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## Glossary
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The Metro Adjacent Development Handbook provides guidance to local jurisdictions and developers constructing on, adjacent, over, or under Metro right of way, non-revenue property, or transit facilities to support transit-oriented communities, reduce potential conflicts, and facilitate clearance for building permits. The Handbook should be used for guidance purposes only. The Metro Adjacent Construction Design Manual and Metro Rail Design Criteria are documents that shall be strictly adhered to for obtaining approval for any construction adjacent to Metro facilities.

Who is Metro?

The Los Angeles County Metropolitan Transportation Authority (Metro) plans, funds, builds, and operates rail and bus service throughout Los Angeles County. Metro moves close to 1.3 million riders on buses and trains daily, traversing many jurisdictions in Los Angeles County. With funding from the passage of Measure R (2008) and Measure M (2016), the Metro system will expand significantly, adding over 100 miles of new transit corridors and up to 60 new stations. New and expanded transit lines will improve mobility across Los Angeles County, connecting riders to more destinations and expanding opportunities for adjacent construction and Transit Oriented Communities (TOCs).

Metro’s bus and rail service spans over 1,433 square miles and includes the following transit service:

**Metro Rail** connects close to 100 stations along 98.5 miles of track and operates underground in tunnels, at grade within roadways and dedicated rights-of-way (ROW), and above grade on aerial guideways. The Metro Rail fleet includes heavy rail and light rail vehicles. Heavy rail vehicles are powered by a third rail through a conductor along the tracks and light rail vehicles are powered by an overhead catenary system (OCS). To operate rail service, Metro owns traction power substations, maintenance yards and shops, and supporting infrastructure.

**Metro Bus-Rapid-Transit (BRT)** operates accelerated bus transit, which serves as a hybrid between rail and traditional bus service. BRT operates along a dedicated ROW, separated from vehicular traffic to provide rapid service. Metro BRT may run within the center of a freeway or may be separated from traffic in its own corridor. BRT station footprints vary from integrated, more spacious stations to compact boarding areas along streets.

**Metro Bus** serves 15,967 bus stops, operates 170 routes and covers 1,433 square miles with a fleet of 2,228 buses. Metro “Local” and “Rapid” bus service runs within the street, typically alongside vehicular traffic, though occasionally in “bus-only” lanes. Metro bus stops are typically located on sidewalks within the public right-of-way, which is owned and maintained by local jurisdictions.

**Metrolink/Regional Rail**: Metro owns much of the ROW within Los Angeles County on which the Southern California Regional Rail Authority (SCRRA) operates Metrolink service. Metrolink is a commuter rail system with seven lines that span 388 miles throughout Los Angeles, Orange, Riverside, San Bernardino, Ventura, and North San Diego counties. As a SCRRRA member agency and property owner, Metro reviews development activity adjacent to Metrolink ROW.
Metro is currently undertaking the largest rail infrastructure expansion effort in the United States. A growing fixed guideway system presents new adjacency challenges, but also new opportunities to catalyze land use investment and shape livable communities along routes and around stations.
As a street-running transit service, Metro’s “Rapid” and “Local” buses share the public ROW with other vehicles, cyclists, and pedestrians, and travel through the diverse landscapes of Los Angeles County’s 88 cities and unincorporated areas.
Why is Metro Interested in Adjacent Development?

Metro Supports Transit Oriented Communities

Metro is redefining the role of the transit agency by expanding mobility options, promoting sustainable urban design, and helping transform communities throughout Los Angeles County. Leading in this effort is Metro’s vision to create TOCs, a mobility and development approach that is community-focused and context-responsive at its core. The TOC approach goes beyond the traditional transit oriented development (TOD) model to focus on shaping vibrant places that are compact, walkable, and bikeable community spaces, and acknowledge mobility as an integral part of the urban fabric.

Adjacent Development Leads to Transit Oriented Communities

Metro supports private development adjacent to transit as this presents a mutually beneficial opportunity to enrich the built environment and expand mobility options for users of developments. By connecting communities, destinations, and amenities through improved access to public transit, adjacent developments have the potential to reduce car dependency and greenhouse gas emissions; promote walkable and bikeable communities that accommodate more healthy and active lifestyles; improve access to jobs and economic opportunities; and create more opportunities for mobility – highly desirable features in an increasingly urbanized environment.

Metro is committed to working with stakeholders across the County to support the development of a sustainable, welcoming, and well-designed environment around its transit services and facilities. Acknowledging an unprecedented opportunity to influence how the built environment throughout Los Angeles County develops along and around transit and its facilities, Metro has created this Handbook – a resource for municipalities, developers, architects, and engineers to use in their land use planning, design, and development efforts. This Handbook presents a crucial first step in active collaboration with local stakeholders; finding partnerships that leverage Metro initiatives and support TOCs across Los Angeles County; and ensuring compatibility with transit infrastructure to minimize operational, safety, and maintenance issues.
What are the Goals of the Handbook?

Metro is committed to partnering with local jurisdictions and providing information to developers early in project planning to identify potential synergies associated with building next to transit and reduce potential conflicts with transit infrastructure and services. Specifically, the Handbook is intended to guide the design, engineering, construction, and maintenance of structures within 100 feet of Metro ROW, including underground easements, on which Metro operates or plans to operate service, as well as in close proximity to or on Metro-owned non-revenue property and transit facilities.

Metro is interested in reviewing projects within 100 feet of its ROW – measured from the edge of the ROW outward – both to maximize integration opportunities with adjacent development and to ensure the structural safety of existing or planned transit infrastructure. As such, the Handbook seeks to:

- Improve communication, coordination, and understanding between developers, municipalities, and Metro.
- Streamline the development review process by coordinating a seamless, comprehensive agency review of all proposed developments near Metro facilities and properties.
- Highlight Metro operational needs and requirements to ensure safe, continuous service.
- Identify common concerns associated with developments adjacent to Metro ROW.
- Prevent potential impacts to Metro transit service or infrastructure.
- Maintain access to Metro facilities for patrons and operational staff.
- Avoid preventable conflicts resulting in increased development costs, construction delays, and safety impacts.
- Make project review transparent, clear, and more efficient.
- Assist in the creation of overall marketable and desirable developments.

Who Should Use the Handbook?

The Handbook is intended to be used by:

- Local jurisdictions who review, entitle, and permit development projects and/or develop policies related to land use, development standards, and mobility
- Developers, Project sponsors, architects, and engineers
- Entitlement consultants
- Property owners
- Builders/contractors
- Real estate agents
- Utility owners
- Environmental consultants
How Should the Handbook be Used?

The Handbook complements requirements housed in the Metro Adjacent Construction Design Manual, which accompanies the Metro Rail Design Criteria (MRDC) and other governing documents that make up the Metro Design Criteria and Standards. This Handbook provides an overview and guide related to opportunities, common concerns, and issues for adjacent development and is organized into three categories to respond to different stages of the development process:

1. Site Planning & Design
2. Engineering
3. Construction Safety & Monitoring

Each page of the Handbook focuses on a specific issue and provides best practices to avoid potential conflicts and/or create compatibility with the Metro transit system. Links to additional resources listed at the bottom of each page may be found under Resources at the end of the Handbook. Definitions for words listed in *italics* may also be found at the end of this Handbook in the Glossary.

Metro will continue to revise the Handbook, as needed, to capture input from all parties and reflect evolving Best Practices in safety, operations, and transit-supportive development.
## Types of Metro ROW & Transit Assets

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Description</th>
<th>Common Concerns for Metro with Adjacent Development</th>
</tr>
</thead>
</table>
| **UNDERGROUND ROW**      | Transit operates below ground in tunnels.                                    | • Excavation support/tiebacks  
• Underground utilities  
• Shoring and structures  
• Ventilation shafts and street/sidewalk surface penetrations  
• Appendages (emergency exits, vents, etc.)  
• Surcharge loading of adjacent construction  
• Explosions  
• Noise and vibration/ground movement |
| **ELEVATED ROW**          | Transit operates on elevated structures, typically supported by columns.     | • Upper level setbacks  
• Excavation support/tiebacks  
• Clearance from the OCS  
• Crane swings & overhead protection  
• Column foundations |
| **OFF-STREET ROW**        | Transit operates in dedicated ROW at street level, typically separated from private property or roadway by a fence or wall. | • Building setbacks from ROW  
• Travel sight distance/cone of visibility  
• Clearance from OCS  
• Crane swings & overhead protection  
• Storm water drainage for low impact development  
• Noise/vibration  
• Trackbed stability |
| **ON-STREET ROW**         | Transit operates within roadway at street level and is separated by fencing or a mountable curb. | • Setbacks from ROW  
• Travel sight distance/cone of visibility impeded by structures near ROW  
• Clearance from OCS  
• Crane swings & overhead protection  
• Driveways near ROW crossings  
• Noise/vibration  
• Trackbed stability |
| **ON-STREET BUSES**       | Metro buses operate on city streets. Bus stops are located on public sidewalks. | • Lane closures and re-routing  
• Bus stop access and temporary relocation |
| **NON-REVENUE/OPERATIONAL ASSETS** | Metro owns and maintains non-operational ROW and property used to support the existing and planned transit system (e.g. bus and rail maintenance facilities, transit plazas, traction power substations, park-and-ride lots). | • Adjacent structure setbacks  
• Adjacent excavation support/tiebacks  
• Ground movement  
• Underground utilities  
• Drainage  
• Metro access |
Metro Review Phases

To facilitate early and continuous coordination with development teams and municipalities, and to maximize opportunities for project-transit synergy, Metro employs a four-phase development review process for projects within 100 feet of its ROW and properties:

<table>
<thead>
<tr>
<th>PRELIMINARY CONSULTATION</th>
<th>ENTITLEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project sponsor submits Metro In-Take Form and conceptual plans. Metro reviews and responds with preliminary considerations.</td>
<td>Metro receives CEQA notice from local municipality and responds with comments and considerations.</td>
</tr>
<tr>
<td>1. Project information is routed to impacted Metro departments for review and comment.</td>
<td>1. If project has not previously been reviewed, Metro routes project information to stakeholder departments for review and comment. If Project has been reviewed, Metro transmits the correspondence to departments to determine if additional comments are warranted. Municipality and project sponsor are contacted if additional information is required.</td>
</tr>
<tr>
<td>2. Metro coordinates a meeting at the request of the project sponsor or if Metro determines it necessary following preliminary review.</td>
<td>2. Metro coordinates design review meetings at the request of the project sponsor or if Metro determines them necessary following drawings review.</td>
</tr>
<tr>
<td>3. Metro submits comment letter with preliminary considerations for municipality and/or project sponsor. Metro recorded drawings and standards are provided as necessary.</td>
<td>3. Metro prepares comment letter in response to CEQA notice and submits to municipality. Metro Engineering coordinates with project sponsor as necessary to approve project drawings.</td>
</tr>
</tbody>
</table>
ENGINEERING & REFINEMENT

Dependent on the nature of the adjacent development, project sponsor submits architectural plans and engineering calculations for Metro review and approval.

1. Metro Engineering reviews project plans, calculations, and other materials. Review fees are paid as required.

2. Metro Engineering provides additional comments for further consideration or approves project drawings.

3. If required, Metro and project sponsor host additional meetings and maintain on-going coordination to ensure project design does not adversely impact Metro operations and facilities.

CONSTRUCTION SAFETY & MONITORING

Dependent on the nature of the adjacent development, Metro coordinates with project sponsor to facilitate and monitor construction near transit services and structures.

1. As requested by Metro, project sponsor submits a Construction Work Plan for review and approval.

2. Project sponsor coordinates with Metro to temporarily relocate bus stops, reroute bus service, allocate track, and/or complete safety procedures in preparation for construction.

3. Metro representative monitors construction and maintains communication with project sponsor to administer the highest degree of construction safety provisions near Metro facilities.
Metro Coordination

Best Practices for Municipality Coordination

Metro suggests that local jurisdictions take the following steps to streamline the coordination process:

1. **Update GIS instruments with Metro ROW**: Integrate Metro ROW files into City GIS and/or Google Earth Files for all planning and development review staff.

2. **Flag Parcels**: Create an overlay zone through Specific Plans and/or Zoning Ordinance that “tags” parcels within 100’ from Metro ROW to require coordination with Metro early during the development process [e.g. City of Los Angeles Zone Information and Map Access System (ZIMAS)].

3. **Provide Resources**: Direct all property owners and developers interested in parcels within 100’ from Metro ROW to Metro resources (e.g. website, Handbook, In-Take Form, etc.).

Best Practices for Developer Coordination

Metro suggests that developers of projects adjacent to Metro ROW take the following steps to facilitate Metro project review and approval:

1. **Review Metro resources and policies**: The Metro Adjacent Development Review webpage and Handbook provide important resources for those interested in constructing on, adjacent, over, or under Metro right of way, non-revenue property, or transit facilities. Developers should familiarize themselves with these resources and keep in mind common adjacency concerns when planning a project.

2. **Contact Metro early during design process**: Metro welcomes the opportunity to provide feedback early in project design, allowing for detection and resolution of important adjacency issues, identification of urban design and system integration opportunities, and facilitation of permit approval.

3. **Maintain communication**: Frequent communication with stakeholder Metro departments during project design and construction will reinforce relationships and allow for timely project completion.
1.1 Supporting Transit Oriented Communities

Adjacent development plays a crucial role in shaping TOCs along and around Metro transit services and facilities. TOCs require an intentional orchestration of physical, aesthetic, and operational elements, and close coordination by all stakeholders, including Metro, developers, and municipalities.

**Recommendation:** Conceive projects as an integrated system that acknowledges context, builds on user needs and desires, and implements elements of placemaking. Metro is interested in collaborating with projects and teams that, in part or wholly:

- Integrate a mix of uses to create lively, vibrant places that are active day and night.
- Include a combination of buildings and public spaces to define unique and memorable places.
- Explore a range of densities and massing to optimize building functionality while acknowledging context-sensitive scale and architectural form.
- Activate ground floor with retail and outdoor seating/activities to bring life to the public environment.
- Prioritize pedestrian scaled elements to create spaces that are comfortable, safe, and enjoyable.
- Provide seamless transitions between uses to encourage non-motorized mobility, improve public fitness and health, and reduce road congestion.
- Reduce and hide parking to focus on pedestrian activity.
- Prevent crime through environmental design.
- Leverage regulatory TOD incentives to design a more compelling project that capitalizes on transit adjacency and economy of scales.
- Utilize Metro policies and programs supporting a healthy, sustainable, and welcoming environment around transit service and facilities.

The Wilshire/Vermont Metro Joint Development project leveraged existing transit infrastructure to catalyze a dynamic and accessible urban environment. The project accommodates portal access into the Metro Rail system and on-street bus facilities.

Links to Metro policies and programs may be found in the [Resources Section] of this Handbook.
1.2 Enhancing Access to Transit

Metro seeks to create a comprehensive, integrated transportation network and supports infrastructure and design that allows safe and convenient access to its multimodal services. Projects in close proximity to Metro’s services and facilities present an opportunity to enhance the public realm and connections to/from these services for transit patrons as well as users of the developments.

**Recommendation:** Design projects with transit access in mind. Project teams should capitalize on the opportunity to improve the built environment and enhance the public realm for pedestrians, bicyclists, persons with disabilities, seniors, children, and users of green modes. Metro recommends that projects:

- Orient major entrances to transit service, making access and travel intuitive and convenient.
- Plan for a continuous canopy of shade trees along all public right-of-way frontages to improve pedestrian comfort to transit facilities.
- Add pedestrian lighting along paths to transit facilities and nearby destinations.
- Integrate wayfinding and signage into project design.
- Enhance nearby crosswalks and ramps.
- Ensure new walkways and sidewalks are clear of any obstructions, including utilities, traffic control devices, trees, and furniture.
- Design for seamless, multi-modal pedestrian connections, making access easy, direct, and comfortable.

**Additional Resources:**
- Metro Active Transportation Strategic Plan
- Metro Complete Streets Policy
- Metro First/Last Mile Strategic Plan
- Metro Transit Supportive Planning Toolkit

The City of Santa Monica leveraged investments in rail transit and reconfigured Colorado Avenue to form a multi-modal first/last mile gateway to the waterfront from the Expo Line Station.
1.3 Building Setback

Buildings and structures with a zero lot setback abutting Metro ROW are of prime concern to Metro. Encroachment onto Metro property to construct or maintain buildings is strongly discouraged as this presents safety hazards and may disrupt transit service and/or damage Metro infrastructure.

**Recommendation:** Metro strongly encourages development plans include a minimum setback of five (5) feet to buildings from the Metro ROW property line to accommodate the construction and maintenance of structures without the need to encroach upon Metro property. As local jurisdictions also have building setback requirements, new developments should comply with the greater of the two requirements.

Entry into the ROW by parties other than Metro and its affiliated partners requires written approval. Should construction or maintenance of a development necessitate temporary or ongoing access to Metro ROW, a Metro *Right of Entry Permit* must be requested and obtained from Metro Real Estate for every instance access is required. Permission to enter the ROW is granted solely at Metro’s discretion.

Refer to Section 3.2 –Track Access and Safety for additional information pertaining to ROW access in preparation for construction activities.

**Additional Resources:**
Metro Adjacent Construction Design Manual
1.4 Shared Barrier Construction &
Maintenance

In areas where Metro ROW abuts private property, barrier construction and maintenance responsibilities can rise to be a point of contention with property owners. When double barriers are constructed, the gap created between the Metro-constructed fence and a private property owner’s fence can accumulate trash and make regular maintenance challenging without accessing the other party’s property.

Recommendation: Metro strongly prefers a single barrier condition along its ROW property line. With an understanding that existing conditions along ROW boundaries vary throughout Los Angeles County, Metro recommends the following, in order of preference:

1. Enhance existing Metro barrier: if structural capacity allows, private property owners and developers should consider physically affixing improvements onto and building upon Metro’s existing barrier. Metro is amenable to barrier enhancements such as increasing barrier height and allowing private property owners to apply architectural finishes to their side of Metro’s barrier.

2. Replace existing barrier(s): if conditions are not desirable, remove and replace any existing barrier(s), including Metro’s, with a new single barrier built on the property line.

Metro is amenable to sharing costs for certain improvements that allow for clarity in responsibilities and adequate ongoing maintenance from adjacent property owners without entering Metro’s property. Metro Real Estate should be contacted with case-specific questions and will need to approve shared barrier design, shared-financing, and construction.
1.5 Project Orientation & Noise Mitigation

Metro may operate in and out of revenue service 24 hours per day, every day of the year, and can create noise and vibration (i.e. horns, power washing). Transit service and maintenance schedules cannot be altered to avoid noise for adjacent developments. However, noise and vibration impacts can be reduced through building design and orientation.

Recommendations: Use building orientation, programming, and design techniques to reduce noise and vibration for buildings along Metro ROW:

- Locate “back of house” rooms (e.g. bathrooms, stairways, laundry rooms) along ROW, rather than noise sensitive rooms (e.g. bedrooms and family rooms)
- Use upper level setbacks and locate living spaces away from ROW.
- Enclose balconies.
- Install double-pane windows.
- Include language disclosing potential for noise, vibration, and other impacts due to transit proximity in terms and conditions for building lease/sale agreements to protect building owners/sellers from tenant/buyer complaints.

Developers are responsible for any noise mitigation required, which may include engineering designs for mitigation recommended by Metro or otherwise required by local municipalities. A recorded *Noise Easement Deed* in favor of Metro may be required for projects within 100’ of Metro ROW to ensure notification to tenants and owners of any proximity issues.

Additional Resources:
- *Noise Easement Deed*
- *MRDC, Section 2 – Environmental Considerations*
1.6 Sightlines at Crossings

Developments adjacent to Metro ROW can present visual barriers to transit operators approaching vehicular and pedestrian crossings. Buildings and structures in close proximity to transit corridors can reduce sightlines and create blind corners where operators cannot see pedestrians. This requires operations to reduce train speeds, which decreases the efficiency of transit service.

**Recommendation:** Design buildings to maximize transit service sightlines at crossings, leaving a clear *cone of visibility* to oncoming vehicles and pedestrians. Metro Operations will review, provide guidance, and determine the extent of operator visibility for safe operations. If the building envelope overlaps with the visibility cone near pedestrian and vehicular crossings, a building setback may be needed to ensure safe transit service. The cone of visibility at crossings and required setback will be determined based on vehicle approach speed.

**Limited sightlines for trains approaching street crossings create unsafe conditions.**

**Visibility cones allow train operators to respond to safety hazards.**

**Additional Resources:**
MRDC, Section 4 – Guideway and Trackwork
MRDC, Section 12 – Safety, Security, & System Assurance
1.7 Transit Envelope Clearance

Metro encourages density along and around transit service as well as greening of the urban environment through the addition of street trees and landscaping. However, building appurtenances, such as balconies, facing rail ROW may pose threats to Metro service as clothing or other décor could blow into the OCS. Untended landscaping and trees can also grow into the OCS above light rail lines, creating electrical safety hazards as well as visual and physical impediments for trains.

**Recommendation:** Project elements facing or located adjacent to the ROW should be designed to avoid potential conflicts with Metro transit vehicles and infrastructure. Metro recommends that projects:

- Maintain building appurtenances and landscaping at a minimum distance of ten (10) feet from the OCS and support structures.
- Plan for landscape maintenance from private property and not allow growth into the Metro ROW. Property owners will not be permitted to access Metro property to maintain private development.
- Design buildings such that balconies do not provide direct access to ROW access.

**Additional Resources:**

MRDC, Section 4 – Guideway and Trackwork
MRDC, Section 6 – Architectural
MRDC, Section 12 – Safety, Security, & System Assurance

Adjacent structures and landscaping should be sited to avoid conflicts with the rail OCS.
1.8 Bus Stops & Zones Design

Metro Bus serves 15,967 bus stops throughout the diverse landscape that is Los Angeles County. Typically located on sidewalks within the public right-of-way owned and maintained by local jurisdictions, existing bus stop conditions vary from well-lit and sheltered spaces to uncomfortable and unwelcoming zones. Metro is interested in working with developers and local jurisdiction to create a vibrant public realm around new developments by strengthening multi-modal access to/from Metro transit stops and enhancing the pedestrian experience.

**Recommendation:** When designing around existing or proposed bus stops, Metro recommends project teams:

- Review Metro’s Transit Service Policy: Appendix D, which provides standards for design and operation of bus stops and zones for near-side, far-side, and mid-block stops. In particular, adjacent projects should:
  - Accommodate 6’ x 8’ landing pads at bus doors.
  - Install a concrete bus pad within each bus stop zone to avoid asphalt damage.
- Replace stand-alone bus stop signs with bus shelters that include benches and adequate lighting.
- Design wide sidewalks (15’ preferred) that accommodate bus landing pads as well as street furniture, landscape, and user travel space.
- Ensure final design of stops and surrounding sidewalk allows passengers with disabilities a clear path of travel.
- Place species of trees in quantities and spacing that will provide a continuous shade canopy in paths of travel to access transit stops. These must be placed far enough away from the curb and adequately maintained to prevent visual and physical impediments for buses when trees reach maturity.
- Locate and design driveways to avoid conflicts with on-street services and pedestrian traffic.

**Additional Resources:**

Metro Transit Service Policy
1.9 Driveways/Access Management

Driveways adjacent to on-street bus stops can create conflict for pedestrians walking to/from or waiting for transit. Additionally, driveways accessing parking and loading at project sites near Metro Rail and BRT crossings can create queuing issues along city streets and put vehicles in close proximity with fast moving trains and buses.

**Recommendation:** Metro encourages new developments to promote a lively public space mutually beneficial to the project and Metro by providing safe, comfortable, convenient, and direct connections to transit. Metro recommends that projects:

- Place driveways along side streets and alleys, away from on-street bus stops and transit crossings to minimize safety conflicts between active tracks, transit vehicles, and people, as well as queuing on streets.
- Locate vehicular driveways away from transit crossings or areas that are likely to be used as waiting areas for transit services.
- Program loading docks away from sidewalks where transit bus stop activity is/will be present.
- Consolidate vehicular entrances and reduce width of driveways.
- Raise driveway crossings to be flush with the sidewalk, slowing automobiles entering and prioritizing pedestrians.
- Separate pedestrian walkways to minimize conflict with vehicles and encourage safe non-motorized travel.

**Additional Resources:**
- Metro First/Last Mile Strategic Plan
- MRDC, Section 3 – Civil
2.1 Excavation Support System Design

Excavation near Metro ROW has the potential to disturb adjoining soils and jeopardize the support of existing Metro infrastructure. Any excavation which occurs within the geotechnical *foul zone* is subject to Metro review and approval. The geotechnical zone of influence shall be defined as the area below the track-way as measured from a 45-degree angle from the edge of the rail track ballast. Construction within this vulnerable area poses a potential risk to Metro service and safety and triggers additional safety regulations.

**Recommendation:** Coordinate with Metro Engineering staff for review and approval of structural and support of excavation drawings prior to the start of excavation or construction. Tie backs encroaching into Metro ROW may require a tie back easement or license, at Metro’s discretion.

Any excavation/shoring within Metrolink operated and maintained ROW would require compliance with Metrolink Engineering standards and guidelines.

An underground structure located within the ROW foul zone would require additional review by Metro.

Additional Resources:
- Metrolink Engineering & Construction Requirements
- MRDC, Section 3 – Civil
- MRDC, Section 5 – Structural/Geotechnical
2.2 Proximity to Stations & Tunnels

Metro supports development of commercial and residential properties near transit services and understands that increasing development near stations represents a mutually beneficial opportunity to increase ridership and enhance transportation options for the users of the developments. However, construction adjacent to, over, or under underground Metro facilities (tunnels, stations and appendages) is of great concern and should be coordinated closely with Metro Engineering.

**Recommendation:** Dependent on the nature of the adjacent construction, Metro will need to review the geotechnical report, structural foundation plans, sections, shoring plan sections and calculations. Metro typically seeks to maintain a minimum eight (8) foot clearance from existing Metro facilities to new construction (shoring or tiebacks). It will be incumbent upon the developer to demonstrate, to Metro’s satisfaction, that both the temporary support of construction and the permanent works do not adversely affect the structural integrity, safety or continued efficient operation of Metro facilities.

Metro may require monitoring where such work will either increase or decrease the existing overburden (i.e. weight) to which the tunnels or facilities are subjected. When required, the monitoring will serve as an early indication of excessive structural strain or movement. Additional information regarding monitoring requirements, which will be determined on a case-by-case basis, may be found in Section 3.4, Excavation Drilling/Monitoring.

**Additional Resources:**
MRDC, Section 3 – Civil
MRDC, Section 5 – Structural/Geotechnical

*Underground tunnels in close proximity to adjacent basement structure.*
2.3 Protection from Explosion/Blast

Metro is obligated to ensure the safety of public transit infrastructure from potential explosive sources which could originate from adjacent underground structures or from at grade locations, situated below elevated guideways or stations. Blast protection setbacks or mitigation may be required for large projects constructed near critical Metro facilities.

**Recommendation:** Avoid locating underground parking or basement structures within twenty (20) feet from an existing Metro tunnel or facility (exterior face of wall to exterior face of wall). Adjacent developments which are within this 20-foot envelope may be required to undergo a *Threat Assessment and Blast/Explosion Study* subject to Metro review and approval.

*An underground structure proposed within twenty (20) feet of a Metro structure may require a threat assessment and blast/explosion study.*

**Additional Resources:**
- Metro Adjacent Construction Design Manual
- MRDC, Section 3 – Civil
- MRDC, Section 5 – Structural/Geotechnical
3 Construction Safety & Monitoring
3.1 Pre-Construction Coordination

Metro is concerned with impacts on service requiring single tracking, line closures, speed restrictions, and bus bridging occurring as a result of adjacent project construction. Projects that will require work over, under, adjacent, or on Metro property or ROW and include operation of machinery, scaffolding, or any other potentially hazardous work are subject to evaluation in preparation for and during construction to maintain safe operations and passenger wellbeing.

**Recommendation:** Following an initial screening of the project, additional coordination may be determined to be necessary. Dependent on the nature of the adjacent construction, developers may be requested to perform the following as determined on a case-by-case basis:

- Submit a construction work plan and related project drawings and specifications for Metro review.
- Submit a contingency plan, show proof of insurance coverage, and issue current certificates.
- Provide documentation of contractor qualifications.
- Complete pre-construction surveys, perform baseline readings, and install movement instrumentation.
- Complete readiness review and perform practice run of shutdown per contingency plan.
- Confirm a ROW observer or other safety personnel and an inspector from the parties.
- Establish a coordination process for access and work in or adjacent to ROW for the duration of construction.

Project teams will be responsible for the costs of adverse impacts on Metro transit operations caused by work on adjacent developments, including remedial work to repair damage to Metro property, facilities, or systems. Additionally, a review fee may be assessed based on an estimate of required level of effort provided by Metro.

All projects adjacent to Metrolink infrastructure will require compliance with SCRRA Engineering Standards and Guidelines.

**Additional Resources:**
- [Metrolink Engineering & Construction Requirements](#)
- [Metro Adjacent Construction Design Manual](#)
3.2 Track Access and Safety

Permission is needed from Metro to enter Metro property for construction and maintenance along, above, or under Metro ROW as these activities can interfere with Metro utilities and service and pose a safety hazard to construction teams and transit riders. Track access is solely at Metro’s discretion and is discouraged to prevent electrocution and collisions with construction workers or machines.

**Recommendation:** To work in or adjacent to Metro ROW, the following must be obtained and/or completed:

- **Right-of-Entry Permit/Temporary Construction Easement:** All access to and activity on Metro property, including easements necessary for construction of adjacent projects, must be approved through a Right-of-Entry Permit and/or a Temporary Construction Easement obtained from Metro Real Estate and may require a fee.

- **Track Allocation:** All work on Metro Rail ROW must receive prior approval from Metro Rail Operations Control. Track Allocation identifies, reserves, and requests changes to normal operations for a specific track section, line, station, location, or piece of equipment to allow for safe use by a non-Metro entity.

- **Safety Training:** All members of the project construction team will be required to attend Metro Safety Training in advance of work activity.

- **Construction Work Plan:** Dependent on the nature of adjacent construction, Metro may request a construction work plan, which describes means and methods and other construction plan details, to ensure the safety of transit operators and patrons.

**Additional Resources:**
- Metro Adjacent Construction Design Manual
- Safety Training
- Track Allocation

Trained flaggers ensure the safe crossing of pedestrians and workers of an adjacent development.
3.3 Construction Hours

To maintain public safety and access for Metro riders, construction should be planned, scheduled, and carried out in a way to avoid impacts to Metro service and maintenance. Metro may limit hours of construction which impact Metro ROW to night or off-peak hours so as not to interfere with Metro revenue service.

**Recommendations:** In addition to receiving necessary construction approvals from the local municipality, all construction work on or in close proximity to Metro ROW must be scheduled through the Track Allocation Process, detailed in Section 3.2.

Metro prefers that adjacent construction that has the potential to impact normal, continuous Metro operations take place during non-revenue hours (approximately 1:00a.m.-4:00a.m.) or during non-peak hours to minimize impacts to service. The project sponsor may be responsible for additional operating costs resulting from disruption to normal Metro service.

**Additional Resources:**
- Metro Adjacent Construction Design Manual
- MRDC, Section 10 – Operations
- Track Allocation

*Construction during approved hours ensures the steady progress of adjacent development construction as well as performance of Metro's transit service.*
3.4 Excavation/Drilling Monitoring

Excavation is among the most hazardous construction activities and can pose threats to the structural integrity of Metro’s transit infrastructure.

**Recommendation:** Excavation and shoring plans adjacent to the Metro ROW shall be reviewed and approved by Metro Engineering prior to commencing construction.

Geotechnical instrumentation and monitoring will be required for all excavations occurring within Metro’s *geotechnical zone of influence*, where there is potential for adversely affecting the safe and efficient operation of transit vehicles. Monitoring of Metro facilities due to adjacent construction may include the following as determined on a case-by-case basis:

- Pre- and post-construction condition surveys
- Extensometers
- Inclinometers
- Settlement reference points
- Tilt-meters
- Groundwater observation wells
- Movement arrays
- Vibration monitoring

**Additional Resources:**
- Metro Adjacent Construction Design Manual
- MRDC, Section 3 – Civil
- MRDC, Section 5 – Structural/Geotechnical
3.5 Crane Operations

Construction activities adjacent to Metro ROW will often require moving large, heavy loads of building materials and machinery by cranes. Cranes referred to in this section include all power operated equipment that can hoist, lower, and horizontally move a suspended load. There are significant safety issues to be considered for the operators of crane devices as well as Metro patrons and operators.

**Recommendations:** Per California Occupational Safety and Health Administration (Cal/OSHA) standards, cranes operated near the OCS must maintain a twenty (20) foot clearance from the OCS. In the event that a crane or its load needs to enter the 20-foot envelope, OCS lines must be de-energized.

Construction activities which involve swinging a crane and suspended loads over Metro facilities or bus passenger areas shall not be performed during revenue hours. The placement and swing of this equipment are subject to Metro review and possible work plan.

**Additional Resources:**
- Metro Adjacent Construction Design Manual
- Cal/OSHA
3.6 Construction Barriers & Overhead Protection

During construction, falling objects can damage Metro facilities, and pose a safety concern to the patrons accessing them.

**Recommendations:** Vertical construction barriers and overhead protection compliant with Metro and Cal OSHA requirements shall be constructed to prevent objects from falling into the Metro ROW or areas designed for public access to Metro facilities. A protection barrier shall be constructed to cover the full height of an adjacent project and overhead protection from falling objects shall be provided over Metro ROW as necessary. Erection of the construction barriers and overhead protection for these areas shall be done during Metro non-revenue hours.

*Additional Resources:*

Metro Adjacent Construction Design Manual
3.7 Pedestrian & Emergency Access

Metro’s ridership relies on the consistency and reliability of access and wayfinding to/from stations, stops, and facilities. Construction on adjacent developments must not obstruct fire department access, emergency egress, or otherwise present a safety hazard to Metro operations, its employees, patrons, and the general public. Fire access and safe escape routes within all Metro stations, stops, and facilities must be maintained.

**Recommendations**: The developer shall ensure pedestrian access to Metro stations, stops, and transit facilities is compliant with the Americans with Disabilities Act (ADA) and maintained during construction:

- Temporary fences, barricades, and lighting should be installed and watchmen provided for the protection of public travel, the construction site, adjacent public spaces, and existing Metro facilities.
- Temporary signage should be installed where necessary and in compliance with the latest California Manual on Uniform Traffic Control Devices and in coordination with Metro Art and Design Standards.
- Emergency exists shall be provided and be clear of obstructions at all times.
- Access shall be maintained for utilities such as fire hydrants, stand pipes/connections, and fire alarm boxes as well as Metro-specific infrastructure such as fan and vent shafts.

**Additional Resources:**
- California Manual on Uniform Traffic Control Devices
- Metro Adjacent Construction Design Manual
- Metro Signage Standards

*Sidewalk access is blocked for construction project, forcing pedestrians into street or to use less direct paths to the Metro facility.*
3.8 Impacts to Bus Routes & Stops

During construction, bus stops and routes may need to be temporarily relocated. Metro needs to be informed of activities that require removal and/or relocation in order to ensure uninterrupted service.

**Recommendations:** During construction, existing bus stops must be maintained or relocated consistent with the needs of Metro Bus Operations. Design of temporary and permanent bus stops and surrounding sidewalk area must be ADA-compliant and allow passengers with disabilities a clear path of travel to the transit service. Metro Bus Operations Control Special Events and Metro Stops & Zones Department should be contacted at least 30 days in advance of initiating construction activities.

Temporary and permanent relocation of bus stops and layover zones will require coordination between developers, Metro, and other municipal bus operators, and local jurisdictions.

**Additional Resources:**
- Metro Transit Service Policy
- MRDC, Section 3 – Civil
3.9 Utility Coordination

Construction has the potential to interrupt utilities that Metro relies on for safe operations and maintenance. Utilities of concern to Metro include but are not limited to: condenser water piping, potable/fire water, and storm and sanitary sewer lines, as well as electrical/telecommunication services.

**Recommendations:** Temporary and permanent utility impacts and relocation near Metro facilities should be addressed during project design and engineering to avoid conflicts during construction.

The contractor shall protect existing aboveground and underground Metro utilities during construction and coordinate with Metro to receive written approval for any utilities pertinent to Metro facilities that may be verified, used, interrupted, or disturbed.

When electrical power outages or support functions are required, the approval must be obtained through Metro Track Allocation.

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**Additional Resources:**
Metro Adjacent Construction Design Manual

Coordination of underground utilities is critical.
3.10 Air Quality & Ventilation Protection

Hot or foul air, fumes, smoke, steam, and dust from adjacent construction activities can negatively impact Metro facilities, service, and users.

**Recommendation:** Hot or foul air, fumes, smoke, and steam from adjacent facilities must not be discharged within 40 feet of existing Metro facilities, including but not limited to: ventilation system intake shafts or station entrances. Should fumes be discharged within 40 feet of Metro intake shafts, a protection panel around each shaft shall be required.

*Additional Resources:*
Metro Adjacent Construction Design Manual
MRDC, Section 8 – Mechanical
The following provides Metro contact information and a list of programs, policies, and online resources that should be considered when planning projects within 100 feet of Metro ROW – including underground easements – and in close proximity to non-revenue transit facilities and property:

**Metro Adjacent Development**

**Contact Information & Resources**

Please direct any questions to the Metro Adjacent Development team at:

- 213-418-3484
- DevReview@metro.net

Metro Adjacent Development Review Webpage: [https://www.metro.net/projects/devreview/](https://www.metro.net/projects/devreview/)

**Metro Right-of-Way GIS Data**

Metro maintains a technical resource website housing downloadable data sets and web services. Developers and municipalities should utilize available Metro right-of-way GIS data to appropriately plan and coordinate with Metro when proposing projects within 100’ of Metro right-of-way: [https://developer.metro.net/portfolio-item/metro-right-of-way-gis-data/](https://developer.metro.net/portfolio-item/metro-right-of-way-gis-data/)

**Metro Design Criteria & Standards**

Metro standard documents are periodically updated and are available upon request:

- Metro Adjacent Construction Design Manual
- Metro Rail Design Criteria (MRDC)
- Metro Rail Directive Drawings
- Metro Rail Standard Drawings
- Metro Signage Standards
Metrolink Standards & Procedures

Engineering & Construction
https://www.metrolinktrains.com/about/agency/engineering-construction/

Metro Policies & Plans

Active Transportation Strategic Plan, 2016
https://www.metro.net/projects/active-transportation-strategic-plan/

Complete Streets Policy, 2014
https://www.metro.net/projects/countywide-planning/metros-complete-streets-policy-requirements/

Countywide Sustainability Planning Policy & Implementation Plan, 2012

First/Last Mile Strategic Plan, 2014
https://media.metro.net/docs/First_Last_Mile_Strategic_Plan.pdf

Transit Service Policy, 2015
https://media.metro.net/images/service_changes_transit_service_policy.pdf

Major construction at the Metrolink San Bernardino Station.

Metro Complete Streets Policy
Resources

Metro Programs & Toolkits

Bike Hub
https://bikehub.com/metro/

Bike Share for Business
https://bikeshare.metro.net/for-business/

Green Places Toolkit
https://www.metro.net/interactives/greenplaces/index.html

Transit Oriented Communities
https://www.metro.net/projects/transit-oriented-communities/

Transit Passes
Annual and Business Access Passes
https://www.metro.net/riding/eapp/

College/Vocational Monthly Pass
https://www.metro.net/riding/fares/collegevocational/

Transit Supportive Planning Toolkit
https://www.metro.net/projects/tod-toolkit/

Useful Policies & Resources

ADA Standards for Accessible Design, 2010
U.S. Department of Justice.
https://www.ada.gov/2010ADAstandards_index.htm

California Manual on Uniform Traffic Control Devices.
State of California Department of Transportation
http://www.dot.ca.gov/trafficops/tcd/signcharts.html

California Occupational Safety and Health Administration (Cal/OSHA)
State of California Department of Industrial Relations
http://www.dir.ca.gov/dosh/
**Cone of Visibility** – a conical space at the front of moving transit vehicles allowing for clear visibility of travel way and/or conflicts.

**Construction Work Plan (CWP)** – project management document outlining the definition of work tasks, choice of technology, estimation of required resources and duration of individual tasks, and identification of interactions among the different work tasks.

**Flagger/Flagman** – person who controls traffic on and through a construction project. Flaggers must be trained and certified by Metro Rail Operations prior to any work commencing in or adjacent to Metro ROW.

**Geotechnical Foul Zone** – area below a track-way as measured from a 45-degree angle from the edge of the rail track ballast.

**Guideway** – a channel, track, or structure along which a transit vehicle moves.

**Heavy Rail Transit (HRT)** – Metro HRT systems include exclusive ROW (mostly subway) trains up to six (6) cars long (450’) and utilize a contact rail for traction power distribution (e.g. Metro Red Line).

**Light Rail Transit (LRT)** – Metro LRT systems include exclusive, semi-exclusive, or street ROW trains up to three (3) cars long (270’) and utilize OCS for traction power distribution (e.g. Metro Blue Line).

**Measure R** – half-cent sales tax for Los Angeles County approved in November 2008 to finance new transportation projects and programs. The tax expires in 2039.

**Measure M** – half-cent sales tax for LA County approved in November 2016 to fund transportation improvements, operations and programs, and accelerate projects already in the pipeline. The tax will increase to one percent in 2039 when Measure R expires.

**Metrolink** – a commuter rail system with seven lines throughout Los Angeles, Orange, Riverside, San Bernardino, Ventura, and North San Diego counties governed by the Southern California Regional Rail Authority.

**Metro Adjacent Construction Design Manual** – Volume III of the Metro Design Criteria & Standards which outlines the Metro adjacent development review procedure as well as operational requirements when constructing over, under, or adjacent to Metro facilities, structures, and property.

**Metro Bus** – Metro “Local” and “Rapid” bus service runs within the street, typically alongside vehicular traffic, though occasionally in “bus-only” lanes.

**Metro Bus Rapid Transit (BRT)** – high quality bus service that provides faster and convenient service through the use of dedicated ROW, branded vehicles and stations, high frequency and intelligent transportation systems, all door boarding, and intersection crossing priority. Metro BRT generally runs within the center of freeways and/or within dedicated corridors.

**Metro Design Criteria and Standards** – a compilation of documents that govern how Metro transit service and facilities are designed, constructed, operated, and maintained.

**Metro Rail** – urban rail system serving Los Angeles County consisting of six lines, including two subway lines (Red and Purple Lines) and four light rail lines (Blue, Green, Gold, and Expo Lines).

**Metro Rail Design Criteria (MRDC)** – Volume IV of the Metro Design Criteria & Standards which establishes design criteria for preliminary engineering and final design of a Metro Project.

**Metro Transit Oriented Communities** – land use planning and community development program that seeks to
maximize access to transportation as a key organizing principle and promote equity and sustainable living by offering a mix of uses close to transit to support households at all income levels, as well as building densities, parking policies, urban design elements and first/last mile facilities that support ridership and reduce auto dependency.

**Noise Easement Deed** – easement completed by property owners abutting Metro ROW acknowledging use and possible results of transit vehicle operation on the ROW.

**Overhead Catenary System (OCS)** – one or more electrified wires (or rails, particularly in tunnels) situated over a transit ROW that transmit power to light rail trains via pantograph, a current collector mounted on the roof of an electric vehicle. Metro OCS is supported by hollow poles placed between tracks or on the outer edge of parallel tracks.

**Right of Entry Permit** – written approval granted by Metro Real Estate to enter Metro ROW and property.

**Right of Way (ROW)** – the composite total requirement of all interests and uses of real property needed to construct, maintain, protect, and operate the transit system.

**Southern California Regional Rail Authority (SCRRA)** – a joint powers authority made up of an 11-member board representing the transportation commissions of Los Angeles, Orange, Riverside, San Bernardino and Ventura counties. SCRRA governs and operates Metrolink service.

**Threat Assessment and Blast/Explosion Study** – analysis performed when adjacent developments are proposed within twenty (20) feet from an existing Metro tunnel or facility.

**Track Allocation/Work Permit** – permit granted by Metro Rail Operations Control to allocate a section of track and perform work on Metro Rail ROW. This permit should be submitted for any work that could potentially foul the envelope of a train.

**Wayfinding** – signs, maps, and other graphic or audible methods used to convey location and directions to travelers.