Mobility infrastructure must consider the slower speeds of pedestrians using canes, especially at street crossings. Tiered signalization programs that allow for longer crossing times should be considered along transit access routes.

Average Speed*

2 mph

Range = 1-3 mph

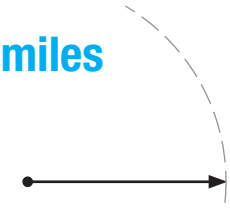
Dynamic Envelope

3 ft

(Minimum width)

Average Ten Minute Access Shed

0.3 miles



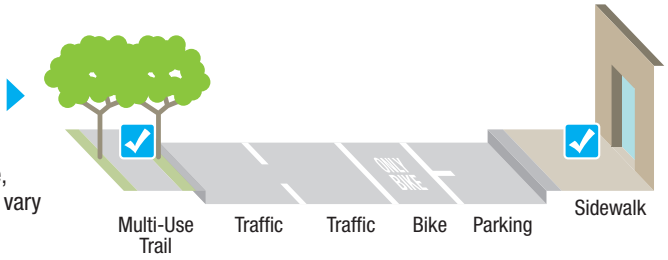
Energy Requirements**

Human powered:

80 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



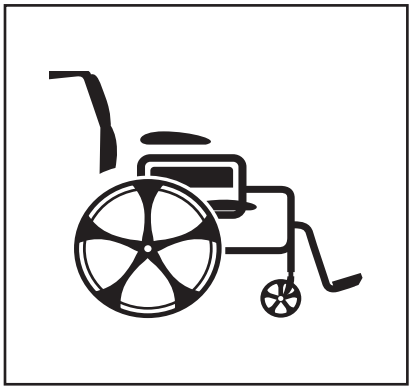
Demographics

Primary: Seniors 65+ yrs.

Secondary: All ages with injuries or disabilities.

* www.livestrong.com

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://walking.about.com/library/cal/uccalc1.htm



GREEN MODE-HUMAN POWERED-UNIVERSAL ACCESS DEVICE-CRUTCHES

Description & Trends

Crutches are used as a mobility aid when a person has an injury or impairment to a leg(s) and cannot fully support one's weight. They come in several types; such as forearm, underarm, strutters, platform, and leg support, and have more load bearing capacity than canes or lift walkers.

Crutches offer a larger variation of gait patterns for movement; however, they require more work to utilize and are typically used for younger people with mobility needs. Facilities such as drop off sites should be provided for those temporarily bound to crutches during their commute.

Multi-Modal Access

ADA compliant transit facilities and appropriate seating on light rail and bus transit should be provided to ensure efficient commuting. Those using crutches typically make up a younger population than canes and wheelchairs, but there are still challenges for long commutes as the energy requirements are quite high.

Tiered signalization programs that allow for longer crossing times should be considered along transit access routes.

Average Speed*

1 mph

Range = 1-2 mph

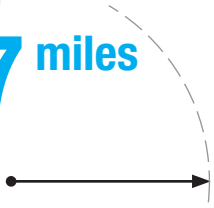
Dynamic Envelope

3 ft

(Minimum width)

Average Ten Minute Access Shed

0.17 miles



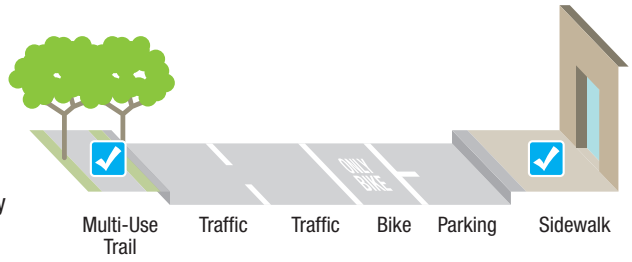
Energy Requirements**

Human powered:

400 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.

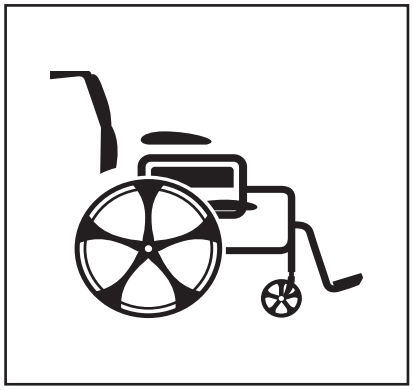


Demographics

Primary: All Ages

* www.livestrong.com

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. www.livestrong.com



GREEN MODE-HUMAN POWERED-UNIVERSAL ACCESS DEVICE-WHEELCHAIR

Description & Trends

The wheelchair originated from England in the 1670s to assist in transporting people with walking disabilities. The standard wheelchair has a seat, a back, two small front wheels, two large wheels, and a footrest. Recently, various accessories have become available for wheelchairs, such as seat belts, adjustable back rests, pouches, and cup holders to offer more freedom to the users.

Many still prefer to use manual wheelchairs, even with the advent of electric powered devices. Many wheelchair users are only temporarily in need of assistance and can get around easily in a manual wheelchair for a short period of time: however, the main factor in determining to use manual chairs for most people is cost.

Multi-Modal Access

Most public transportation stations, trains, and buses are accommodating to manual wheelchair users; however, they have historically been treated as an isolated group, with limited number of spaces on buses. As the population ages and more manual and electric wheelchair users ride public transit, new seating configurations and storage may be required.

Sidewalks and routes to transit nodes must maintain smooth and clear rolling surfaces, accessible curb ramps, and signal times conducive to safe street crossings.

Average Speed*

3 mph

Range = 2-4 mph

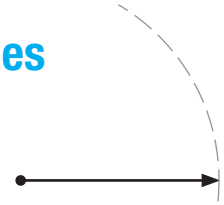
Dynamic Envelope

4 ft

(Minimum width)

Average Ten Minute Access Shed

.5 miles



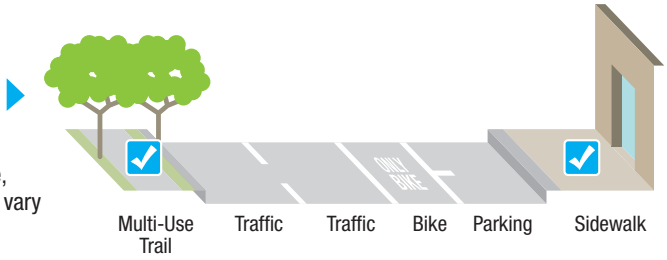
Energy Requirements**

Human Powered:

120 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



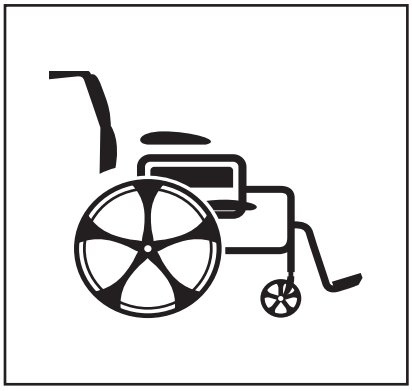
Demographics

Primary: Teens/Adults 16-40 yrs.

Secondary: All ages with injuries or disabilities.

* http://www.wheelchairs.com/index.htm

* * Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://www.utk.edu/tnto-day/2011/10/28/wheelchair-exercise-calorie-burning/



GREEN MODE-HUMAN POWERED-UNIVERSAL ACCESS DEVICE-LIFT WALKER

Description & Trends

First appearing in the 1950s and later patented in the U.S. in 1953. A walker, or "Zimmer Frame", is a tool designed to support disabled or elderly people while walking. Both easy to use and easy to store, the walker is the alternative choice to a cane when a person needs assistance keeping balance while walking.

While having few disadvantages, the walker does require the patient lift the walker every step, thus slowing down a patients stride.

Multi-Modal Access

Along with the facilities provided for other access devices, such as drop-off sites and ADA compliant transit stations, the lift walker takes up additional space on light rail and bus transit, additional storage may be required. As the population of those requiring assisted devices grows, the lift walker remains one of the slower modes.

Tiered signalization programs that allow for longer crossing times should be considered along transit access routes.

Average Speed*

1 mph

Range = 1-4 mph

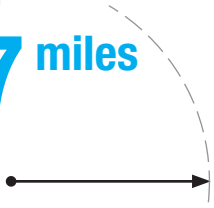
Dynamic Envelope

3 ft

(Minimum width)

Average Ten Minute Access Shed

0.17 miles



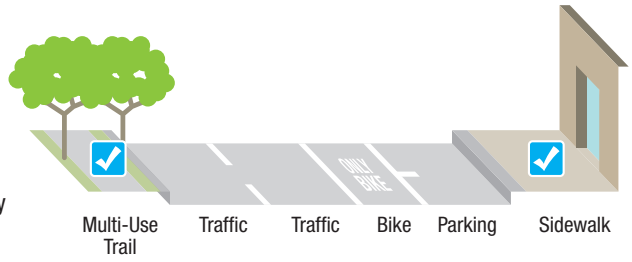
Energy Requirements**

Human powered:

40 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



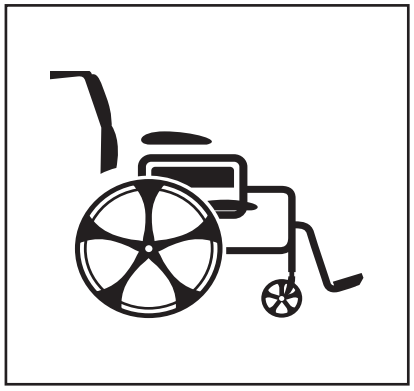
Demographics

Primary: Seniors 65+ yrs.

Secondary: All ages with injuries or disabilities.

* www.livestrong.com

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://walking.about.com/library/cal/uccalc1.htm



GREEN MODE-HUMAN POWERED-UNIVERSAL ACCESS DEVICE-WHEELED WALKER

Description & Trends

Serving as an alternative to a traditional walker, the rolling walker is easier to operate and provides additional comfort to the user; however, the small wheels are not suited for use on grass or paved surfaces with obstructions. The small wheels can also cause the wheeled walkers to be less stable than lift walkers, but alleviate the lifting for those with additional disabilities/ needs.

The wheeled walker comes in several variations, the front-wheeled walker is most similar to the lift walker, with two small wheels to make movement smoother. The rollators, are a later variation of wheeled walkers, with four wheels, hand brakes, and a built-in seat (often a basket is also included). Rollators allow the user to stop and rest when needed, and have more adjustable features such as height. Braking on the handlebars allows for immediate stopping and for maneuvering the rollator by braking one side making the turning radius much tighter.

Multi-Modal Access

Similar drop off, ADA compliant, and storage facilities are required in transit stations and on light rail and bus transit, as for typical walkers.

Sidewalks and routes to transit nodes must maintain smooth and clear rolling surfaces, accessible curb ramps, and signal times conducive to safe street crossings.

Average Speed*

2 mph

Range = 1-5 mph

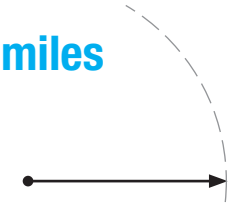
Dynamic Envelope

2.5 ft

(Minimum width)

Average Ten Minute Access Shed

0.3 miles



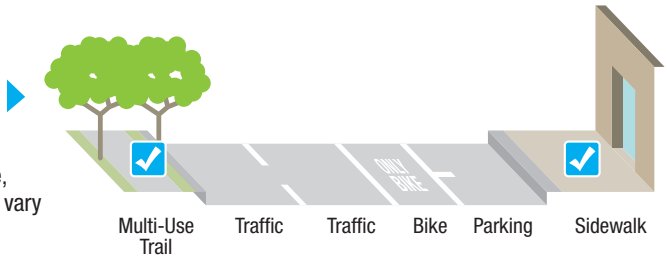
Energy Requirements**

Human powered:

80 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



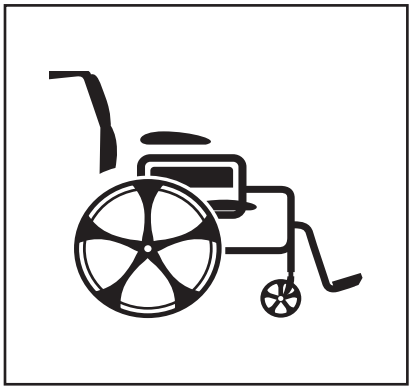
Demographics

Primary: Seniors 65+ yrs.

Secondary: All ages with injuries or disabilities.

* www.livestrong.com

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://walking.about.com/library/cal/uccalc1.htm



GREEN MODE-HUMAN POWERED-UNIVERSAL ACCESS DEVICE-WHITE CANE

Description & Trends

White canes are used by those who are blind or visually impaired as a mobility tool. There are several variations and lengths of white canes, but the primary purpose of each is to scan for curbs and steps, make others aware of the bearer's visual impairment, and offer balance, support or stability.

Techniques used to navigate with a white cane include synchronized tapping and stepping, and two-point touch techniques, which traditionally have provided enough information to the user about the immediate environment to make safe move decisions.

The use of a white cane does not account for abruptly approaching devices and erratic movements, a concern given the growing number of faster moving mobility devices observed on sidewalks.

Multi-Modal Access

Alterations to traffic signals and transit facilities, such as bus arrival notifications, require noise enhancements to account for the visually impaired. Routes to transit nodes will benefit from the use of tactile wayfinding strategies.

Average Speed*

2 mph

Range = 1-3 mph

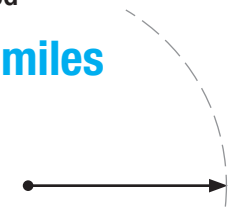
Dynamic Envelope

4 ft

(Minimum width)

Average Ten Minute Access Shed

0.3 miles



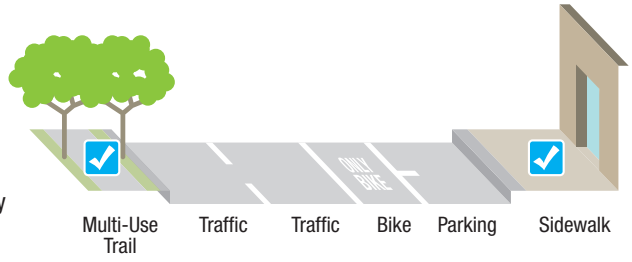
Energy Requirements**

Human powered:

80 cal/mi

Observed Street Use

Presents observed use, policies governing use vary by municipality.



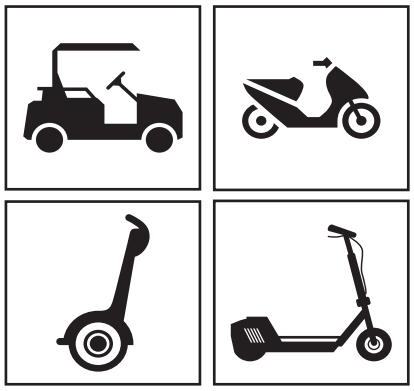
Demographics

Primary: Visually Impaired

(All Ages)

* http://www.nfbnj.org/mobility.php

** Based on the National Center for Health Statistics average weight for adults, in the United States, of 175 lbs. http://walking.about.com/library/cal/uccalc1.htm



GREEN MODE-ELECTRIC-NEIGHBORHOOD ELECTRIC VEHICLES

Description & Trends

Neighborhood electric vehicles (NEVs), refer to battery electric vehicles that are operated on roads that have speed limits up to 35 mph. In the United States, they fall under the legal categorization of low-speed vehicles.

Golf carts are a sub-category of NEVs, originally built to carry 2 golfers and their clubs, but with the price of gasoline skyrocketing, electric golf carts have become a green and convenient alternative mode of transportation for short trips.

Whole communities have been built around golf cart and NEV transportation. With more of them hitting the market for transportation use each year, the safety concerns have encouraged many cities to begin introducing golf carts and NEVs into their vehicle codes.

Multi-Modal Access

Transit stations/hubs and urban infrastructure will need to re-evaluate design guidelines for parking and charging stations as NEVs continue to grow as a commuter device due to rising gas prices, an aging population, and their low priced batteries, when compared to other electric devices on the market.

Average Speed*

30 mph

Maximum = 45 mph

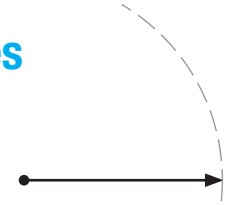
Dynamic Envelope

6 ft

(Minimum width)

Average Ten Minute Access Shed

6 miles



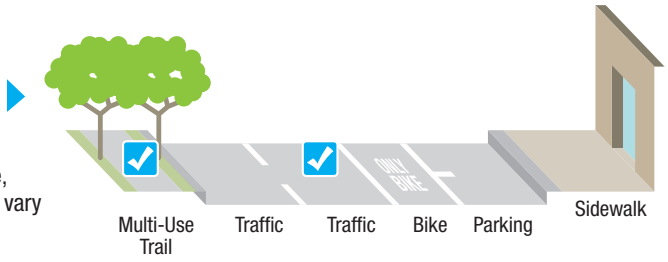
Energy Requirements

Battery powered:

Approximately 30 miles/ charge (varies)

Observed Street Use

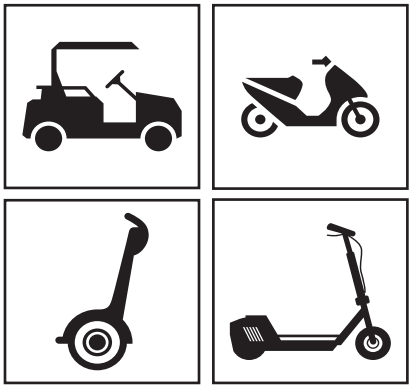
Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Adults 18+ yrs.

* http://www.pikeresearch.com/research/neighborhood-electric-vehicles



GREEN MODE-ELECTRIC-ELECTRIC BICYCLE

Description & Trends

The Power-Assisted Bicycle is an emerging form of transportation that attempts to merge the health and environmental benefits of a bicycle with the convenience of a motorized vehicle. The environmental impact of an electric bike is more favorable than cars, busses, or other forms of urban transit.

Electric bicycle usage worldwide has experienced rapid growth since 1998. It is estimated that there were roughly 120 million e-bikes in China as of early 2010 and over 700,000 electric bicycles were sold in Europe in the same year.

Multi-Modal Access

E-bikes are not considered motor vehicles by the federal government and are subject to the same consumer safety laws as unassisted bicycles; because of this, they often operated on sidewalks and in bike lanes, even though they achieve speeds similar to car traffic on many urban roadways. They have similar dimensions as regular commuter bikes, and can be stored at transit facilities with basic bicycle lockers and locking racks. Charging facilites could be added at stations to help strengthen the link between their use to access transit.

Average Speed*

15 mph

Maximum = 25 mph

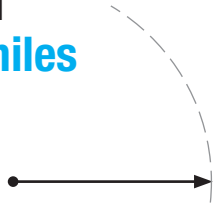
Dynamic Envelope

3ft

(Minimum width)

Average Ten Minute Access Shed

2.5miles

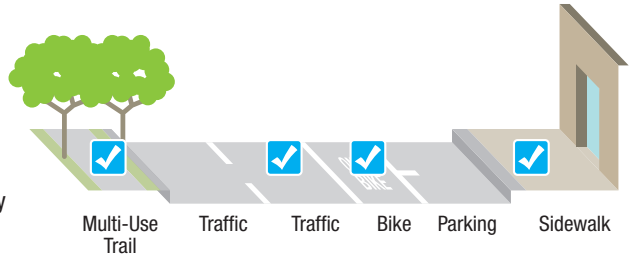


Energy Requirements

Battery powered:
1 amp hour/mile
(10-20 miles/charge)

Observed Street Use

Presents observed use, policies governing use vary by municipality.

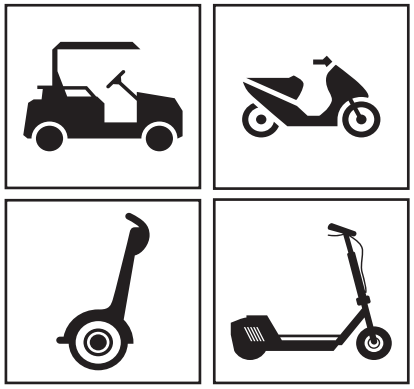


Demographics

Primary: Adults 18-65 yrs.

Secondary: Teens/Young Adults 12- 18 yrs.

* http://www.electric-bicycle-guide.com/



GREEN MODE-ELECTRIC-ELECTRIC SCOOTER

Description & Trends

Electric kick scooters have small platforms with two wheels, and are propelled by an electric motor, alongside human propulsion (pushing off the ground). The most common, have two hard small wheels, and are aluminum folding scooters much like the popular Razor kick scooters for children.

While they can attain similar speeds to electric bicycles and urban area car traffic, they are less safe to operate in the vehicle right of way, especially given the assisted propelling method of achieving such speeds.

Multi-Modal Access

E-scooters are amongst newly popular mobility devices that do not have a safe operating area, as they are too fast for sidewalks and have limited breaking/ maneuvering around pedestrians. They also have rather small wheels, which makes them difficult to operate on surfaces with any obstructions. They can be locked to bicycles racks and stored in lockers at transit stations, but charging may be required as they have limited battery life.

Average Speed*

15 mph

Maximum = 20 mph

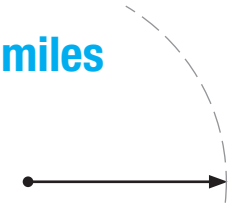
Dynamic Envelope

2ft

(Minimum width)

Average Ten Minute Access Shed

2.5 miles



Energy Requirements

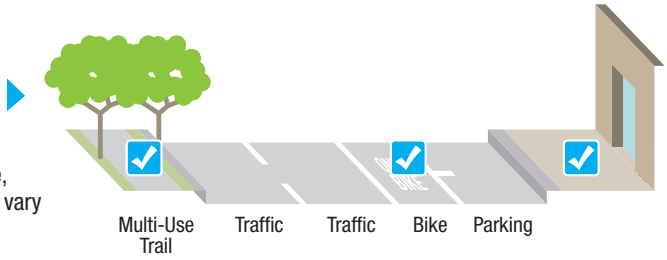
Battery powered:

17 watt/mile

(Assisted propelling)

Observed Street Use

Presents observed use, policies governing use vary by municipality.

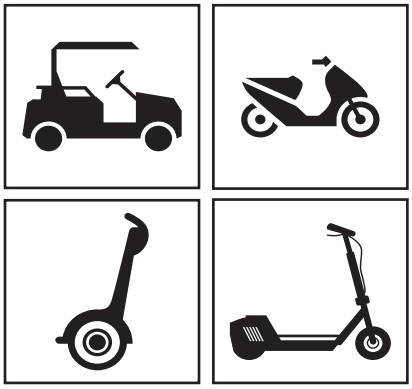


Demographics

Primary: Adults 25-40 yrs.

Secondary: Children/Young Adults 6-25 yrs.

* www.trendtimes.com/electric-scooters



GREEN MODE-ELECTRIC-ELECTRIC SKATEBOARD

Description & Trends

Electric skateboards are modified to be propelled by an electric engine, controlled by a remote that the user holds in their hand. Originally designed for local transport, there are versions with larger wheels that allow for traversing grass, gravel, dirt, and sand to make them functional in many environments.

Unlike scooters, they do require the skills for operating a skateboard (turning, foot breaking, etc.) and are more difficult to learn to operate. They reach higher speeds than is safe to be operated on sidewalks amongst pedestrians, but only experienced riders should utilize them on bicycle paths and shared roadways.

Electric skateboards are a reflection of the increased efficiency and reduced price of electric motors, and the fact that just about all human powered electric devices can be electrified.

Multi-Modal Access

Much like typical skateboards, they are lightweight and easy to store, making them a good device to transition between transit modes.

Average Speed*

15 mph

Maximum = 25 mph

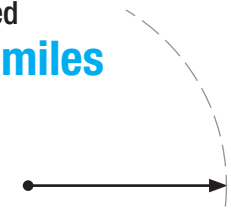
Dynamic Envelope

2ft

(Minimum width)

Average Ten Minute Access Shed

2.5 miles



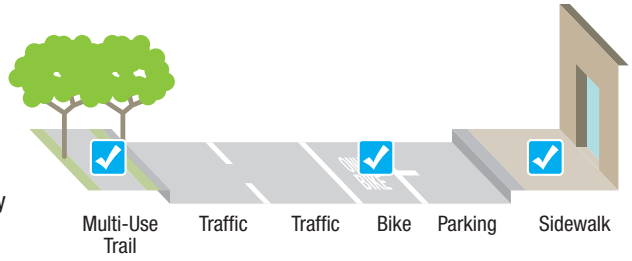
Energy Requirements

Battery powered:

800 watt/mile (9-12 miles per charge)

Observed Street Use

Presents observed use, policies governing use vary by municipality.

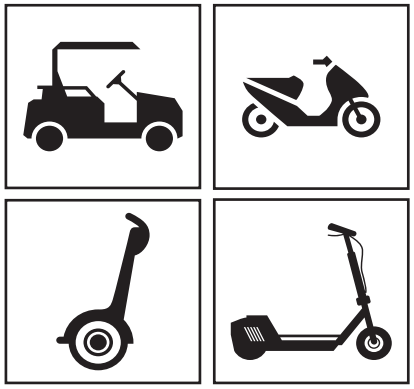


Demographics

Primary: Young Adults 16-25 yrs.

Secondary: Teens/Young Adults 25-40 yrs.

* www.electricskateboardreview.com



GREEN MODE-ELECTRIC-GYROSCOPIC DEVICES

Description & Trends

The electric Segway (the most common brand of gyroscopic devices) is a personal transporter (PT), designed to be used by an individual as an eco-friendly mode of transportation. The self balancing nature of gyroscopic devices, makes them easy to learn to operate and generally more safe than many other wheeled devices. Segways decrease risks additionally, by slowing and stopping when the operator is not on the devices.

Segways are used for a variety of purposes; tourists, police forces, postal service, and other small delivery companies began the trend of Segway use in the United States. The company that created Segways has challenged sidewalk bans throughout the United States, and have won in all but few municipalities to allow their use on sidewalks and in public transportation because of their classification as a medical device.

Multi-Modal Access

More popular for recreation currently, they are beginning to grow in use by commuters. As part of a larger commute, new designs for charging stations, lockers, or storage may be needed to accommodate the larger size and shape of gyroscopic devices.

Average Speed*

6 mph

Range = 3-12 mph

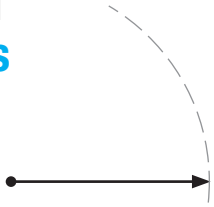
Dynamic Envelope

2ft

(Minimum width)

Average Ten Minute Access Shed

1 miles

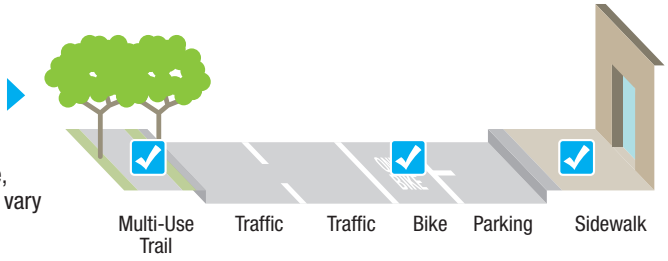


Energy Requirements

Battery powered:
12 miles/charge

Observed Street Use

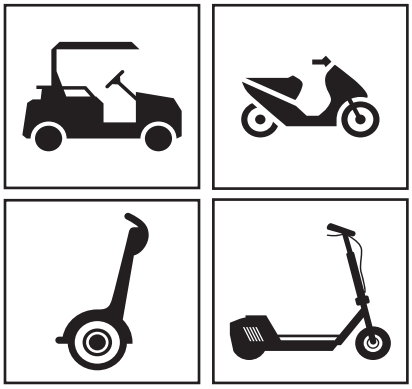
Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Adults/Seniors 41+ yrs.

* www.segway.com/support/FAQs



GREEN MODE-ELECTRIC-MOBILITY SCOOTER

Description & Trends

Since 1990 the number of people using wheeled mobility devices has increased specifically in the mobility scooter sector; however, the unmet need for assisted technology devices is still substantial. The cost of mobility scooters (ranging from $1000-$20,000) is quite high given that only 18% of users ages 16-64 are employed.

Relying on mobility scooters for transportation is a growing trend, because the benefits outweigh those of electric wheelchairs. For instance, they can travel over more challenging ground and are easier to navigate, removing the need for assistance from a nursing aid. The sportier aesthetic of mobility scooters is considered a psychological advantage for people who don't want to look like they are reliant on medical equipment.

Multi-Modal Access

Mobility scooters and their users require large turning radius, ramps and transition zones, and lifts to transition between light rail and bus transit. They are constantly evolving; they are gaining power, speed, range and stability. New design guidelines to facilitate the changing device should be considered, including charging stations and access to stations.

Average Speed*

3 mph

Maximum = 15 mph

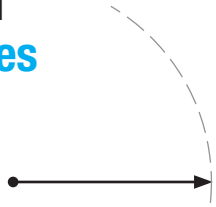
Dynamic Envelope

3 ft

(Minimum width)

Average Ten Minute Access Shed

.5 miles



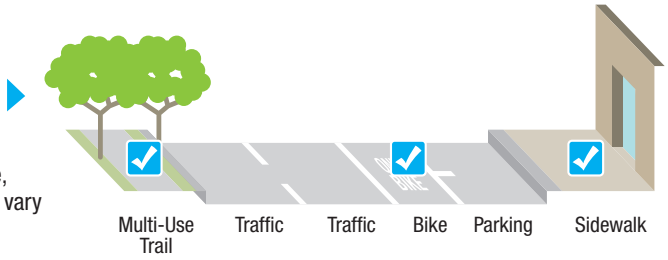
Energy Requirements

Battery powered:

45 miles/charge

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Seniors 65+ yrs.

Secondary: All ages with injuries or disabilities.

* www.activeforever.com

GREEN MODE-ELECTRIC-INNOVATIONS

Description & Trends

Devices such as the Puma, Uni-Cub, and Solowheel follow the trend of mobility devices with an environmental commitment; however, they offer more interesting and portable alternatives than many forms of electric transportation (such as NEVs).

As more devices such as these become popular amongst commuters, who are the main audience they are designed for, more frequent charging stations and new parking types will need to be designed to accommodate them.

Cost is a main concern for these devices, which are cheap to operate, but have initially high prices to purchase; the transportation network could benefit from the inclusion of personal transport devices such as these by utilizing a bike share or car model.

The Puma, in particular, is a modification to an existing device (Segway/Gyroscopic) that will aims to serve a population as the baby boomer generation begins to require assisted access devices; it is the beginning of a trend of customizing personal transportation for mobility without sacrificing speed and function.

Multi-Modal Access

New design guidelines to facilitate these evolving devices should be considered, including charging stations and access to stations.

Average Speed*

8 mph

Maximum = 20 mph

Dynamic Envelope

2-5ft

(Minimum width)

Average Ten Minute Access Shed

1.3miles

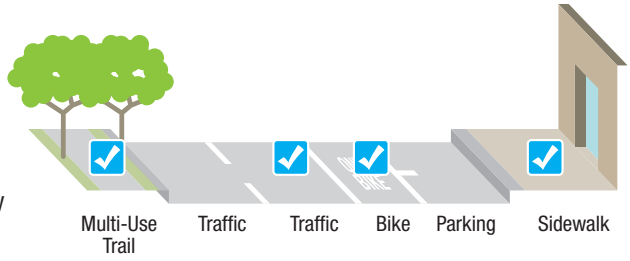
Energy Requirements**

Battery powered:

Varies

Observed Street Use

Presents observed use, policies governing use vary by municipality.



Demographics

Primary: Adults 18+ yrs.

(These are relatively new devices aimed at commuter populations)

* www.solowheel.com
www.inhabitat.com
www.segway.com