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SECTION 1: INTRODUCTION, PURPOSE & BACKGROUND

1.1 INTRODUCTION

The Los Angeles County Metropolitan Transportation Authority (Metro) is at a critical planning juncture as the agency seeks to create a better regional transportation system. This vision can be achieved through better coordination between the Bus Rapid Transit (BRT) network, Metrolink, and other local and regional transportation providers, leveraging the expansion of a robust rail network, and improved service quality.

In times of fewer resources, Metro's success to meet challenges related to serving the diverse needs of current and potential passengers, communities, and operators will be contingent on innovative thinking that stems from a solid base of sound planning principles. Critical elements for consideration are regional multimodal system integration and coordination, provision of world-class services that are safe, reliable, effective, convenient, user-friendly, focused on both customer and employee needs, and an emphasis on long-term sustainability. Therefore, Metro's goal and objective is to allocate resources to maximize the benefits of service to transit riders, while at the same time ensure that service delivery is efficient and cost effective. Achieving this delicate balance requires establishing policy guidance and service standards that are designed to target levels of productivity, efficiency, and quality.

To help develop policy guidance for service development, Metro established a Blue Ribbon Committee (BRC) in November 2009 represented by key stakeholders who serve as regional operators as well as beneficiaries of transit service. The BRC recommended a service concept, conveyed as a set of overarching policy statements summarized and detailed in Appendix A that provides a blueprint to build a better transit system for greater regional mobility with fewer resources. The service concept also defines the roles of Metro bus, rail, and municipal operations, identifies and prioritizes essential service quality attributes, and recommends policy guidance on service coordination, bus-rail integration, and reduction of duplicative services. The key principles of the service concept set policy direction for Service Priorities, Service Design, Service Quality Attributes, and Governance:

Summary Position Statement

Increased regional coordination and integration of service, and improved reliability are essential to having a seamless system that is convenient, simple to use and of high quality – and provides maximum benefit in light of scarce resources.

Service Priorities: Service should be focused first in high-density areas and be scaled to fit the overall density and passenger demand in the service area.

Service Design: The network should be coordinated and designed to be simple and user-friendly to increase trip-making by existing riders and attract new riders.

Service Attributes: The system should provide high quality service to better serve existing riders and attract new riders. Service quality priorities include:

- Reliability - "I can count on it"
- Fast travel options
- Real-time, readily-available information
- Clean and safe transit vehicles, stops, and all transit facilities (e.g. Transit Centers, Park and Ride, Rail Stations, etc.)

Governance: Metro should serve as a facilitator to coordinate services among operators in the region.

Ultimately, the policy guidance is reflected in the Transit Service Policy as a set of regional network and service design guidelines, performance criteria and standards, and service change process that provides the quantitative tools to evaluate the system, identify opportunities for service improvements and ensure the regional transit system is adjusted accordingly to achieve the goals and objectives of the service concept.

1.2 PURPOSE

The 2011 Metro Transit Service Policy establishes the following: (1) a formal process for evaluating existing services; (2) a methodology and process for developing and implementing service adjustments; and, (3) service design guidelines to ensure that the transit system is developed consistent with policy guidance approved by the Metro Board of Directors.

The policy was originally adopted in 1986 and is reviewed on an annual basis. If required the Metro Transit Service Policy is updated to better reflect agency goals and objectives, major initiatives, and changes in local, state, and federal regulations and funding. The policy is organized into six sections:

- Introduction, Purpose & Background
- Designing a Regional Transit Network
- Service Design Guidelines
- Service Performance Evaluation
- Service Change Process
- Conclusion

1.3 BACKGROUND

Metro is responsible for operating an efficient and effective transportation system in Los Angeles County. As the principal transit provider in the Southern California region, Metro serves about 75 percent of all transit trips within its 1,433 square-mile service area, carrying an estimated 1.1 million passengers per day on buses and 297,000 passengers on rail.

In addition to the bus and rail services provided by Metro, Metro also funds 40 other municipal operators that offer fixed-route service and more than 100 other local return and non-profit agencies provide community-based transportation for a total investment in regional transit service of $1.6 billion, according to the FY2011 adopted budget.

Metro operates bus, BRT, light rail, and heavy rail with an annual operating budget of $922 million for the bus system, and $257 million for rail.

The Metro bus system spans more than 185 routes and serves approximately 16,000 bus stops, including two premium BRT dedicated busways known as the Metro Orange Line and Metro Silver Line. The premium BRT, Metro Rapid and Metro Express services have attributes that may include signal priority, right-of-way, HOV and prepay fare collection that enable these buses to operate with faster travel times than local routes. Also, Metro's eco-friendly fleet of more than 2,500 Compressed Natural Gas (CNG) buses is the largest in the world. Systemwide, Metro Bus provides more than 7.2 million revenue service hours annually with an average of 1.1 million boardings per weekday.

The Metro Rail system consists of 275 light and heavy rail cars that operate on five lines to 70 stations across approximately 76.7 route miles in heavily congested travel corridors. Three light rail lines – Blue, Gold and Green – serve 56 stations along 60.7 miles of track with the Blue Line being one of the most heavily patronized light rail lines in the nation. The Red and Purple Lines are heavy rail that serve 16 stations along 17.4 miles of track. Metro Rail provides connections to many key multi-modal transportation hubs and accounts for 300,000 weekday boardings.

Measure R and the 30/10 Initiative

Metro will continue to expand its bus and rail network across the region under Measure R and the 30/10 Initiative. In November 2008, Los Angeles County voters approved Measure R, a half-cent sales tax. The measure is expected to generate $40 billion for countywide transportation projects over the next 30 years. In April 2010 Metro's Board of Director adopted the 30/10 Initiative to use the revenue from Measure R as collateral for long-term bonds and a federal loan, which will allow Metro to build 12 major transit projects in 10 years instead of 30 years. Part of the funds from Measure R will be used to expand Metro Rail projects throughout the region:

- Gold Line Foothill Extension to Azusa
- Exposition Line – Phase II
- Crenshaw/LAX Extension
- Regional Transit Corridor connecting the Blue, Exposition, and Gold Lines
- Purple Line Extension to Westwood
- Gold Line Eastside Extension from East Los Angeles – Phase II
- Green Line Extension to LAX
- Green Line Extension – South Bay

The Go Metro map below shows Metro Rail and Metro Liner services. Also visible are construction projects for the Orange Line Extension to the Chatsworth Metrolink Station in San Fernando Valley, the Gold Line Foothill Extension in the San Gabriel Valley, and the Expo Rail Line from Downtown Los Angeles to Culver City.

SECTION 2: DESIGNING A REGIONAL TRANSIT NETWORK

Transit network design must take into account both the needs of the passengers and operators, as well as the practical ability to provide the service. From the passenger's perspective, the transit network should provide convenient service when and where they need to go, operate on time and safely, with good customer service and information. From a systemwide transit operations perspective, the transit network must be manageable, operable, and sustainable – all within the constraints of a fixed operating budget.

2.1 KEY PRINCIPLES OF NETWORK DESIGN

At times, competing service interests result in unproductive use of scarce transit resources. As such, the BRC was charged with identifying and prioritizing the needs of the customer and operator. Based on recommendations from the BRC, critical factors to consider in network design should be reliability, network simplicity, speed, and safety, followed by vehicle cleanliness and timely, relevant, accurate customer information.

The following key principles are critical in building an efficient and effective transit network based on the BRC policy guidance:

A. Develop a Network of Services Rather than a Collection of Individual Routes

Individual routes do not need to serve all market needs. Rather, routes should be designed to serve a specific purpose within the network. Combined, the network should provide service between all major destinations and densely populated areas throughout the day. The transit network includes integration of other public transportation services within Los Angeles County, as well as with other modes, such as bikes, carpool/vanpool, car share, and private shuttles that provide first and last mile transportation to better access the transit network.

B. Integrate Services to be "Seamless to the User"

Transfer penalties should be minimized

In developing an integrated network, it is essential that the system is seamless to use from a customer's perspective. The need to create a simple and convenient system that minimizes transfer penalties is critical. An integrated regional network should emphasize high frequency service, timed transfers on less frequent services, and shared stops for ease of transfers. Trip information, wayfinding, and an integrated fare structure also are important elements of a customer-focused transit network.

Services must be better coordinated

Although Metro bus ridership levels have remained fairly stagnant for the last two decades, bus seat capacity in the region has increased 31

percent and revenue service hours have increased 42 percent, if the significant growth in municipal bus operations is included. With the addition of Metro Rail, seat capacity increased 45 percent and revenue service hours increased 50 percent.

Given the significant growth in municipal and local return operators as well as Metro Rail, improved coordination between all operators and modes is vital to establishing an integrated regional transit network. Metro serves as a regional coordinator of transit services. In addition, Metro operates within a hierarchy of services, in which Metrolink provides the region's commuter rail to serve high volume inter-county trips. Metro Rail and Metro Liner (Orange Line and Silver Line) serve as the backbone of the urban transit network, which is augmented by local, limited stop, and rapid bus service on key corridors operated by Metro along with municipal operators. LADOT and local return operators complement the system with community and shuttle buses that serve specific neighborhood needs.

Coordination of service changes is achieved through standing committees, such as the Technical Advisory Committee (TAC), Bus Operations Subcommittee (BOS), and the Local Transit Systems Subcommittee (LTSS). In addition, Metro meets quarterly with various municipal and local return operators impacted by Metro's service changes. (Section 5 discusses the service change process in greater detail.)

Minimize duplication and increase shared stops

From a patron and operator point of view, operating overlapping services may be costly, confusing and unproductive. Through better service coordination, duplication between Metro and municipal bus services, as well as between bus and rail service, can be reduced. In addition, this concept will result in an easier and more simple to use transit network. Finally, opportunities to share stops also will help reduce confusion.

Customer trip information must be timely and readily available

Timely, relevant, accurate and readily-available trip information is necessary to minimize a rider's confusion about using transit service. Patrons should always be kept informed about the status of their trip. Real-time information is useful for reassuring passengers when the next transit vehicle will arrive, or if there has been a service disruption and how long is the expected delay time. It should provide them with options, such as whether to continue their wait time for the next transit vehicle, or take another mode of transit to complete their trip.

C. Keep the service simple and easy to use

An easy to use and understand transit system relies on simple network and route design. Consolidating services on the same or parallel corridors within a quarter-mile to a half-mile distance apart provides an opportunity to simplify the network for ease of use and reduce unused capacity. This concept requires better coordination of schedules and transfer points, and will result in an easier to use and more convenient system, while reducing wait time and overall travel time. These enhancements to service quality are expected to help increase ridership and revenue at no additional cost.

Furthermore, consistent headways that are predictable for patrons also help to reduce the unknown about next bus arrival times. Consistent headways should be a priority for lines that operate headways of less than 15 minutes.

D. Ensure high quality services

Establishing a world-class transportation system requires identifying and prioritizing service quality attributes of highest priority that support a reliable, effective and sustainable operation. The following are critical service quality attributes to consider when designing service:

Reliability

When it comes to key service quality attributes, reliability should be given highest priority. Reliability can be impacted by poor schedule adherence, vehicle breakdowns, and missed trips. Therefore, controlling service reliability requires a coordinated effort between establishing reasonable running times and schedules, maintenance and management of vehicles, and operator availability and performance. Service levels are scheduled to meet passenger levels. Late or missed trips result in capacity issues and eventually pass-ups. Therefore, it is essential that service is on time and reliable to avoid the misperception that service levels are inadequate to meet demand.

Passengers generally maintain a level of confidence that transit service should depart a stop or station and arrive at a destination as stated on the timetable. However, instances of poor reliability that could cause passengers to arrive late to work or school, miss medical appointments or critical transit connections would result in an overall lack of confidence in the system. Furthermore, poor reliability would create unnecessary travel delays and greater concerns about safety and comfort due to longer waits at the stops and stations.

For high frequency service with headways of every 15 minutes or better, schedules should be written to allow operators to be on time

without excessive running time that can slow the service substantially and result in additional operating cost. Passengers missing a trip on high frequency services can be comforted knowing that another bus or train will be available within a reasonable wait time, minimizing the consequences of reliability.

For low frequency service with headways of every 20 to 60 minutes, reliability becomes even more critical. Missing trips on low frequency service increases the consequences to the passenger given the significant travel delays and wait times. Therefore, special attention should be placed on ensuring low frequency services are designed and operated to the greatest reliability.

Achieve higher network speeds

Increasing the speed of transit service improves the competitiveness of transit with other modes, such as automobiles. In addition, faster service requires fewer resources to operate and thus reduces operating cost. Several factors cause a reduction of speed along a route, including turns, particularly left turns, an increased number of stops, traffic-congested corridors, and long dwell times at stops and stations.

While the advantages to increase bus system speed include attracting new riders and reducing operating cost, the disadvantage is reduced access to the transit network due to the streamlining of routes and limiting the number of stops. Therefore, adjustments to a route that results in slower speeds are warranted when the ridership benefit outweighs the negative impacts to speed.

Passenger Capacity

Passenger capacity, the amount of seats and standing room onboard a vehicle, is an important consideration when designing transit service. The utilization of vehicle capacity should be maximized to make the most use of resources. However, capacity should not exceed a threshold that deters ridership due to uncomfortably crowded conditions or excessive stop and station dwell times from blocked passageways on board.

Capacity thresholds are expressed as a load factor indicating the ratio of available capacity to seats. This indicator is used to determine how many trips must be scheduled for each direction of travel during specified time periods.

Other considerations that may influence design capacity include the duration that passengers must stand based on passenger turnover along the line and operating conditions, such as on a freeway route in which standees should be minimized.

Safe Routing and Stops

Perceptions of safety and security, as well as actual conditions, enter into a customer's mode choice decisions. Safety includes the potential for being involved in a crash, slips and falls, or other elements such as aggressive passengers or poor passenger conduct. Security covers both real and potential incidents of crime that may contribute to a passenger's unease, even if the actual risk is minimal or non-existent. Measures must be taken to alleviate a passenger's unease both at stops and onboard transit vehicles. Whenever possible, stops should be located at well-lit areas with ample sidewalk space for ADA compliance and queuing for buses. Other measures to enhance security at stops and onboard transit vehicles include police officers in uniform and plainclothes who ride transit, two-way radios, silent alarms for emergency communications, and surveillance cameras at stops and on-board transit vehicles.

Cleanliness and Courtesy

Clean and well-maintained transit stops, stations, and vehicles improve the general public's perception of Metro and their desire to take transit as a viable mode of travel that is comfortable, convenient and of high quality. Many elements make transit more comfortable for passengers, including climate-controlled vehicles, seat comfort, courteous operators, and ride comfort.

2.2 MARKETS SERVED

Given the current financial climate, service should be placed when and where the maximum benefit can be provided to the general public. In addition, productive service lowers the net cost per hour, resulting in more service per dollar.

In general, service should be focused on corridors and within areas where high density population, employment, and activity centers exist. These corridors and areas usually generate high levels of transit riders to justify frequent service (15 minute or better headway) that provides convenient access to key origins and destinations. Corridors and areas with dense ridership should be served throughout the day and week. As ridership potential decreases, the emphasis on service should be during peak periods, base day, weekends, and late night, in priority order.

While service should focus on when and where significant demand exists, there is still a need to provide basic lifeline service in areas and times of day with low demand. Therefore, a basic lifeline network should be provided on critical corridors during the owl period and to connect low density areas to the transit network.

2.3 TRANSIT SERVICE CLASSIFICATIONS

Metro classifies its bus services into two categories to provide the framework for evaluation and planning of the various components of the transit network.

Tier 1: Core Regional Network

Core regional service consists of Metro Liner, Metro Rapid, Metro Local (bus lines averaging 10,000 or more boardings per weekday), and Metro Rail. Together these lines form the basic network of the region's service and serve the region's major activity centers and market areas.

Tier 2: Inter-Community and Community Service

Inter-Community and Community Service supplements the core service, provides primary coverage in outlying areas, feeds the fixed-route system, and provides community circulation focusing on local travel.

2.4 METRO TRANSIT SERVICE TYPES

Metro operates six types of bus service and two types of rail service to better match the transit mode with specific passenger demand and needs. (See **Appendix B** for Metro's Bus Line Identification, Route Numbering, and Color Convention.)

Metro Rail

Metro Rail is high capacity rapid transit service using rail technology. It operates along a dedicated right-of-way, serves full scale transit stations, and is powered by electricity. The rail system serves as a backbone of public transportation in the greater Los Angeles region, linking many key multi-modal transportation centers and destinations together.

Service operates in high-demand travel corridors and is offered in two forms – heavy rail and light rail. Metro's heavy rail is the subway system served by the Red and Purple Lines. Metro's three light rail lines – Blue, Gold and Green – use shorter trains than heavy rail, and generally operate at slower speeds powered by overhead wires. Unlike heavy rail, the light rail lines run along a right-of-way ranging from complete grade separation to at grade in mixed flow traffic. Rail routes are designated with route numbers between 800 and 899.

Metro Liner

Metro Liner service is expedited BRT service operated on its own exclusive right-of-way on either arterials or freeways with dedicated transit stations. Metro operates two Metro Liner routes: Metro Orange Line and Metro Silver Line. Metro Liner service is numbered between 900 and 910. As a form of BRT, Metro incorporates a series of design features to reduce delays, increase reliability and improve passenger comfort:

- **Dedicated Bus Lanes** – This right of way provides fewer traffic conflicts and obstructions and reduces delays and travel time.

- **High-Capacity Vehicles** – State-of-the-art high-capacity vehicles are used on this service to meet high demand and provide the ultimate in passenger comfort.
- **Transit-Signal Priority** – Signal programs, grade separation, and queue jumpers are employed to further speed the operations and improve service reliability.
- **Bus Stations and Shelters** – Stations and shelters provide the customer with enhanced comfort and safety.
- **Streetscape** – Streetscape and other design features such as landscaping, pedestrian count-down signals, bicycle racks, and well designed crosswalks make it easier for pedestrians and bicyclists to access the stations.
- **Improved Fare Collection** – For faster service and convenience, major stations have ticket vending machine (TVMs) which allow passengers to prepay.
- **Park 'N' Ride Facilities** – Park 'N' Ride facilities are provided in close proximity to major stops and stations. Shared and joint use parking is also encouraged.
- **Advanced Transit and Traffic Management Systems** – ATMS systems provide an array of technologies to improve service reliability and passenger travel.

Metro Rapid

Metro Rapid is expedited arterial bus service operating on heavily traveled corridors. Time reductions are achieved through the use of fewer bus stops, transit signal priority, and peak period bus lanes. Metro Rapid buses use specially branded buses and enhanced bus stops at selected locations that include special shelters, information kiosks and "Next Trip" displays. Metro Rapid Lines are designated with route numbers between 700 and 799.

Service warrants guide the design, monitoring and development of the Metro Rapid program. The warrants are specific targets or objectives that are linked to each of the program's key attributes. These warrants are presented in **Appendix C**.

Metro Express

Metro Express is used for longer distance trips with fewer stops and service that typically becomes more localized near the end of their routes. Metro Express service usually operates from a collector area, such as a park and ride location, directly to a specific destination or in a particular corridor with stops en-route at major transfer points or activity centers. In addition, it generally operates a major portion of its routing on freeways either in mixed flow traffic, HOV lanes, or dedicated bus lanes. This service type charges a premium fare and Express services are designated with route numbers between 400 and 599. Express services in the downtown area are given a 400 route number, while those that do not go downtown are given a 500 route number.

Metro Limited Stop

Metro Limited is an accelerated bus service with limited stops. Metro Limited operates in corridors with high transit demand and provides higher-speed services by limiting stops at key transfer points and major activity centers. It is augmented by local bus

service. Metro Limited bus service does not include signal priority and unique branding. Limited stop routes are designated with route numbers between 300 and 399.

Metro Local

Metro Local services operate on city streets and provide service to all stops along a route. Metro Local provides the bulk of Metro's transit service and ridership. Local routes are designated with route numbers between 1 and 299.

Metro Shuttle

Shuttle routes operate on secondary streets and serve short-distance trips. These services specialize in local community circulation, connect residential neighborhoods with local trunk-line transit services, including rail. Typically these services carry less than 2,000 passengers a day. These bus routes are designated with route numbers between 600 and 699. The chart below highlights Metro's bus service types and features.

METRO BUS SERVICE TYPES AND FEATURES

	BUS SERVICE TYPES				
FEATURES	Shuttle	Local/ Limited	Express	Rapid	Metro Liner
Right of Way	Local Streets	Major Arterials	Major Arterials and Fwys	Major Arterials	Dedicated Right-of-Way
Average Stop Spacing	¼ mile	¼ - ½ mile	1+ mile	.7 mile	1+ mile
Target Travel Market	Neighborhood	Inter-Community	Inter-Community Regional	Inter-Community	Inter-Community
Vehicle Type	40-foot bus or smaller	40/60-foot bus	40-foot bus	40/60-foot bus	60-foot bus
Color Coded Buses	California Poppy	California Poppy	Business Blue	Rapid Red	Silver
Communities Served	1 - 2	Multiple	Multiple	Multiple	Multiple
Signal Priority	No	No	No	Yes	Yes
Fare Collection	On board	On board	On Board	On Board	On Board/Pre Pay
Passenger Amenities	Benches and Shelters	Benches and Shelters	Shelters and Stations	Shelters and Stations	Shelters and Stations
Real-time Passenger Info	No	No	No	Yes	Yes
Route Number Designations	600-699	1-399	400-599	700-799	900-910

2.5 ALTERNATIVE SERVICE DELIVERY OPTIONS

Alternative service delivery options are services not directly operated by Metro, including van service, taxicabs, flexible destination operations, contracted services, scrip programs and beginning tier/wages operators. These transportation options may be viable alternatives to marginally performing fixed-route options and can complement traditional transit service.

2.6 FACILITIES

Transit services are supported by facilities, including bus stops, transit centers and stations. These locations are often the first and last points of contact with the passenger. The BRC considered these facilities to be an essential component of transit infrastructure that serve to orient passengers to existing transit services, provide a safe and comfortable environment in which to wait for service, and facilitate safe and efficient transfer movements between services. Given the importance of transit facilities, it is vital that transit routes and schedules are developed with consideration for the quality, appropriateness, and availability of facilities.

Bus stops are places where passengers safely wait, board and alight along a route in-service. They consist of route line number, destination and service qualification signage, curb markings or parking restriction signage and may include passenger amenities such as shelters, benches, telephones, trash receptacles, lighting and information displays installed by the appropriate municipality. Most bus stops are located along the curb of a street while others are at offsite facilities such as at transit centers that may be owned and maintained by the local municipality or by Metro. Transit stations are stops along a fixed guideway with features, such as loading platforms, ticket vending machines for fare pre-payment and a host of passenger amenities including shelters, benches, lighting, information displays, trash receptacles, bike racks and lockers and emergency call boxes. Many of them also are connected to park-and-ride and passenger pick-up/drop off areas.

Transit centers are high volume transfer points for multiple transit services and layover space for end of line bus storage and turn around. Features include passenger loading and alighting areas, benches, shelters, lighting, information displays, bicycle racks and lockers, trash receptacles, and bus layover bays. On-street bus layover zones are designated stopover points for a bus at or near the end of the line. They may or may not allow for passenger boarding and alighting. Bus terminals are major offsite layover areas for multiple bus lines and may or may not allow for passenger boarding and alighting.

3.0 SERVICE DESIGN GUIDELINES

The BRC's policy guidance states that Metro's transit network should be well integrated, coordinated, and designed to be simple and user-friendly to increase trip making. To ensure an integrated and not duplicative system, Metro Rail, Metro Rapid, and other exclusive guideway services (e.g. Metro Orange Line and Metro Silver Line) should serve as the backbone of the transit system, fed and complemented by a regional bus network of key travel corridors that provide high-frequency service for easy transfers. Less-frequent localized services should augment the regional network to provide geographic coverage.

For network simplicity and to create a more intuitive system, closely-spaced services should be consolidated into fewer, more frequent services at a half-mile to one-mile route spacing. For ease of use, transfers should be as seamless as possible by providing high frequency routes on the regional network, timed transfers for less frequent services, and consolidated bus stops at the same intersection.

Finally, since the regional transit network consists of more than 40 fixed route operators and many more local return transit services, coordination of services and alignment of schedules should be a high priority. Coordinated planning and scheduling between Metro, Muni, Local Return, and Metrolink operations are essential towards achieving this service integration.

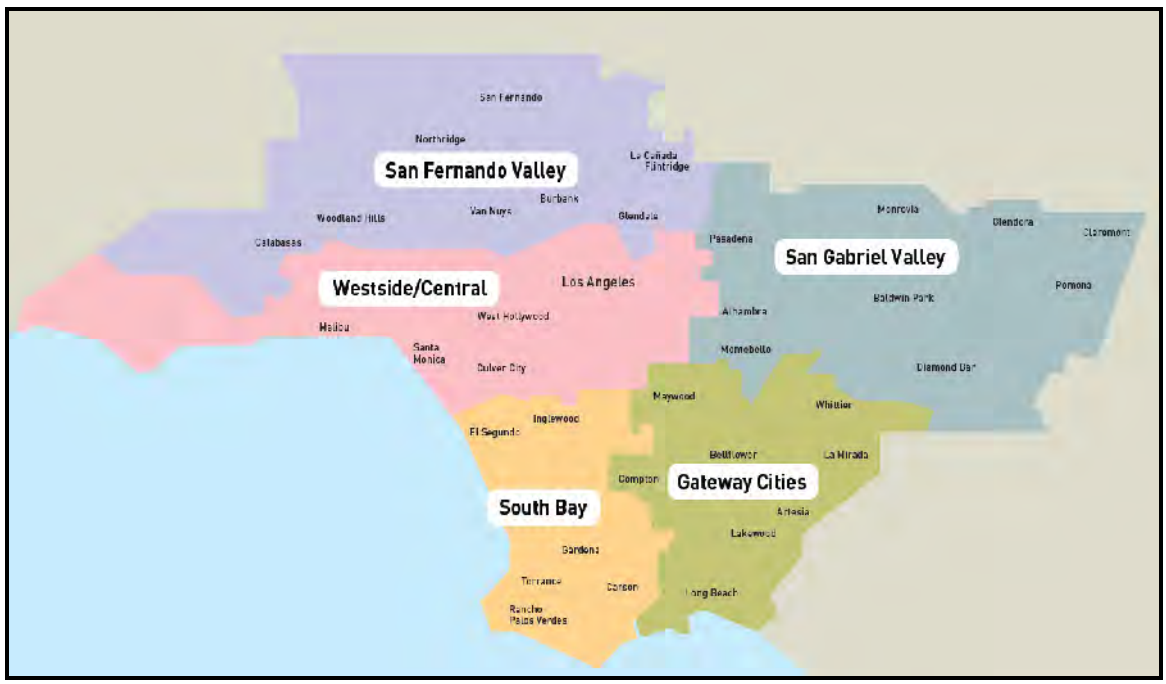
3.1 METRO SERVICE COUNCIL

Metro is the primary transit provider in Los Angeles County, operating within a 1,433 square mile service area. In conjunction with Metro are reserved service areas in operation since March 1, 1971, and the Foothill Transit Zone created in 1988 by a joint powers authority consisting of 22 member cities in the San Gabriel and Pomona Valleys.

In 1971, State Legislation granted cities that operate fixed route transit within Metro's service area the right to continue being the main provider for their respective municipalities and keep serving corridors and destinations outside their city boundaries without fear of encroachment by Metro. However, if these operators wish to extend their operations beyond the existing service since 1971 then an agreement must be reached with Metro. These operators include Commerce, Culver City, Gardena, Long Beach, Montebello, Santa Monica and Torrance.

During the late 1980s, there was a desire for subregions to operate their own local services in lieu of Metro. Metro passed an ordinance whereby a city or group of cities can apply to provide transit service under specific conditions set forth by Metro and state statute. This became known as Transit Zones. In 1988, a group of 22 cities in the San Gabriel Valley took advantage of this opportunity and formed the Foothill Transit Zone.

Metro decentralized its bus operations in 2002, dividing them into five localized sectors or councils. More recently however since 2010, Metro restructured and established a centralized organization, while maintaining the role and responsibility of the councils to help coordinate service changes. Metro Service Councils recommend and approve changes to bus service that may impact each respective geographical area within Metro's purview, as shown in the map on next page.



These community-based councils provide the following role and responsibilities:

- Greater community involvement: Regionalized outreach gives residents more opportunities for direct input into service issues in their communities.

- Improved service: Local service evaluation to better understand passenger needs and recommend the appropriate response.

- Subregional perspective: Advise and approve the planning and implementation of service within their area; call and conduct public hearings; evaluate Metro bus programs related to their service area; review proposed service changes; and make policy recommendations to the Metro Board.

3.2 SERVICE DESIGN

A. Service Type Determination

Metro operates a local, limited, and rapid bus grid network system overlaid by services such as rail and express bus services, and supported by shuttle bus feeder/community services.

Determining the most appropriate transit service in a corridor depends on a number of factors, including level of demand, resource availability, site or corridor characteristics, environmental considerations, and community acceptance. The table below shows desirable characteristics considered during the initial review of proposals to upgrade existing operations. The demand thresholds include the combined ridership levels for all services operating in the corridor.

SERVICE TYPE DETERMINATION

Heavy Rail	Operating 100 % within an exclusive right of way.	2,500 boardings per route mile or more than 50,000 boardings per day. Ability to construct a fully grade-separated facility.
Light Rail	Operating in mixed flow traffic or an exclusive right of way	1,000 boardings per route mile or more than 25,000 boardings per day. Ability to construct a guideway within or adjacent to the corridor.
Expedited Transit Bus	A regular or articulated bus operating in a fixed guide way or a limited stop service in mixed flow with signal priority treatment.	300 or more boardings during peak-hour and in peak direction of travel. Daily average of more than 500 boardings per route mile or more than 10,000 total daily boardings. Ability to implement operating speed improvements in the corridor.
Standard Transit Bus	A 30-40 foot bus operating fixed route/fixed schedule in either local or express mode.	80 or more passengers during peak-hour and in a single direction of travel. Total daily boardings greater than 2,000.

B. Physical Routing Guidelines

Metro primarily operates three types of buses: a standard 40-foot bus, a 45-foot bus, and a 60-foot "articulated" bus. To ensure that buses can adequately navigate route alignments and serve bus stops, Metro established the following standards:

- **Transit Centers /Bus Terminals**

  - Layover zones should be designed to accommodate various sizes of buses (40-foot, 45-foot, and 60-foot).
  - Re-striping of layover zones should be implemented on an as needed basis based on needs and size of buses scheduled.
  - Scheduled routes should be scheduled in such a way that the amount of layover space can be accommodated.

- **Minimum turning radius clearance required for each type size bus movement**

  - 44 feet for both 40-foot and 60-foot articulated buses
  - 47.5 feet for 45-foot buses

- **Street lane widths for bus operations must be 12 feet or more**

- **Bus Stop Curb Lengths and Zone**

  - 40-foot buses should at minimum be:
    a. Farside – 90 feet
    b. Nearside – 100 feet
    c. Mid-block –150 feet

  Note: *For two 40-foot buses servicing a stop simultaneously, add 50 feet. Additional bus stop curb length may be needed for 45-foot buses.*

  - 60-foot bus should at a minimum be:
    a. Farside and mid-block – 120 feet
    b. Nearside – 170 feet

  Note: *For two 60-foot buses servicing a stop simultaneously, add 70 feet.*

  - Bus Layover Zone general space requirements for service operating on schedule:
    a. One Space – 15 minutes
    b. Two Spaces – 12 minutes
    c. Four spaces – 6 minutes

Appendix D provides additional information on Transit Cooperative Research Program bus stop standards and guidelines.

C. Bus Service Guidelines

- Corridor/ Route Duplication refers to a collection of parallel routes serving several common destinations. If the route spacings were such that patrons could walk to one or the other within the same amount of time and distance then relatively speaking these routes can be considered duplicative services. Route Duplication occurs when two or more bus routes operate on the same alignment by one or more carriers in a transit corridor. While service duplication should be minimized, exceptions apply, such as Metro Rapid bus corridors that support an underlying local route, on approaches to business districts, major terminals, and transit centers, or if serving key destinations along a corridor from several directions.

- Frequency of Service refers to the level of service provided. Frequency is driven by the amount of time separation between scheduled trips, otherwise known as the headway. Service frequencies are dictated by ridership demand and should be set in such a manner that it provides sufficient capacity to adequately meet this demand and ensure a reasonable and attractive level of service is provided throughout the day. There are instances when the frequency in a corridor is so frequent that operating a high-capacity bus makes more sense and is more cost effective.

- Metro policy headway is that all local service should operate 60 minutes or better and that Metro Rapid service should operate at least every 20 minutes between the hours of 6:00 a.m. and 6:00 p.m.

- Limited-Stop Service makes significantly fewer stops than local service, and the key design objective is to operate at a minimum of 10% faster than local service. Limited service will be considered in corridors where the demands require a 10-minute headway or less on the local line prior to implementation of a limited-stop service.

- Load Ratio is the average ratio of passengers on-board to seats available commonly measured over a one-hour period. The load ratio determines what the proper scheduled headway should be. Metro's Load Factor Policy is 1.30, which is significantly lower than industry peer agencies.

- Network Spacing, also called "route spacing," refers to the average distance between two or more parallel bus routes. It is generally accepted that patrons are willing to tolerate walking up to one quarter mile to a bus stop. In general bus routes operating parallel to one another in an urban area should be spaced a half-mile apart from one

another and bus routes operating parallel to rail should be spaced a half-mile apart on either side of a rail route. Bus routes operating parallel in a suburban area should be spaced no more than one-mile apart from one another; and bus routes operating in low density or underdeveloped areas should be operated where needed in such a way that it is cost-effective. When possible, alternate delivery methods should be considered.

- Route Alignment should be direct for network simplicity and to maximize average speed and minimize travel time. In general there should be no more than 2 branches per trunk-line routes. Route deviation, also referred to as "out of direction movement," is when a route is realigned to operate in close proximity of a new activity center such as a rail station or transit center. Route deviation should only be considered if the diversion time in one direction is 5 minutes or less, and there is a net travel time benefit for riders who are connecting or traveling through.

- Route Length should be as short as possible to reduce a vehicle's exposure to events that may delay service (e.g. accidents, road construction, or poor weather conditions) and to maintain scheduled travel times to maximize on-time performance.

- Span of Service refers to the hours that service is available on a given day and defines the minimum period of time that service should operate at any point in the system. This provides customers with the confidence that direct and connecting service will be provided. General span of service guidelines by service type are identified below.

  Some of the criteria used to determine the span of service on a bus route include:

  - Existing ridership and productivity levels.
  - Span of service on connecting and alternative services with expanded service.
  - Resource availability.
  - Hours of operation of major job sites or activity centers along the alignment.

STANDARD SPAN OF SERVICE BY SERVICE TYPE

Service Type	Weekday	Weekends
Metro Liner	5am - 9pm	6am - 9pm
Metro Express	Peak-hours Only	N/A
Metro Rapid	5am - 9pm	6am - 8pm
Metro Local	5am - 11pm	6am - 9pm
Metro Rail Feeder/ Shuttle	5am - 9pm	6am - 9pm

- Transfers occur when passengers change from one transit unit to another (bus or rail), which occur at a common stop location such as an intersection, station, or transit center. Metro's goal is that transfers should be seamless minimizing wait times as much as possible. Metro accomplishes this through time transfers and positive transfers.

    - Timed Transfers are when wait times are built into the schedule of a route to provide convenient connections between two routes for passengers who wish to transfer at a common stop location. In these instances it is preferable that wait times be built into the schedule of a low frequency route with headways greater than 20-minutes and owl routes that operate every 30 minutes or greater.

    - Positive Transfers are when one route is scheduled to arrive 2-5 minutes before or after another route at a common stop location to enhance connections and reduce wait times for passengers who wish to transfer from line to another such as connections between bus and rail.

    - In addition to timed and positive transfers, Metro will work with other municipal transit operators to better coordinate services and schedules to minimize transfer impacts.

D. Bus Stops

Bus Stops allow for boarding and alighting of passengers. There are instances when two or more routes operate along the same corridor, such as a Metro Rapid Line and an underlying Metro Local line, which serve different stops. In these cases it is desirable their stops be consolidated to avoid unnecessary crosswalk movements and minimize confusion as to which stop riders should wait to catch their bus. However, there are instances when stops cannot be consolidated:

- Would cause unsafe right turn movements
- Objections from businesses adjacent to stops
- Loading Zones (business & passenger)
- Jurisdiction refusal to allow extending current stop zone
- Lack of available space

- Stop Location is the proper location of a transit stop requires on-site investigation of the stop(s) under consideration and must be concurred with by the municipality the stop is located in. No standard type of stop can be recommended for all locations, as each intersection has its own unique characteristics. An inventory of land uses within a quarter-mile corridor of the road under consideration should be taken; noting uses that serve as major trip producers and attractors.

- Stops should be located within a short walk from schools, major retail malls, office buildings and multi-unit apartments. These stops provide access to the transit system for uses that generally attract a large number of transit riders. Bus stops should be located to balance good rider access with pedestrian safety. Stop locations should support efficient transfer movements minimizing walking distances, unnecessary crosswalk movements, and potential for jaywalking.

  In addition, all bus stops and rail station stops along a route should be fully accessible in accordance with the Americans with Disabilities Act. For example there should be no obstructions preventing the boarding and alighting of patrons who use a wheelchair or other assistive mobility devices. In addition, pathways to and from a bus stop and rail station should be unobstructed. If obstructions do exist every effort must be made to resolve this with respective municipalities. In the case of bus stops they can either be moved to a new location on a permanent basis or temporary basis depending upon situations such as construction.

- Stop Spacing refers to the average distance between consecutive stops along a bus route. Guidelines for bus stop spacing are established at a level where service is within a reasonable walking distance and stop delays do not significantly reduce travel time. Ideally, stops should be as far apart as possible without adversely affecting passenger convenience.

  Decisions regarding bus stop spacing and location call for careful analysis of the safety of passengers, Operators, equipment, passenger service requirements, the type of service provided, and the interaction of stopped buses with general traffic flow. Achieving a balance of convenience to both the transit passenger and the auto user is a prime objective.

Bus stop spacing should be related to ridership density. Stops should be closer together in the major commercial districts and farther apart in the outlying areas.

As shown below, the primary determinants for stop spacing are bus service type and population densities. Stop spacing for shuttles should be determined on a case-by-case basis as these services can be operated in a variety of environments and in a number of different ways.

BUS STOP SPACING GUIDELINES

Service Type	Population Density (Persons per Square Mile)			Route Average
	Over 20,000	10,000-20,000	Under 10,000	(Stops per one-way route mile)
Metro Liner	1,500-4,000 ft.	1,500-4,000 ft.	2,600-5,200 ft.	1
Express	500-2,600 ft.	1,500-4,000 ft.	2,600-5,200 ft.	1
Rapid	800-1,500 ft.	1,000-4,000 ft.	2,600-5,200 ft.	0.7
Limited	750-1,000 ft.	750-1,500 ft.	1,000-4,000 ft.	0.5
Local	500-800 ft.	500-1,000 ft.	500-1,300 ft.	0.25
Shuttle	TBD	TBD	TBD	TBD

E. Bus Lanes

A bus lane is an exclusive lane used by transit on urban streets along a roadway through widening or dedication of one or more existing general traffic or parking lanes for transit use. These lanes can be designated for transit use during peak periods only or all day. These lanes typically allow use by general traffic for right turn movements and local access to and from driveways. Bus lanes are most effective in those areas where there are very high bus volumes or passenger volumes and where operational efficiencies can be achieved.

Bus lanes are a key desired attribute for Metro Rapid lines and an important strategy for improving traffic congestion, mobility, and air quality. They make transit usage more attractive by reducing transit travel times, increasing service reliability, and improving safety. They are considered beneficial to the customer in situations where the average trip time can be reduced by at least 15%. This translates into a travel time savings of approximately 40 seconds per mile using the average bus speed of 11.5 mph and an average trip length of 20 minutes. The bus lane guidelines shown below suggest that a project meet either the peak-hour passenger or bus volume thresholds, and the trip time savings. In

addition to the guidelines, factors such as traffic and parking impacts, overall travel time savings, and street design considerations must be considered.

BUS LANE GUIDELINES

Treatment	Minimum One-Way Peak-hour Bus Volumes	Minimum One-Way Peak-hour Passenger Volumes	Minimum Average Trip Time Savings
Curbside bus lanes	25	1,000	15%

F. High Capacity Bus

Metro operates two high-capacity vehicle types: 45-foot buses with 46 seats and articulated 60-foot buses with 57 seats. Ideally these high-capacity vehicles should primarily be operated on high-volume trunk service routes such as Wilshire Blvd. (Line 720), Vermont Blvd. (Lines 204, and 754), and Olympic Blvd. (Line 66), which currently operate 60-foot articulated buses.

One advantage to their deployment is the opportunity to reduce vehicle requirements and service hours; however their deployment should not increase service intervals to the point where riders notice degradation in service quality. For this reason, bus lines with peak headway of five minutes or less (frequency of 12 trips or more an hour) are ideal candidates for this type of vehicle. In evaluating services for higher capacity vehicles other factors must be considered, including: facility compatibility, street design, and potential impacts to services where schedules have been interlined.

G. Bus / Rail Integration

As the Metro Rail system expands, adjustments are made to the bus system to improve access to rail stations, take advantage of new transfer facilities, and reduce bus and rail service duplication. The following guidelines provide direction to routing and scheduling changes that will be necessary as the Metro Rail system is expanded:

Cancellation of Parallel Limited and Express Service

Competing limited stop and express service that parallel the rail corridor will be discontinued when duplication exists.

Diverting Service

Bus routes that run parallel to a rail line may be diverted to a station when:

- The walk time from the nearest station is greater than 3 minutes.
- The diversion time in one direction is 5 minutes or less.

- The average three-hour peak load factor is less than 50 percent.
- There is a net travel time benefit for connecting and through traveling riders.

Intersecting bus lines or bus lines that travel in a perpendicular direction to a rail line will be diverted to serve the closest rail station when:

- The diversion time in one direction is 5 minutes or less.
- The average three-hour peak load factor is less than 75 percent.
- There is a net travel time benefit for connecting and through traveling riders.

Extending Terminating Lines

Bus routes that end within one mile of a rail station will be extended to terminate at the station. Routes that terminate at distances greater than one mile may be extended if the rerouting will create a valuable link to the rail system or will result in a reduction in travel time for a significant number of riders.

New Bus Routes

New rail feeder service will be considered as part of the service change process if a need is demonstrated and if funding is available as part of the service change process.

Scheduling Bus Interface

- During peak travel periods, bus arrival and departure times should be governed by the rail arrival and departure times when predominant movement is from bus to rail.
- During off-peak times, bus routes with frequencies of 20 minutes or greater ending at a rail station should be scheduled to arrive 2-5 minutes before the rail departure time.
- When the predominant movement is from rail to bus, terminal buses should be scheduled to depart 2-5 minutes after the scheduled rail arrival time.

H. School Trippers

School trippers are extra service operated to protect against overcrowding on bus routes serving schools. Metro's policy on school trippers is based on FTA regulations (49 CFR Part 605). These regulations are directed at protecting the private sector against unfair competition and ensuring that FTA funding is focused on providing services that meet the needs of the "general public."

School tripper service may be operated if it meets the following criteria:

- There is sufficient demand to warrant the operation of a tripper;
- There are sufficient resources to operate a tripper;
- The school tripper will not result in a significant increase in travel time for regular customers; and
- The school tripper is operated as part of the regularly scheduled public transportation service.

School tripper service must meet the following requirements:

- All school trippers must fully comply with established policies and procedures;
- All regularly scheduled school trippers must be published on public timetables;
- All locations where trippers board or alight passengers, including the bus stops at deviated routes, must be marked with Metro signage including the bus line numbers servicing the stop;
- School tripper changes must be provided to the general public by a service change notice or on the Metro website at www.metro.net;
- Requests for new school trippers or modifications to existing school trippers will be considered when a notice is given at least two weeks in advance giving ample time to complete an appropriate analysis of the request and to allow appropriate notification of changes.

School Tripper Service Change Procedures are listed in **Appendix E**.

I. Special Event Service

Special event services are bus routes designed to take passengers to a specific venue and are not part of the regularly scheduled operation. Metro will provide service under contract to other entities only if the provision of these services does not interfere with Metro's ability to meet its regularly scheduled service obligations and fits within the scope of the agency's regular operation in terms of route structure, fares and span of service. Special events service will be provided on a full cost recovery basis and in conformance with the agency's charter bus policy.

J. Charter Bus Policy

Charter Service is the use of buses, vans or facilities (rail system) to provide a group of persons under a single contract, at a fixed charge, with the exclusive use of the vehicle or service to travel together under an itinerary either specified in advance or modified after having left the place of origin. Generally, for service not to be considered charter, it must meet the following tests:

- Be available to the general public; operate within the system's normal scope (existing routings, fit within normal hours of operation and established fare structure).

- Have a published timetable.
- Customers must pay their own fare.

Charter Service Policy

As a grantee of Federal funds, Metro is prohibited from using its federally-funded equipment and facilities to provide charter service except on an incidental basis and when one or more of applicable exceptions discussed below apply:

- Charter service shall be incidental to the mass transportation service and shall be provided only during times of the day when vehicles are not needed for regularly scheduled service.
- Charter service will only be considered when one of the following exceptions apply:
    - There are no willing or able private charter operators.
    - For special events the private operators are not capable of providing the service.
    - When there is a formal agreement regarding the provision of charter services between the recipient and all private charter operators that have been identified to be willing and able. For government or certain non-profit organizations, if the trip involves a significant number of handicapped persons, or if the organization is a qualified social service agency, or if it receives public welfare assistance funds whose implementation may require transportation services.
- All requests for Charter Service must be approved by the Chief Executive Officer and it may require a waiver from the Federal Transit Administration. Petitions for a waiver should be requested in writing 90 days in advance of the event whenever possible.
- The rates for charter service shall equal or exceed the annual fully allocated cost, including depreciation, of providing charter bus operations, and Metro shall deduct the mileage and hours from the useful life of the buses.
- The operation of charter service must also comply with relevant state laws, including Section 30630.5 of the California Public Utilities Code.

3.3 RAIL SERVICE GUIDELINE

Rail service planning efforts is multi-layered with a primary focus on matching service levels and capacity with demand. Key rail policies address the frequency of service, span of service and passenger loading. Additional efforts focus upon coordination among lines sharing common track or stations, public safety, and enabling allotments of time for regularly occurring preventive maintenance.

A. Rail Headway/Frequency

Headway refers to the interval of time, expressed in minutes, between consecutive trips on a transit line. Headways are based on policy and demand. Frequency refers to how often the arrival of a trip occurs in a given time period. For instance if the headway of a line is 10-minutes the frequency is six trips every hour. Service frequencies are set in a manner that ensures a reasonable and attractive level of service is provided throughout the day and to provide sufficient capacity to adequately meet ridership demand. The table below defines the maximum headways for each service period operated by Metro along the trunk portion of a line. Service along branches may be less frequent.

RECOMMENDED MAXIMUM HEADWAY

Service	AM/PM Peak	Midday (9am-3pm)	Evening (6pm-9pm)	Night (9pm-2am)	Weekends
Light Rail (Blue Line, Green Line, Gold Line)	10	15	15	20	12-15
Heavy Rail (Red/Purple Lines)	10	15	15	20	12-15

B. Span of Service

Span of service refers to the hours of the day and days of the week that service is operated. For the rail system, the span of service is determined based on the operational hours of key activity centers located along the alignment and ridership demand. A key factor in determining the span of service on individual lines is based upon system connectivity as well. Evening schedules are designed to provide connections at the 7th St./Metro Center/Julian Dixon Station, Union Station and Imperial/Wilmington/Rosa Parks Station. The approximate span of service for light and heavy rail service is summarized on next page.

MAXIMUM SPAN OF SERVICE

Service	Weekdays	Weekends
Light Rail (Blue Line, Green Line, Gold Line)	3:50 am - 2:00 am	3:50 am - 2:00 am
Heavy Rail (Red/Purple Lines)	4:30 am - 1:30 am	4:30 am - 1:30 am

C. Passenger Loading

Passenger loading is a measure of seating capacity. It is typically expressed as a percentage of the total passengers compared to the seats available. These standards are set at a level to offer sufficient seating capacity on the Metro Rail lines to meet the need of Metro's current and future riders, and ensure overcrowded vehicles do not discourage patronage or adversely affect planned dwell times at stations. The current load standard for light rail car is 175% based on 76 seats and heavy rail car is 230% based on 55 seats. Currently these standards are under review and subject to change.

PASSENGER LOAD STANDARDS

Service	Standard
Light Rail	175%
Heavy Rail	230%

The above table shows the current passenger loading standards for peak periods for each service type. The standards vary to reflect differences in seating and available space for standees by vehicle type.

3.4 CUSTOMER INFORMATION & AMENITIES

Providing customer information assists both regular riders and infrequent riders on how to use transit as a viable mode of transportation to and from their destinations. The BRC determined that clear, concise, and timely information is an important adjunct to service quality, particularly when bus and rail services are not operating as planned. Amenities aid in the comfort and security of riders.

Customer Information

Passengers need to know how to use transit, where to go to access it, where to alight to access their destination, whether transfers are required, and when transit services are scheduled to depart and arrive. Infrequent users particularly need this information and even regular transit users may require information about specific route when they need to travel to a location they rarely visit or is new to them.

Information must be provided in accessible formats. Metro provides customer trip planning and help information via telephone, in person with a customer service representative, on-board announcements, by mail, online at the metro.net website and by email.

At Transit Infrastructure, such as shelters, signs directing motorists to park-and-ride lots, and bus stop signs that indicate the presence of service to people not currently using transit.

Audible Announcements at bus stops, rail stations and on board vehicles to assist not only passengers with visual impairments, but also passengers unfamiliar with the route or area.

Internet Information available 24 hours per day to anyone with Internet access such as:

- Route Maps & Timetables, Fare Information, and Trip Planner
- Specialized Guides (Bikes, Riders with Disabilities, Safety and Security, etc.)
- Commuting Information (Carpools, Vanpools, School Pools, and Employer Programs)
- News and Media Information
- Latest Projects and Programs
- Contact Information
- Special Event Information

Next Bus or Train Real-Time Information, both audible and visual, to reassure when the next scheduled vehicle will arrive.

Printed, Distributable Information, such as timetables, maps, service change notices, rider newsletters, etc., preferably available at a number of locations.

Posted Information, such as system maps, bus cubes posted at stops, stations, and on-board transit vehicles.

Route Numbering Convention at stops and transit vehicle head signs to assist passengers to quickly identify what stops to wait at and what transit vehicle to board related to printed and posted information. See **Appendix C.**

Wayfinding is the process of communicating information to support our patrons with the ability to navigate through the use of signage, system / route maps, kiosk, bus cubes, directions, etc. so they can easily determine where they are, where they want to go, and how to get there.

Visual Displays to assist passengers with hearing impairments and to supplement on-board announcements that may be muffled by other noise.

Customer Amenities

Passenger amenities are those elements provided at a transit stop, transit center, and station stops to enhance comfort, convenience, and security. Metro will provide customer amenities where applicable and have available resources. In some instances, Metro will partner with municipalities to provide the appropriate amenities. Amenities include such items as shelters, benches, vending machines, trash receptacles, lighting, restrooms, and telephones.

Benches provide comfort for waiting passengers, help identify the stop or station, and cost less when compared to installing shelters.

Elevator/Escalators provide accessibility for those who otherwise cannot use stairs to elevated station stops.

Lighting increases visibility, increases perceptions of comfort and security, discourages use of bus stops once transit operations are no longer in-service.

Public Restrooms may be provided at transit centers and maintained for public safety and convenience.

Shelters provide comfort for waiting passengers, shelter from climate conditions, and help identify the stop or station.

Telephones/Intercoms provide access to transit information and emergencies.

Trash receptacles provide a place to discard trash and keep bus stop and surroundings clean.

Vending machines can provide newspapers and snacks while waiting for a transit vehicle.

When transit service is not provided near one's origin, driving to a park-and-ride lot or riding a bicycle to transit may be viable alternatives. Park and rides are especially important amenity for choice riders.

Bicycle Storage

Bicycle storage may be provided at transit stations where demand exists and space allows and on transit vehicles. Bicycle racks and lockers may be provided at transit center and stations. On transit vehicles bicycles may be bus-mounted racks located in front of a bus or on-board a rail car in a designated space.

Bike racks provide a simple, relatively low-cost approach and can hold a large number of bicycles in a relatively small space, but the bicycles are subject to potential damage and theft. Enclosed bicycle lockers provide added protection from theft and from weather, but are more costly and require more space.

Park 'N' Ride/Station Parking

A Park 'N' Ride facility provides a place for choice riders to park their cars before boarding a bus or train. Park 'N' Ride facilities are usually provided at station stops or transit centers such as Metro's El Monte and Artesia Centers and at various rail stations. Park and rides can also be found at lower density suburbs serving as a staging area for commuter riders.

SECTION 4: SERVICE PERFORMANCE EVALUATION

Metro uses a comprehensive bus performance analysis process that focuses on mobility, the customer's experience, and resource utilization. Historically Metro has primarily used a Route Performance Index (RPI) to determine a route's performance relative to other similar services. Metro now uses an additional process that complements the RPI. This process contains four core attributes using ten performance indicators, with detailed analytical reports produced quarterly. Lines are analyzed according to their service type, nine specific time periods, and days of operations (weekday, Saturday, and Sunday). This analysis allows the analyst to focus on the performance of a line by time period.

4.1 ROUTE PERFORMANCE INDEX

The Route Performance Index (RPI) is used to ensure Metro services are effective and provide a reasonable return on investment. This measure is applied to all Metro bus lines in operation for more than a year. The specific methodology used to calculate the RPI is provided in **Appendix F**.

The RPI is used to identify under-performing lines. Specific corrective actions are taken during the service change process. Corrective actions could include marketing, service restructuring, implementing an alternative service, or cancellation of service.

The RPI consists of three variables:

> Utilization of Resources – Passenger boardings per revenue service hour is used as a measure to determine how effectively resources are used on a given line. This measure is determined by dividing the total number of boardings by the revenue service hours operated. A route having a higher number of boardings per revenue service hour represents a better utilization of resources such as buses, operators and fuel.
>
> Utilization of Capacity – Passenger miles per seat mile is the measure used to evaluate how well the seating capacity of the system is being used. Passenger miles are calculated by multiplying the average distance traveled per passenger by the number of passengers using the service. Seat miles are calculated by determining the number of seats per vehicle by the number of service miles operated. A higher resulting number indicates greater utilization of system capacity.
>
> Fiscal Responsibility – Subsidy per passenger is the measure for fiscal responsibility. Subsidy refers to the amount of public funding required to cover the difference between the cost of operation and the passenger revenues collected. Higher subsidy services require more public funding support.

The RPI is calculated within groups of similar services. The following service categories are used in the RPI process:

- Metro Liner
- Metro Express
- Metro Rapid

- Metro Local
- Metro Shuttles

Specific indices are developed for each measure within each category of service. Lines with an index of 1.0 perform at the category average, while lines with an index of less than 1.0 perform below the average. Lines with an RPI lower than 0.6 are defined as performing poorly and targeted for corrective action. Lines that have been subjected to corrective actions and do not meet the 0.60 productivity index after six additional months of operation may be canceled, subject to Metro Service Council or Board approval, unless a funding agreement with a city or other agency is in place to offset the poor performance of the service. Such agreements need to be for a period of one year or more and in an amount sufficient to bring the farebox recovery ratio of the poorly performing service up to the service category (Metro Local, Metro Express, etc.) average.

4.2 SERVICE PERFORMANCE INDICATORS

Beginning in FY2009, Metro introduced a more comprehensive internal monitoring process that focuses on four core service attributes using ten performance indicators. A detail of each of the indicators and their standard for performance is provided in **Appendix G**.

Availability

Two indicators are used to measure the extent to which transit service is available: Accessibility and Connectivity. The accessibility indicator mandates that 99% of census tracts with three or more households and/or four or more jobs per acre should be within a quarter-mile of transit. The connectivity indicator states that direct transfers should be available for all Rapid-to-Rapid and Tier 1 Local-to-Tier 1 Local connections. At the present time only one isolated census tract does not meet the standard for Availability, and a short list of exceptions to the Connectivity standard is maintained.

Quality

Quality is important in retaining existing customers and attracting new ones. Two performance indicators measure quality: In-Service On-Time Performance and Customer Complaints. In-Service On-Time Performance uses a standard of one-minute early and up to five-minutes late as the range for on-time achievement. The baseline performance target is 80% on-time or better. Since this measure has been monitored, performance has been consistently improving. Customer Complaints monitors the frequency (complaints per 100,000 boarding) with which customers are dissatisfied with some attribute of service delivery (Commendations are excluded from this performance measure). The standard of performance varies by service type and was established at 85th percentile of rate for each service type during FY2008.

Quantity

Quantity is important in establishing minimum service levels for any service operated as well as ensuring that demand is adequately served when higher volumes of patronage are achieved. Two performance indicators are used: Frequency of

Service and Average Load Factor. Frequency of Service ensures that service will operate at least hourly in any corridor in which Metro operates fixed route service. Metro Rapid service is held to a demand driven standard that ensures service at least every 20 minutes between 6:00 a.m. and 6:00 p.m. The Average Load Factor measure ensures an average of not more than 30% of bus patrons are standing during any hour. This standard is subject to reevaluation, and is not applicable to rail transit which uses differing standards that tolerate higher levels of standees by design.

Effectiveness

Effectiveness measures are used to ensure that service is provided in the most cost-effective manner given scarce resources. Four performance indicators are used: Boardings per Service Hour, Cost per Passenger Mile, Passenger Miles per Seat Mile and the Route Performance Index (previously described). The standards of performance for the first three of these measures are established by the performance of the lowest 15% of services within each service type during FY2008. The RPI establishes its performance threshold at 0.60. Boardings per Service Hour measures the level of passenger activity, or passenger turnover, during each hour of operation. Cost per Passenger Mile measures the cost effectiveness of the service provided, and Passenger Miles per Seat Mile establishes the extent to which provided capacity is actually used.

SECTION 5: SERVICE CHANGE PROCESS

Metro traditionally implements service changes every six months. Schedule changes are conducted to modify service based on patronage and/or budget fluctuations. Service changes follow an established timeline and are highlighted with additional details in **Appendix H**.

SERVICE CHANGE TIMELINE

Key Activities	Required Lead Time (Months Prior to Implementation)
Initiate Planning Process	12
Develop Preliminary Recommendations	7-8
Public Review and Input	4-7
Impact Analysis for Proposed Changes	4-7
Finalize Program	4-5
Program Approval	4-4
Develop New Service Schedules	3-5
Print Public Time Tables and Operator Assignments	1-2
Fabricate Decals for Bus Blades	1-4
Print Bus Cube/Take-One Bus Inserts	1-4

Metro Service Councils provide a forum for the community and local municipal operators to express needs and priorities, and evaluate opportunities and issues with service coordination. Service change programs are developed based on input generated by a wide variety of sources. Sources include customer and employee input, service restructuring studies, requests from other local operators and performance monitoring results. The evaluation process includes public review of the proposals, a technical evaluation of ridership and resource impacts, environmental considerations, coordination with key stakeholders in the regional bus system, and review and approval by Metro Service Councils and/or Board of Directors. Once a program is approved, the public is notified of the upcoming changes and new public timetables and bus operator work assignments are developed.

Changes to the rail system occur less frequently. They generally relate to the opening of a new line or adjustments to the frequency or hours of operation for existing

service. Changes in rail and bus service follow the same planning and implementation process.

Service Change Measures

Federal guidelines and Metro policy require that a public hearing be held when major service changes to the bus system are considered. These changes are detailed in the table below:

Item	Measures to Determine Major Service Changes
A	A change of 25% or more in the transit route miles.
B	A change of 25% or more in the revenue vehicle miles.
C	A new transit route is proposed.
D	Experimental service changes that meet or exceed the measures specified in items A, B and/or C above may be instituted for 180 days or less without prior notification. A public hearing must be held during that time if the experiment is to remain in effect for more than 180 days.
E	If the number of changes on a route in an operator's fiscal year add up to the percentage noted in A, B or C above, a hearing must be held prior to the last change.
F	Standard seasonal variations in transit service are exempt from public hearing requirements unless the number, timing and type of service changes meet the above criteria.
G	Emergency service changes may be instituted for 180 days or less without prior notification. A public hearing must be held during that time if the emergency service is to remain in effect for more than 180 days.
H	It will not be a major service change if service is replaced without interruption at a level that would not otherwise constitute a major change.

5.1 IMPACT ANALYSIS FOR PROPOSED CHANGES

Prior to approval, proposed service changes undergo a technical evaluation. The purpose of the evaluation is two-fold: 1) to define and evaluate the impact on riders; and 2) to develop appropriate mitigation measures if needed. Factors considered are service performance, availability of alternatives and special mitigation strategies. As part of this evaluation process, resource impacts including in-service hours and vehicles are also tracked to ensure compliance with budget parameters.

5.2 TITLE VI REVIEW PROCESS FOR MAJOR SERVICE CHANGES

Title VI of the 1964 Civil Rights Act states that "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Title VI bars intentional discrimination as well as disparate impact discrimination (i.e., a neutral policy or practice that has a disparate impact on protected groups).

Chapter V part 4 of the Federal Transit Administration Circular 4702.1A, requires transit agencies serving large urbanized areas to evaluate significant system-wide service and fare changes at the planning and programming stages to determine whether proposed changes would have a discriminatory impact. For service changes, this requirement applies to “major service changes” only and the recipient should establish guidelines or thresholds for what it considers a “major service change” to be.

Metro must ensure that there is Title VI consideration whenever there is a change in service that could impact minority communities. Metro must describe significant service changes relating to hours or days of operation, headways or fares, etc., and provide an analysis of the effect that any proposed changes may have on minority, low-English proficiency (LEP), and low-income communities. This policy provides a delineation of that service review. Service changes covered by this policy are those indicated as “Major Adjustments of Transit Service” under Board Policy (Chapter 2-50 Public Hearings of the Administrative Code). Major service adjustments are generally those that constitute an aggregate change of 25 percent or more in route miles or hours when compared on a daily basis. This includes system wide route restructuring, or adding and deleting service.

All major service changes will be screened to determine if they have a disproportionate impact on minority, poor and LEP communities (target populations). The routing of those services, for which major changes are recommended, will be overlaid on top of GIS demographic information to determine if the route serves a large share of the target population(s). If it does, than the impacts of the change will be determined, and if they are significant, mitigation may be recommended, alternative services identified, and the change could be withdrawn. If the route does not serve a large share of the target populations, no further review will be required.

5.3 PUBLIC HEARING PROCESS

Metro Service Councils oversee the planning and implementation of service within their service area, while coordination of the overall Service Change Program is an agency function within the purview of Metro Service Planning staff. The service council by-laws require service changes to Tier 1 and Metro Rapid bus routes to be reviewed and approved by the Metro Board of Directors.

Tier 1 bus routes generally operate along the major corridors in the County. The responsibilities of Metro Service Councils include calling and conducting public hearings for area bus lines, review and development of policy recommendations to the Metro Board, and ensuring compliance with Metro policies procedures and legal agreements.

After a Service Change Program has been developed by Metro Service Planning staff Metro Service Councils are asked to set a date, time and place for their public hearings. During the period between publication of the hearing notices and the conduct of the hearings each service council is provided with a detailed presentation and an opportunity to discuss each of the changes that will be the subject of public comment. Subsequent to each hearing, each service council will meet to consider and approve all proposed service changes. These actions will then be summarized and presented in an informational report to the Metro Board of Directors.

TIMELINE FOR KEY PUBLIC NOTIFICATION ACTIVITIES

Activity	Months Prior to the Service Change
Service Planning staff reviews preliminary proposals.	7
Metro Service Councils set dates of public meetings, publish hearing notices in local newspapers and send LEP and minority communities written notification to elected officials, other operators and key stakeholder groups.	5-6
Service Planning staff provides information on proposed changes to the Metro Bus Operators Subcommittee and at quarterly meetings held with the region's municipal and local operators	3
Communication Department posts information proposed changes on Metro's website.	5
Operations staff distributes meeting notices on-board vehicles. Public outreach at key transportation centers, bus stops, and on-board patron interface occurs as well.	At least one month prior to public hearings
Metro Service Councils conduct public hearings.	4
Metro Service Councils approve final service change program.	3
Communication Department prepares press releases on final program and program brochures are distributed on-board Metro vehicles and other outlets.	1

5.4 PUBLIC OUTREACH

Prior to the public hearing, a number of public outreach efforts are made so that the greatest number of patrons may respond to the changes at either a public hearing, or by submitting written comments via email, mail, or fax. The public out reach efforts include:

- Distribution of 5,000 information brochures on Metro buses and at information centers, which include line number, line name and route change information. Public hearings are held at regularly scheduled service council meetings.

- Placement of 8 1/2 by 11 information cards in holders located behind the Operator.

- Public outreach at key transportation centers, bus stops, bus and rail stations, and on-board vehicles occurs up to one month before the public hearing is held. This effort reaches patrons who may not have time to attend a public hearing, and informs them of other communication methods available for filing public comment.

Public participation in the public hearing process is an important step in assisting staff and Metro Service Councils in developing and approving final service changes.

5.5 IMPLEMENTING MINOR CHANGES ON AN INTERIM BASIS

Minor service changes are generally route modifications that can be accommodated without impacting the vehicle or operator requirements of the service. Each service council can make minor route modifications (not requiring a public hearing) not to exceed an annual cost based on the annual CEO signature authority.

SECTION 6: CONCLUSION

Metro's vision to establish world-class transportation services and meet challenges related to serving the diverse needs of passengers, communities, and operators will be contingent on innovative thinking that stems from a solid base of sound planning principles. To meet the changing needs of a growing population in Los Angeles County, Metro will continue to expand its high-speed bus and rail network across the region under Measure R and the 30/10 Initiative. As the regional transit coordinator of transit services, Metro must provide safe, reliable, effective, and convenient services focused on both customer and employee with an emphasis on long-term sustainability. Achieving this delicate balance between maximizing the benefits of service to transit riders, while ensuring that service delivery is efficient and cost effective requires policy guidance and service standards that are designed to target levels of productivity, efficiency, and quality.

Given the significant growth in municipal and local return operators as well as Metro Rail, Metro's vision can be achieved through better coordination between all operators and modes in the region, leveraging the expansion of a robust rail and Metro Liner (Orange Line and Silver Line) as the backbone of the urban transit network, and reducing service duplication. These measures will make the transit system more efficient and manageable, resulting in better service quality and a simpler, more user-friendly system to use.

Overall, the 2011 Metro Transit Service Policy establishes a set of performance criteria and standards, a service change process that provides the quantitative tools to evaluate the system, identify opportunities for service improvement, and service design guidelines to ensure that the transit system is developed consistent with policy guidance approved by the Metro Board of Directors.

Appendix A

Metro Blue Ribbon Committee

POLICY AND POSITION STATEMENTS

July 6, 2010 Committee Final Draft

Summary Position Statement

Increased regional coordination and integration of service, and improved reliability are essential to having a seamless system that is convenient, intuitive and of high quality – and provides maximum benefit in light of scarce resources.

Service Priorities: Service should be focused first in high-density areas and be scaled to fit the overall density and passenger demand in the service area.

1) Highest priorities include weekday services and basic weekend service in areas of high demand.
2) Later-night service in areas of higher demand is of secondary but still important priority to provide basic mobility.
3) Lowest priorities are owl service and service to low-density areas.

Service Design: The network should be coordinated and designed to be simple and intuitive to increase trip making by existing riders and attract new riders.

1) Rail, other fixed or exclusive guideway services (e.g. Metro Orange Line, Metro Silver Line), and Metro Rapid should serve as the backbone of the transit system, fed and complemented by a regional bus network of key travel corridors, that provide high-frequency service for easy transfers.
2) Less-frequent localized services should augment the regional network to provide geographic coverage.
3) Transfers should be as seamless as possible – high frequency on regional network, timed transfers for less frequent services; consolidate bus stops at same intersection, and implement a more liberal transfer policy.
4) Closely-spaced services should be consolidated into fewer, more frequent services at a one half to one mile route spacing.
5) Connectivity of services and alignment of schedules should be a high priority – coordinated planning and scheduling between Metro, Muni, Local Return, and Metrolink operations are essential.

Service Attributes: The system should provide high-quality service to better serve existing riders and attract new riders. Service quality priorities include:

- Reliability – "I can count on it"
- Fast travel options
- Real-time, readily-available information

- Clean and safe transit vehicles, stops, and all transit facilities (e.g. Park and Ride, Transit Hubs, Rail Stations, etc.).

1) Less frequent services must be held to a higher standard of on-time performance to minimize passenger waiting time for missed trips or connections.
2) Clear, accurate, and timely customer information is an important adjunct to service quality, especially when and where service is less available and when service is not provided as expected (e.g. bus stop signage should include website, phone number, basic service characteristics).

Governance: Metro should serve as a facilitator to coordinate services among operators in the region.

1) Metro should develop a formal process for working with Muni, Local Return, and Metrolink operators to arrive at mutually agreed-upon service coordination plans.
2) Metro should offer technical assistance to local operators and facilitate more cooperative, coordinated funding approaches.
3) Metro Governance Councils should broaden their perspective beyond Metro bus to include all public operators that provide services within their jurisdictions, and provide a forum for the community to express needs and priorities, and operators to evaluate opportunities and issues with service coordination.

Unresolved Issues

Blue Ribbon Committee members have flagged some unresolved issues that could preclude certain BRC recommendations on service coordination, and need to be addressed in order to fully implement the regional transit vision.

1) Supporting coordination of service by facilitating a working group consisting of Metro, Muni, and included Operators to resolve any funding impediments to service coordination.
2) Achieving our desire for local system identity at the operator and city level, while providing seamless, coordinated services.
3) Addressing "first mile/last mile" issues by integrating other modes (e.g. bicycles, bikeshare/carshare systems, taxi, pedestrian networks, etc.).
4) Coordinating information among operators, keeping information current, maintaining signage, etc.
5) Developing the TAP program to achieve its full potential.
6) Working closely with labor to identify strategies, solutions, and agreements that result in better coordination and efficiencies of service provision.
7) Providing funding flexibility and addressing the need for increased advocacy efforts at the federal level to allow use of federal capital funding for operating purposes.

Next Steps

Blue Ribbon Committee members recommend the following actions for consideration by the Metro Board.

1. Update the Transit Service Policy to include specific service design guidelines, performance metrics and standards to reflect BRC policy recommendations by September 2010 for Metro Board approval.
2. Develop future service change proposals based on the updated Transit Service Policy.
3. Establish operator working groups to identify specific service coordination opportunities.
4. Revise Governance Council By Laws to expand the scope of responsibility to include identification and recommendations for inter-operator and multi modal service coordination.
5. Clarify the mission and purpose of the Citizens Advisory Council and utilize the Council to further promote the vision of a seamless regional transit system.
6. Coordinate the efforts of Governance Councils and CAC.
7. Establish working group to resolve any funding impediments to service coordination.
8. Establish formal process for coordinating inter-operator service plans.
9. Convene the BRC on a periodic basis to review the status of BRC recommendations.

BRC Membership Roster

Name	Title	Organization
Neil Bjornsen	Council Member	Metro Citizens Advisory Council
Cathi Cole	Transit Manager	Pasadena Area Rapid Transit System (ARTS)
Donald Camph	Executive Director	El Segundo Employers Association
Diana Ho for Larry Eisenberg	Executive Director of Facilities Planning	Los Angeles Community College District
Genevieve Giuliano	Professor of Policy, Planning, and Development	University of Southern California
Alex Gonzalez	Council Member	Metro San Gabriel Valley Sector Governance Council
Rena Kambara	Council Member	Metro South Bay Sector Governance Council
Jim Lefton	Chief of Transit	Los Angeles Department of Transportation
Antonio LeMons	Executive Vice-President of Operations	FAME Assistance Corporation
Stephanie Negriff	Director of Transit Services	Santa Monica Big Blue Bus
Jim Parker	Director of Transportation	Norwalk Transit System
Kymberleigh Richards	Service Sector Representative	Metro San Fernando Valley Sector Governance Council
Joyce Rooney	Transportation & Transit Operations Supervisor	City of West Hollywood
Wally Shidler	Council Member	Metro Gateway Cities Sector Governance Council
Stuart Waldman	President	Valley Industry & Commerce Association
Jerard Wright	Council Member	Metro Westside/Central Sector Governance Council
Kelly Norris	Executive Director	Valley Industrial Association of Santa Monica

APPENDIX B

Metro's Line Identification Standards

The purpose of establishing transit service line identification standards is to create a simple way for passengers to identify, locate, and reference Metro services, and thereby make the services easier for patrons to use.

The line identification standards shall be adhered to when identifying Metro Bus and Metro Rail lines by name. The standards shall be implemented across all internal and external mediums including, but not limited to, bus stop signs, bus station signs, vehicle headsigns, timetables, the Metro Transit Trip Planner, HASTUS and ATMS. The descriptions and chart below help explain the standards, and how and when they should be implemented.

General Standards

- Transit service lines will be identified using a combination of line number, destinations (both terminals) and the corridor(s) the line travels along, with the exception of Metro Rail and Metro Liner service which will use the established operational name (e.g., Metro Red Line, Metro Purple Line, Metro Orange Line).
- Acceptable destination names include a city, community, major landmark, transit center or rail station. Street intersections are no longer to be used as a destination, unless the intersection is required to identify short-line service.
- The destination points will be listed in a West to East or North to South order, consistent with how the line would be read on a map.
- Lines that have Downtown Los Angeles as one of the line's end points will list its first, as Downtown LA.
- The name of the line will also list at least one major corridor on which it travels.
- Name abbreviations, street extensions and other topics will be dictated by the Metro Signage Guidelines.

Printed Materials and Electronic Customer Information

- The line will be presented using the full name, listing both the destinations and major corridor(s).
- The printed materials include, but are not limited to, timetables, service change announcements, brochures, system maps, and service reports.
- Electronic customer information includes the line information presented on metro.net and underlying electronic databases such as HASTUS and ATMS.
- The Metro Transit Trip Planner will present the line name similarly to what will be shown on the vehicle headsign and bus stop sign, so patrons can easily locate the appropriate line at the stop.

Bus Stop Signage:

- The line will be presented using the line number, service brand, color and destination point that the vehicle is traveling to in each direction.
- The main corridor(s) will also be listed as well as special service qualifiers including, but not limited to, rush-hour service and weekday-only service.
- Short-line trip destinations will not be shown on bus stop signs.

Vehicle Headsigns

- Headsigns will list the destination in which the vehicle is traveling towards in one frame.
- For short-line trips, the line number and destination shown will be the destination of that trip and not of the entire line.
- When the line is not in service, the sign will read "Not in Service" and display the route number per Operations Notice #09-18.

Automatic Voice Announcements

External On-Board Announcements:

- The line will be identified in automatic external voice announcements using the line number and destination point that the vehicle is traveling to in each direction.
- For short-line trips, the destination noted will be the destination of that trip and not of the entire line.

Internal On-Board Announcements:

- When the automatic voice announcement system identifies a stop, the end destination of that line will follow.
- The stops and stations announced onboard should be consistent with names used on maps, timetables and other printed materials.

Assigning Line Identifiers

- It is expected that the standards will be easily applied to the majority of lines; however, it is also understood that exceptions will have to be made for some lines due to unfamiliar end points or corridors. In these limited cases, Service Planning staff and Communications must be in consensus regarding these changes before deciding to deviate from the standards.

Metro's Bus Line Identification, Route Numbering and Color Conventions

Service Type	Numbering	Primary Route Direction	Color Scheme
Local	1-99	Serves Downtown LA - counterclockwise from NW quadrant.	California Poppy
	100-149	Primarily EW operation in areas S of LACBD	California Poppy
	150-199	Primarily EW operation in areas N of LACBD	California Poppy
	200-249	Primarily NS operation in areas W of LACBD	California Poppy
	250-299	Primarily NS operation in areas E of LACBD	California Poppy
Limited	300-399	Branch of local line.	California Poppy
Express	400-499	Serves Downtown LA -- numbered counterclockwise from NW quadrant.	California Poppy / 450X Blue
	500-599	Does not serve LACBD.	California Poppy / 577X Blue
Shuttles & Circulators	601-649	Generally circuitous routing within service area.	California Poppy
	650-659	Generally scheduled service operating point-to-point.	California Poppy
	660-699	Generally serves a rail line within service area.	California Poppy
Rapid Bus	700-799	Usually operated in combination with an underlying local line.	Red
Specialized Services			
	901	Metro Liner: Orange Line (BRT)	Silver
	902	Local Complementary Service to BRT	Silver
	910	Silver Line: El Monte Busway (ExpressLanes) / Downtown LA/Harbor Transitway (ExpressLanes)	California Poppy

APPENDIX C

METRO RAPID PROGRAM SERVICE WARRANTS

The Metro Rapid program came into being in March 1999 with the approval of the initial implementation plan. Over the past decade, Metro has instituted 31 Rapid routes along with 3 Muni operated routes (one additional Muni operated route is planned for early 2011). During the implementation period two routes were cancelled for poor performance (Rapid 724 – Lankershim and Rapid Express 940 – Hawthorne).

During 2010 Metro carried out an extensive review of the performance of the Rapid network. Initially, this review was guided by performance standards expressed in the form of Rapid Warrants which are detailed in this Appendix. The Rapid Warrants were adopted in August 2004 to provide a framework for monitoring performance, and determining when changes to a route would likely be beneficial or not. It was determined during the review that some of the Rapid Warrants were unrealistic. For example, a Rapid seeks to achieve a 25% or better traveltime reduction over an associated local bus line. In fact, only three Rapid lines were able to reach this level of performance, though most were able to attain 18-20% savings. The review also found it necessary to establish additional means of assessing performance that were not addressed by the Rapid Warrants. In order to determine whether or not each Rapid was serving a distinct portion of the travel market in its corridor, the average trip lengths of Rapid and local riders were compared. Unless these were found to be materially different (one more than 25% greater than the other) it would be assumed that the Rapid and the local were serving essentially the same riders and not offering a distinctly different service.

In view of these findings, while the Rapid Warrants have been used as a guide for designing and implementing these services, a modified set of standards has been used to assess the long term viability of each route. As a consequence, 5 additional Rapid routes were to be cancelled in December 2010, and one route is planned for cancellation in June 2011 leaving a network of 23 Rapid routes that will continue to be operated by Metro.

PROGRAM PRINCIPLE: Improve Operating Speed and Frequency.	PROGRAM GOAL: Minimum operating speed improvement is 20% over existing limited-stop service or 25% over existing local service.

Program Element	Program Component	Program Objective
Corridor Alignment	PLANNING DEPARTMENT RESPONSIBILITIES	
	Maximize patronage and minimize costs	Identify core segment of corridor for Metro Rapid operation to maximize patronage (500 passengers per route mile or greater) and minimize operating costs.
	Linear corridor alignment	Minimize corridor turning movements to maximize safe and reliable operating speeds, improve customer understanding and confidence in service structure, and provide reliable service operations.
	OPERATIONS DEPARTMENT RESPONSIBILITIES	
	Alignment modification	Changes to the alignment that affect one-way revenue route miles or which impact planned or existing infrastructure (stations and TPS) require a technical memorandum analyzing impacts on customers, line performance, operating costs, and capital costs.
	Addition of shortlines and branches	Proposed shortlines and branches must occur at a point where less than 30% of the maximum passenger load remains so as to avoid passenger pass-ups on through-trips. Shortlines or branches must occur every other trip to avoid confusion and bunching due to erratic loading of passengers. All shortlines and branches require a technical memorandum analyzing impacts on customers, line performance, operating costs, and capital costs.
	Addition of express trips	Consideration of express service can be undertaken only as a separate route and where justified in a technical memorandum analyzing impacts on customers, line performance, operating costs, and capital costs.
	Maintenance of operating speed	Maintenance of the Program Goal is required. Corridor vehicle run times will be monitored. Improvements in operating speed are encouraged through improved stop placement, signal priority software, elimination of unproductive stops, introduction of bypass lanes, and improved BOCC and TOS management.

Program Element	Program Component	Program Objective
Stop Location	PLANNING DEPARTMENT RESPONSIBILITIES	
	Station spacing average no less than 0.70 miles	Station spacing will average no less than 0.70 miles per corridor and be based on existing ridership and connections with other bus and rail service. Station locations must be planned to accommodate either 45-foot or 60-foot buses.
	Far-side station location	Far-side stop locations are required to realize TPS and must be planned at all intersections for both Metro Rapid and Local service. The only exceptions are where far-side stop locations are not possible within a reasonable walk from the intersection or where nearside locations facilitate access for greater than 75% of the boardings, e.g., intersecting Metro Rail station portals.
	Full separation from local stop	Shared Metro Rapid and local bus stop locations must be avoided to reduce delay, minimize bus congestion at the stop, and eliminate passenger confusion with "next trip" displays. Circumstances that may warrant stop consolidation include the following: a) Stops are outside the core segment of the line where core is defined as greater than 30% of the maximum passenger load, b) Metro Rapid and Local combined headways are greater than 10 minutes in the peak period, or c) Extended stop zone is not available.
	OPERATIONS DEPARTMENT RESPONSIBILITIES	
	Addition of new stop	Stops may be added only if they exceed 250 all-day boardings and alightings (100 boardings if within one mile of line terminal) and only where the Time Delay Index of existing on-board passengers to the additional riders expected at the new stop is (a) less than 3 for the addition of a new stop that is less than 0.5 miles from an existing stop; (b) less than 5 for the addition of a new stop that is between 0.5 and 0.7 miles; (c) less than 7.5 for the addition of a new stop that is between 0.7 and 1.0 miles; or (d) less than 10 for the addition of a new stop that is over 1 mile from an existing stop. Stops less than 0.5 miles from an existing stop can only be added in extraordinary circumstances. Added stops require a technical memorandum that analyzes the impacts on customers, line performance, operating costs, and capital costs. Station construction costs associated with stops added beyond those approved in the September 2002 Metro Rapid Board report will be paid by the Managing Sector.
	Elimination of stop	Stops may have construction deferred or be eliminated if (a) after the first 12 months the Time Delay Index is greater than 15; or (b), where use of the station results in operating speed, reliability, or safety problems. A technical memorandum is required that analyzes the impacts on customers, line performance, operating costs, and capital costs.

Program Element	Program Component	Program Objective
Stop Location	Relocation of station	Stations may be relocated only when required by a city or the County and where the station relocation does not negatively impact ridership. If possible, relocations should be made prior to the construction of the permanent station facility. A technical memorandum is required that analyzes the impacts on customers, line performance, operating costs, and capital costs.
Station Facility	PLANNING DEPARTMENT RESPONSIBILITIES	
	Full Metro Rapid station with canopy	All stations will have the "branded" Metro Rapid canopy facility with flagpole, kiosk, and "next trip" display unless it is physically impossible without extreme cost. For terminal stations and stops on turnaround loops that only discharge passengers, the full station facility will not be provided; a Metro Rapid "discharge only" sign on a channel post will be provided.
	Double canopies will be installed only at high demand stops	Double canopies will be located only at high demand stops, such as high ridership Metro Rail station portals or where high ridership bus lines meet.
	All stations will be designed to accommodate either 45-foot or 60-foot buses	Far-side stations require a total clear space (red curb) of 120 feet unconstrained or 100 feet constrained. The largest vehicle required for the Metro Rapid Program is the 60-foot articulated bus.
	OPERATIONS DEPARTMENT RESPONSIBILITIES	
	Station Maintenance Monitoring	All stations will be maintained by the city or County responsible for the station and kept in good repair with regular cleaning and emptying of trash receptacles such that a positive, properly maintained image is projected and problems with adjacent land owners are minimized.
Transit Priority	PLANNING DEPARTMENT RESPONSIBILITIES	
	All signalized intersections should provide bus signal priority for Metro Rapid	Signal priority should include terminal movements to reduce operating costs.
	Identification of by-pass lane needs	At points of significant delay due to traffic congestion, an analysis will be developed of the feasibility of establishing by-pass lanes for Metro Rapid service.
	Monitor effectiveness of transit priority measures	The effectiveness of the transit priority measures will be periodically analyzed and recommendations will be developed for potential further improvements where warranted.
	OPERATIONS DEPARTMENT RESPONSIBILITIES	
	Signal priority at intersections along major deadhead movements is desired	Metro Rapid not-in-service vehicle movements should be operated off the route-of-line to avoid invalid requests for bus signal priority and false "next trip" information on the station displays. Consideration should be given to consolidating several Metro Rapid not-in-service routes along the same streets to benefit from signal priority.

Program Element	Program Component	Program Objective
Vehicles and Vehicle Planning	PLANNING DEPARTMENT RESPONSIBILITIES	
	Metro Rapid lines are assigned one vehicle size, i.e., 40-ft, 45-ft, or 60-ft articulated	The planned service frequency will be based on deployment of a particular size bus and these vehicles will need to be assigned to the particular line and operating Division. Only one size vehicle should be scheduled and operated on each line in order to avoid passenger overcrowding and service bunching.
	OPERATIONS DEPARTMENT RESPONSIBILITIES	
	Vehicles must be in Metro Rapid livery	Metro Rapid vehicles may be operated only on Metro Rapid routes. On the rare occasion that a red bus is unavailable for pullout, a local bus may be substituted to ensure pullout. Operation of "branded" Metro Rapid buses is integral to the operating speed, simplicity of service, and customer experience.
Service Frequencies	OPERATIONS DEPARTMENT RESPONSIBILITIES	
	Weekday peak frequency	The minimum weekday peak frequency is 10 minutes or less.
	Weekday off-peak frequency	The preferred minimum weekday off-peak frequency is 12 minutes or less. Minimum frequency is subject to funding availability and may be relaxed to no more than 20 minutes.
	Local service frequency at start-up 75-100% of planned Metro Rapid	Initial local service levels (trips) must be set at 75-100% of Metro Rapid service levels based on individual corridor needs; adjustments can be initiated after a one-year trial period once actual ridership splits are known.
	Operating expense	Initial service levels are specified in the New Service Plan. Service levels thereafter may be adjusted based on passenger demand after a year of operation.
Service Span	OPERATIONS DEPARTMENT RESPONSIBILITIES	
	Service Span	Metro Rapid span of service is 5:00 a.m. to 9:00 p.m. on weekdays. Metro Rapid service should operate on weekends when warranted by passenger demand. Five Metro Rapid corridors may be exempted from operation within the service span and frequency criteria if approved by the Metro Board.
Schedule Development	OPERATIONS DEPARTMENT RESPONSIBILITIES	
	Terminal departure timepoints	Operating schedules and running boards must be developed for free running time by operators with schedule adherence timepoints for terminal departure only; no other timepoints will be shown on the operator running board.
Operating Protocols	OPERATIONS DEPARTMENT RESPONSIBILITIES	
	Headway interval-managed service operation	Metro Rapid service allows for dynamic optimization of operating speeds through the utilization of free running time operation after scheduled departure times from terminals; vehicle spacing and on-time departure from terminals must be managed in real-time by the BOCC and/or assigned TOSs.

APPENDIX D

BUS STOP STANDARDS AND GUIDELINES

Transit Cooperative Research Program

SPONSORED BY

The Federal Transit Administration

TCRP Report 19

Guidelines for the Location and Design of Bus Stops

Transportation Research Board
National Research Board

CHAPTER 3 STREET-SIDE FACTOR

BUS STOP ZONE DESIGN TYPES-Curb-Side Bus Stop Zone Dimensions

A bus stop zone is the portion of a roadway marked or signed for use by buses when loading or unloading passengers. The lengths of bus stop zones vary among different transit agencies. In general, bus stop zones for far-side and near-side stops are a minimum of 90 and 100 feet, respectively, and midblock stops are a minimum of 150 feet. Far-side stops after a turn typically have a minimum 90-foot zone, however, a longer zone will result in greater ease for a bus driver to position the bus. Bus stop zones are increased by 20 feet for articulated buses. Representative dimensions for bus stop zones are illustrated in Figure 3.

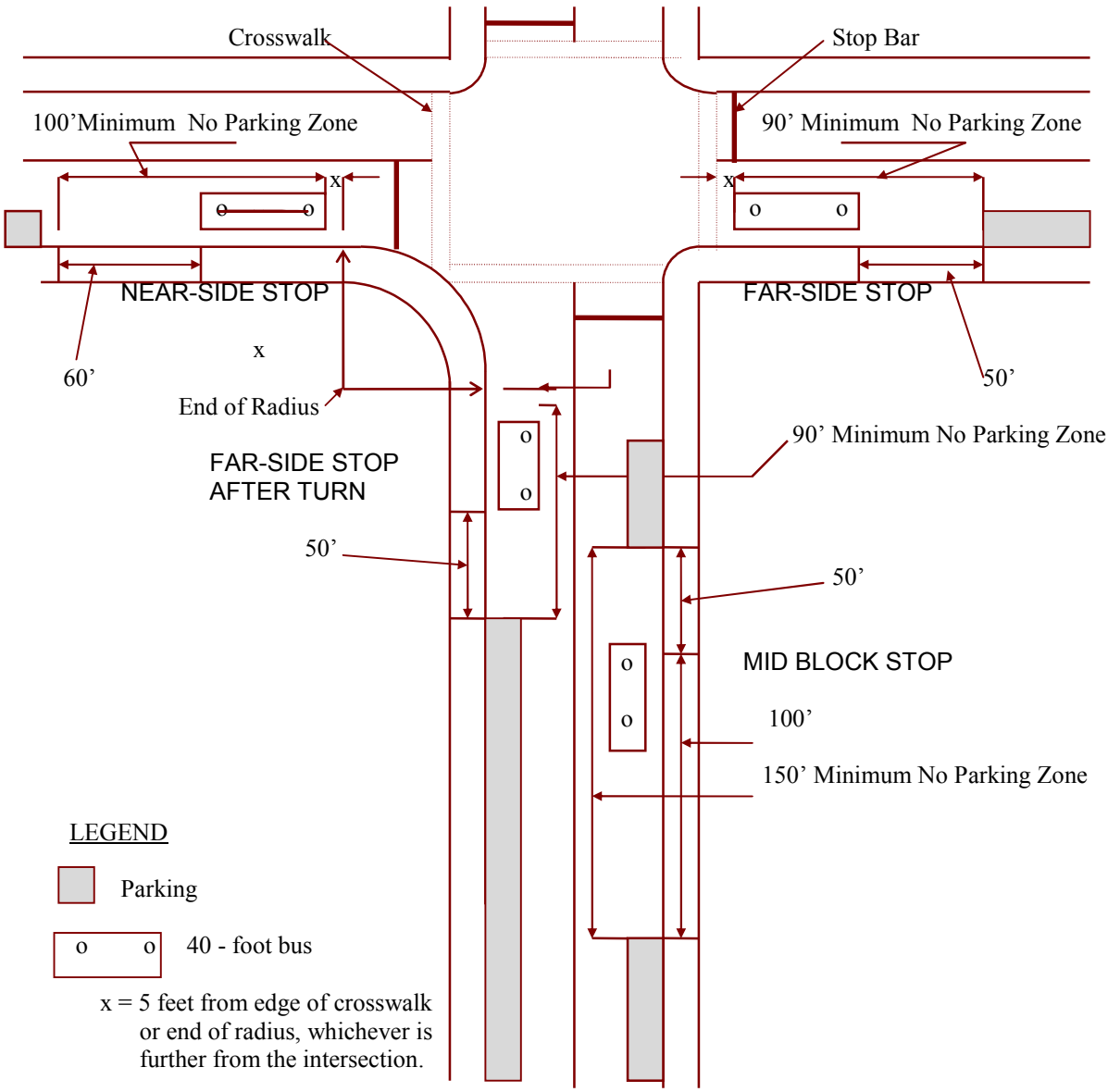
More than one bus may be at a stop at a given time. The number of bus-loading positions required at a given location depends on 1) the rate of bus arrivals and 2) passenger service time at the stop. Table 3 presents suggested bus stop capacity requirements based on a range of bus flow rates and passenger service times. For example, if the service time at a stop is 30 seconds and there are 60 buses expected in the peak-hour, two bus loading positions are needed. The arrival rate is based on a Poisson (random) arrival rate and a 5 percent chance the bus zone will be exceeded.

Table 3. Recommended Bus Stop Bay Requirements.

	Capacity Required (Bays) When Service Time at Stop Is				
Peak-Hour Bus Flow	10 Seconds	20 Seconds	30 Seconds	40 Seconds	60 Seconds
15	1	1	1	1	1
30	1	1	1	1	2
45	1	1	2	2	2
60	1	1	2	2	3
75	1	2	2	3	3
90	1	2	2	3	4
105	1	2	3	3	4
120	1	2	3	3	5
150	2	3	3	4	5
180	2	3	4	5	6

CHAPTER 3 STREET-SIDE FACTOR

BUS STOP ZONE DESIGN TYPES-Curb-Side Bus Stop Zone Dimensions



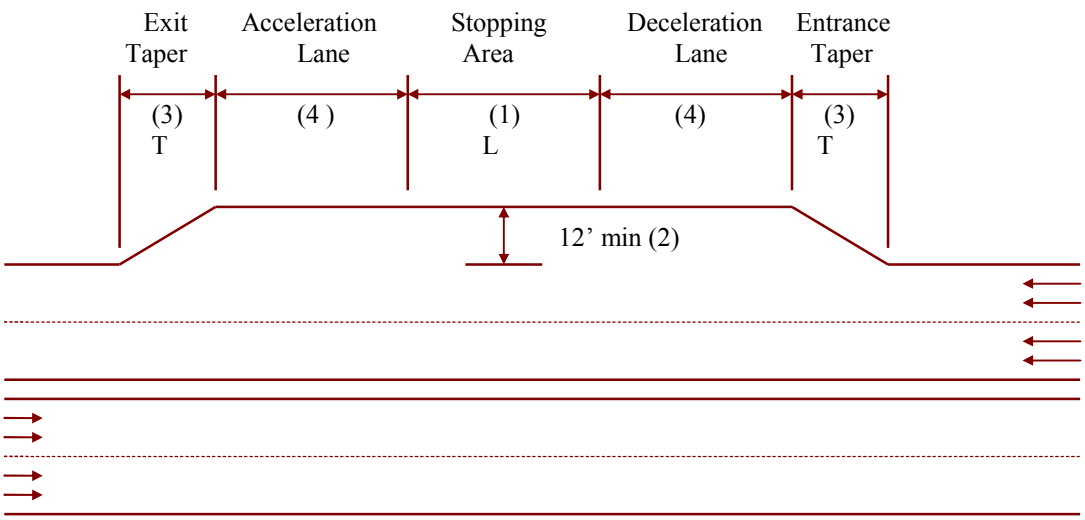
Notes:

1) Add 20 feet to bus stop zones for an articulated bus.
2) Increase bus stop zone by 50 feet for each additional standard 40-foot bus or 70 feet for each additional 60-foot articulated bus expected to be at the stop simultaneously. See Table 3 for the suggested bus stop capacity requirements based on a range of bus flow rates and passenger service times.

Figure 3. Typical Dimensions for On-Street Bus Stops

CHAPTER 3 STREET-SIDE FACTOR

BUS STOP ZONE DESIGN TYPES--Bus Bay Dimensions



Notes:

1) Stopping area length consists of 50 feet for each standard 40-foot bus and 70 feet for each 60-foot articulated bus expected to be at the stop simultaneously. See Table 3 for the suggested bus stop capacity requirements based on a range of bus flow rates and passenger service times.
2) Bus bay width is desirably 12 feet. For traffic speeds under 30 mph, a 10-foot minimum bay width is acceptable. These dimensions do not include gutter width.
3) Suggested taper lengths are listed in table below. Desirable taper length is equal to the major road through speed multiplied by the width of the turnout bay. A taper of 5:1 is a desirable minimum for an entrance taper to an arterial street bus bay while the merging or re-entry taper should not be sharper than 3:1.
4) Minimum design for a busy bay does not include acceleration or deceleration lanes. Recommended acceleration and deceleration lengths are listed in the table below.

Through Speed (mph)	Entering Speed [a] (mph)	Length of Acceleration Lane (Feet)	Length of De-celeration Lane [b] (Feet)	Length of Taper (Feet)
35	25	250	184	170
40	30	400	265	190
45	35	700	360	210
50	40	975	470	230
55	45	1400	595	250
60	50	1900	735	270

[a] Bus speed at end of taper, desirable for buses to be within 10 mph of travel lane vehicle speed at the end of the taper.

[b] Based on 2.5 mph/sec deceleration rate.

Figure 5. Typical Bus Bay Dimensions.

CHAPTER 3 STREET-SIDE FACTOR

BUS STOP ZONE DESIGN TYPES—Partial Open Bus Bay

Another alternative to the bus bay design is a partial open bus bay (or a partial sidewalk extension). This alternative allows buses to use the intersection approach in entering the bay and provides a partial sidewalk extension to reduce pedestrian street-crossing distance. It also prevents right-turning vehicles from using the bus bay for acceleration movements. Figure 7 illustrates the design for a partial open bus bay.

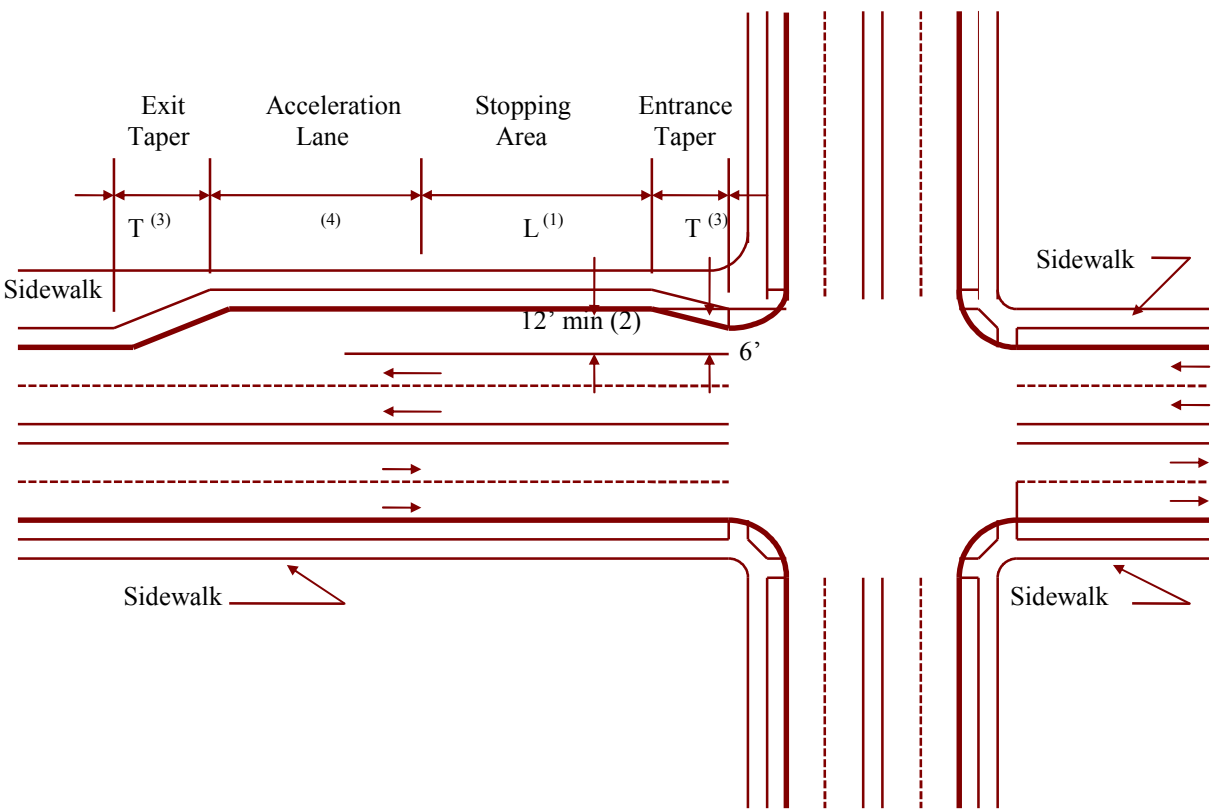


Figure 7. Partial Open Bus Bay

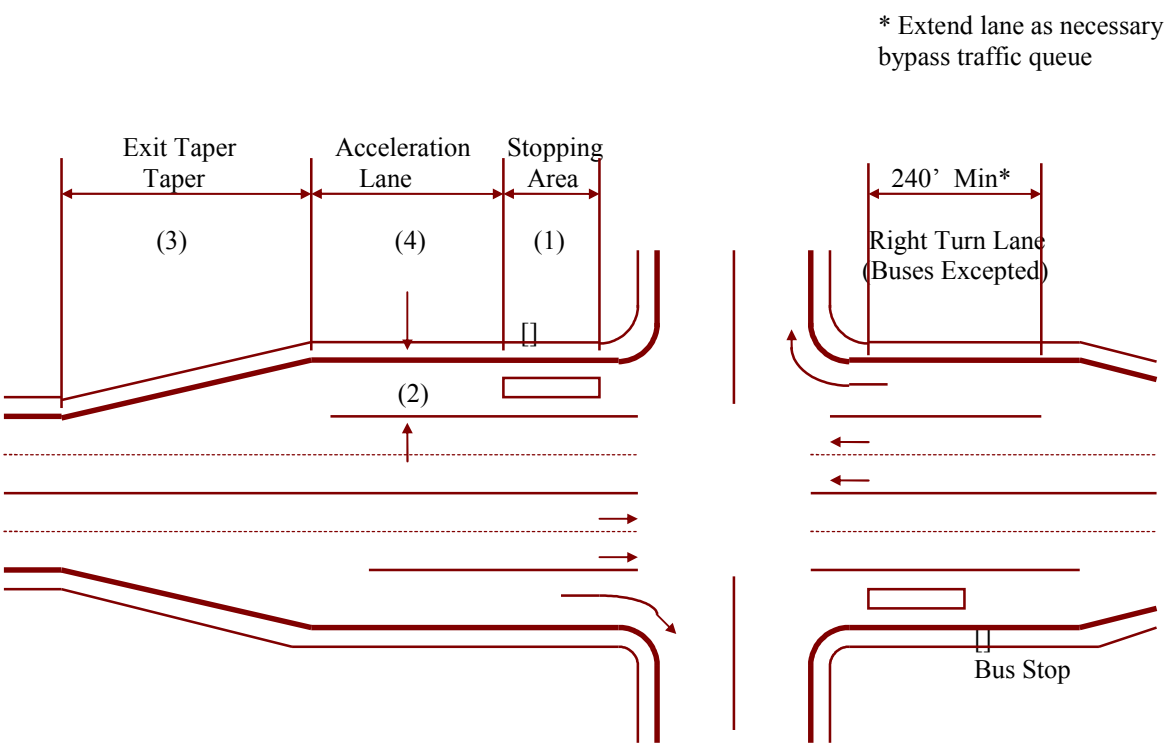
CHAPTER 3 STREET-SIDE FACTOR

BUS STOP ZONE DESIGN TYPES—Queue Jumper Bus Bay

According to the transit agencies that use the queue jumper bus bays, these bays should be considered at arterial street intersections when the following factors are present:

- High-frequency bus routes have an average headway of 15 minutes or less;
- Traffic volumes exceed 250 vehicles per hour in the curb lane during the peak-hour;
- The intersection operates at a level of service "D" or worse (see the Transportation Research Board's *Highway Capacity Manual* for techniques on evaluating the operations at an intersection); and
- Land acquisitions are feasible and costs are affordable.

An exclusive bus lane, in addition to the right-turn lane, should be considered when right-turn volumes exceed 400 vehicles per hour during the peak-hour.



Notes for Comments 1,2,3, and 4 are on page 29.

Figure 9. Queue Jumper Bus Bay Layout.

APPENDIX E

SCHOOL TRIPPER SERVICE CHANGE PROCEDURES

1. Service Development Managers (SDMs) are responsible for certifying that all school trippers in their service area fully comply with Metro's School Tripper Policy (Section 3.2 of the Transit Service Policy). Each SDM will submit a report prior to each major service change program that details all existing and proposed school tripper service to the Service Planning & Scheduling Department.

2. All regularly scheduled school trippers must be published on public timetables to ensure that both the general public, as well as the student population, are aware of the services.

3. School tripper "pink letters" require notification to the general public through the use of a service change notice or on www.metro.net.

4. Uniform standards for the documentation of school tripper pink letters must be employed by all sectors. This includes standardizing the pink letter form and oversight of the pink letter information being input into the SLS 2000 system to ensure accuracy. All requests for new school trippers and modifications to existing school trippers must be logged into the SLS2000 regardless if the requested new or modified school tripper is actually implemented.

5. Request for new school trippers or modifications to existing school trippers will be considered only if at least two weeks prior notice is provided to complete appropriate analysis of the request and to allow appropriate notification of changes to the general public.

6. SDMs are responsible for working with school districts in their service area which use school tripper service. For example, a specific protocol has been established with LAUSD in which their monthly Operations Coordinators' Meeting has a standing agenda item, "Metro Coordination," where special events and bell-time changes are disseminated to Metro through communication with staff and the meeting's minutes.

APPENDIX F

ROUTE PERFORMANCE INDEX

The route performance index is designed to provide an objective measure of a bus route's performance relative to other similar types of service. The index is based on system ridership and financial targets from the current fiscal year Metro Budget. The following categories are used during the performance evaluation process:

- Metroliner
- Metro Express
- Metro Rapid and Rapid Express
- Metro Local
- Metro Shuttles

The evaluation process focuses on three factors:

- **Utilization of Resources –** Boardings per service hour is used as a measure to determine how effectively resources are being used. This measure is determined by dividing the total number of boardings on the line by the service hours operated. Routes having a higher number of passengers per hour represent a better utilization of resources such as buses, operators and fuel.
- **Utilization of Capacity** - Passenger miles per seat miles is the measure used to evaluate how well the seating capacity of the system is being used. Passenger miles are calculated by multiplying the average distance traveled per passenger by the number of passengers using the service. Seat miles are calculated by determining the number of seats per vehicle and multiplying by the number of service miles operated. The higher the resulting number, the greater the utilization of system capacity.
- **Fiscal Responsibility** - Subsidy per passenger is the measure for fiscal responsibility. Subsidy refers to the amount of public funding required to cover the difference between the cost of operation and the passenger revenues collected. Higher subsidy services require more public funding support.

The indices for passengers per service hour and passenger miles per seat mile are normalized measures where the performance of each individual route is divided by the standard set for the category. The subsidy per passenger measure is an inverse relationship (higher values represent poorer performance) and therefore is calculated by dividing the category standard by each route's performance.

The following formula is used to develop the route performance index:

$$\text{Route Performance Index} = [(BSH_i / BSH) + (PMSM_i / PMSM) + (SUB / SUB_i)] / 3$$

Explanation of Variables

BSH & BSH_i	Category average and line specific boardings per service hour
PMSM & $PMSM_i$	Category average and line specific passenger miles per seat mile
SUB & SUB_i	Category average and line specific subsidy per passenger

The route performance index is calculated and reported annually. The performance measurement standards for each route category are set annually relative to the percentage improvement of overall system performance relative to the previous years performance. This percentage improvement will be based on the performance objectives outlined in the Metro Operating Budget.

APPENDIX G

PERFORMANCE MEASURES DEFINITIONS AND PERFORMANCE THRESHOLDS

PERFORMANCE MEASURES	DEFINITIONS & PERFORMANCE THRESHOLDS
AVAILABILITY	
-- Accessibility	Service is to be provided to within 1/4 mile of all census tracts having at least 3 households/acre and/or 4 jobs/acre
-- Connectivity	Direct transfers should be available for all Rapid-to-Rapid and Tier 1 Local-to-Tier 1 Local connections
QUALITY	
-- In Service On-Time Perf. (ISOTP)	[In Service On-Time Performance] At least 60% of trips in each time period should be no more than one minute early or five minutes late at all non-terminal time points
-- Customer Complaints	Complaints per 100,000 boardings should be less than the ratio achieved by the poorest 15% of bus lines in each service type in FY2008

Local Service	8.70
Express Service	30.00
Shuttle Service	24.00
Rapid Service	4.00

QUANTITY	
-- Frequency of Service	Service should be operated at least every 60 minutes, and Rapid service at least every 20 minutes between 6am-6pm
-- Load Factor	The ratio of passengers to seats should not exceed 1.20 during any hour at the peak load point of a line

EFFECTIVENESS

-- Boardings per Service Hour — Should be at least the ratio achieved by the poorest 15% of bus lines in each service type in FY2008

	DX 4-6am	DX 6-9am	DX 9am-3pm	DX 3-7pm	DX 7-9pm	DX 9pm-Mid	DX Mid-4am	SA	SU
Local Service	18.50	29.50	26.00	24.00	11.50	12.00	12.50	23.00	18.60
Express Service	13.00	15.00	14.00	16.00	12.00	2.00		17.00	13.00
Shuttle Service	8.50	11.00	14.00	9.00	6.00	7.00		12.00	11.00
Rapid Service	26.00	39.00	41.00	39.00	26.00	25.00		30.00	30.00

-- Cost per Passenger Mile — Should be less than the ratio achieved by the poorest 15% of bus lines in each service type in FY2008

	DX 4-6am	DX 6-9am	DX 9am-3pm	DX 3-7pm	DX 7-9pm	DX 9pm-Mid	DX Mid-4am	SA	SU
Local Service	$2.00	$1.20	$1.30	$1.43	$2.47	$2.50	$3.00	$1.14	$1.42
Express Service	1.00	1.00	0.75	0.90	1.25	1.75		1.18	1.37
Shuttle Service	6.50	3.60	2.95	4.00	6.00	6.00		4.05	5.42
Rapid Service	1.15	0.90	0.80	0.95	1.10	1.00		0.85	0.95

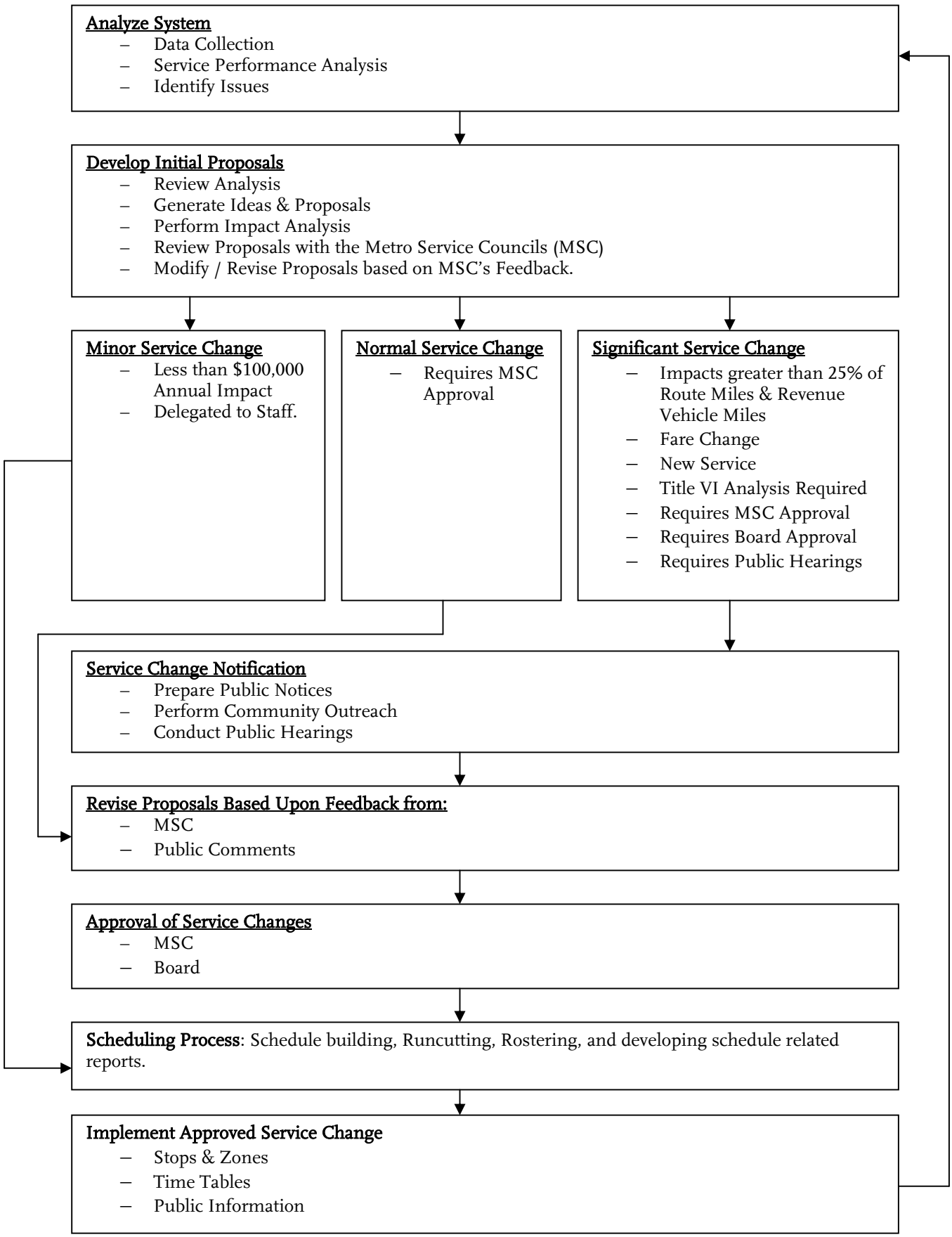
-- Psgr Miles per Seat Mile — Should be at least the ratio achieved by the poorest 15% of bus lines in each service type in FY2008

	DX 4-6am	DX 6-9am	DX 9am-3pm	DX 3-7pm	DX 7-9pm	DX 9pm-Mid	DX Mid-4am	SA	SU
Local Service	0.12	0.22	0.21	0.20	0.09	0.08	0.07	0.20	0.17
Express Service	0.19	0.24	0.21	0.25	0.13	0.03		0.20	0.16
Shuttle Service	0.05	0.08	0.10	0.07	0.04	0.05		0.06	0.04
Rapid Service	0.15	0.21	0.29	0.28	0.19	0.17		0.31	0.25

-- Route Performance Index — Should be 0.60 or greater. (Average value for service type is 1.0.)

APPENDIX H

Service Change Process Work Flow



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