



Metro®

ISDS PROJECT

INTEGRATED STATION DESIGN SOLUTIONS



Landscaping White Paper

November 2021

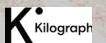
Gensler

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1.0 Element Overview and Problem Statement

1.1 Description of Element

The landscaping element of the Integrated Station Design Solutions (ISDS) project includes standard plaza layouts for aerial, at-grade, and underground stations, as well as schematic details for tree wells, and station planting areas. This element also includes plant palette recommendations for specific environmental and microclimate areas within Metro jurisdiction.

1.2 Problem Statement

Metro requires consistent standards for the design of station plazas and landscaping features including tree wells and planters. Landscaping is an element of design variability at stations allowing for community-specific input and responds to site specific conditions, but Metro requires further development on recommended landscaping layouts and plant species. Current challenges within the system as they relate to station layout and landscaping include:

- Lack of planting palettes providing a wide variety of planting material that are sustainable, easily maintainable, allow for variable station landscape design, and enhance rider experience for a variety of station types and microclimates.
- Lack of typical landscaping layout plans for at-grade, aerial, and underground station plazas.
- Lack of standard details for tree wells and planters.

Metro's priorities for landscaping include:

- A comprehensive plant palette for consistent use across the system that takes into account the different microclimates within Los Angeles County, and indicates lessons learned from the Facilities Maintenance Department.
- Optimizing stormwater management design to reduce water runoff and allow biofiltration.
- Standard station landscaping layout plans designed to enhance safety, security, wayfinding, passenger experience, consider operations and maintenance needs, and assist with efficient project delivery.
- Standard details for tree wells and planters with a common design language to ensure maintainability of landscape features that can be used to reinforce accessibility and visual consistency systemwide,

while at the same time provide sufficient flexibility to provide for variation responsive to specific conditions at each station site.

- Provide variability between stations to relate each station design to the surrounding community.



Figure 1-1 Tree limbs under 6' from above finished surface creates a security concern as it does not ensure clear sightlines. Expo/La Brea station. E (Expo) Line.



Figure 1-2 Bare landscape planter with unmaintained irrigation at station plaza level. Harbor Freeway station. J (Silver) Line.



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2.0 Design Process and Principles

2.1 Design Process

The Project Design Team for this element was led by Studio-MLA and Gensler.

Metro departments across the agency provided input throughout the design process. Beginning in May 2018, Working Group members accompanied the Project Design Team on site visits to Metro stations to observe and document the condition of existing station landscaping. The Project Design Team also conducted a series of interviews with representatives from Metro departments, including:

- Arts + Design
- Environmental Compliance and Sustainability
- Facilities Engineering-Operations
- Facilities/Property Maintenance (including separate interviews with FM field staff and management)
- Office of Civil Rights
- Operations Liaison and Planning
- Project Engineering
- Rail Operations
- System Security & Law Enforcement

Based on the analysis and the information provided during interviews with Metro staff, the Project Design Team developed initial design concepts, which were presented to the Working Group in December 2018.

Using the feedback provided by the Working Group members, the Project Design Team refined the initial design concepts into a draft Concept Design, which was submitted to the members of the Working Group for review in January 2019. A revised Concept Design was submitted in March 2019 followed by the final Concept Design completed in April 2019.

The Project Design Team submitted the draft Design Documentation package and White Paper in May 2019. The revised White Paper was submitted in October 2019, and the revised Design Documentation package in January 2020. Final versions were submitted February 2020. For additional information, see “Table 2-1 Timeline of Design Process” on page 5.



Figure 2-1 The Project Design Team conducted a station landscaping charrette with Working Group members.

2.2 Working Group Feedback

Working Group members provided the following feedback on station landscaping:

Safety & Security

- Avoid providing shade and seating at the back of the plaza if surrounded by non-active uses. (System Security & Law Enforcement)
- Planter walls should be low and narrow enough to discourage sitting, sleeping, and skateboarding.
- Locate bike shelter and shared mobility device parking areas where they are visible, well lit and monitored, and not obscured by landscaping to deter theft and vandalism.
- Ensure clear sightlines to reduce security issues.
- Consider safety in tree well designs to minimize tripping hazard. (Office of Civil Rights)
- Do not specify plant material with spikes, thorns, or other sharp edges directly adjacent to walkways.

Maintenance Considerations

- Consider resiliency and fire prevention. (Environmental Compliance and Sustainability)
- Limit use of tree grates as they may be stolen, displaced by tree roots, or cause girdling.
- Avoid plants that excessively flower or create fruit litter. (Facilities Maintenance)
- Utilize plant species with a moderate growth rate to provide a positive user experience and aesthetic quality as well as ease of maintenance.
- Consider clearances at bike racks including landscaping and other required station plaza amenities.



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- Do not specify or locate trees with root systems that compromise walking surfaces and cause upheaving of tree well covers or grates.
- Ensure runoff water drains away from elevators and escalators to reduce future maintenance costs.
- Meet MRDC clearance requirements for trackway and Overhead Catenary System (OCS) poles. Tree canopy should not cover station canopies or roof structure of bike shelters. (Facilities Maintenance)
- Consider maintenance problems when specifying vines.
- Use bark within planters at the back of the plaza where there is limited pedestrian activity and where it will not be blown away and create a maintenance issue.
- Do not landscape between rail tracks.
- Specify appropriate stabilized decomposed granite (DG) size to meet ADA requirements and ensure that cleaning does not spread DG outside of tree well. (Office of Civil Rights)

Station Plaza Design

- Ensure tree canopy height of selected tree species located near station ID element preserves sightlines.
- Use DG tree wells instead of tree grates at property edge, adjacent to bus transfer locations to allow open pedestrian access.
- Provide shade trees and seating at transfer locations (bus stops and pick-up/drop-off).
- Choose trees that can help identify Metro stations and can be recognizable from across the street.
- Use standardized materials for planter walls.
- Station plaza landscape layouts should provide dedicated area for high capacity bike shelters, as well as shared mobility devices with stub-ups for future equipment installation.
- Create standards for stormwater mitigation that maximizes on-site retention or biofiltration of stormwater quality design volume.
- Consider pedestrian path of travel, especially for the vision impaired, when landscaping at stations.
- Design plaza pavement to handle water runoff and maintenance truck loading, as trucks may drive and park on plaza to gain access for maintenance.
- Only use ornamental (non-shade) trees such as palm trees at the back of non-activated station plaza areas to avoid creating spaces that attract loitering and camping.

2.3 Design Principles

Based on the comments provided by the Working Group, the Project Design Team identified the following Design Principles for station landscaping:

Landscape as Neighborhood Identifier

- Landscaping should provide an element of variability to allow for community input.
- Select trees to provide identity for Metro stations.
- Complement station ID element with tree species selection to reflect neighborhood character.

Address Security Issues

- Locate bike racks to ensure visibility.
- Ensure clear access and wayfinding.
- Shrub height should allow clear line-of-sight.
- Ensure that irrigation equipment is screened from view to prevent vandalism and theft.

Reduce Maintenance

- Minimize use of flowering/fruit-bearing trees.
- Provide proper tree clearance from OCS and station structures to aid operations and maintenance.
- As a graffiti deterrent, utilize ivy or artificial vines to cover large blank walls. As this method is still in pilot phase, further in-field evaluation for long term effectiveness is needed.

Emphasize Sustainability

- Provide climate-specific plant material, with a preference towards native and non-native drought tolerant species.
- Ensure all water runoff is captured on site, and dedicate specific areas for stormwater management.
- Ensure irrigation does not overspray onto elevators, escalators, areas within the main path-of-travel, as well as bike parking facilities.

Improve Passenger Comfort

- Locate seating and shade trees at key locations where passengers wait to transfer.
- Use stabilized DG at tree well areas to provide flat walking surfaces on the plaza.



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Table 2-1 Timeline of Design Process

May to June 2018	Project Design Team and Metro Working Group Members conducted site visits to existing stations, including 7th St./Metro Center, Arcadia, Aviation/LAX, Bundy, Cal State LA, Harbor Freeway, Hollywood/Highland, North Hollywood, Pacific Coast Highway, and Wilshire/Vermont.
June to November 2018	Project Design Team conducted interviews with Metro departments, including Arts + Design, Environmental Compliance and Sustainability, Facilities Engineering-Operations, Facilities/Property Maintenance (including separate interviews with FM field staff and management), Operations Liaison and Planning, Project Engineering, Rail Transportation, and System Security & Law Enforcement.
September to December 2018	Project Design Team developed initial design concepts.
December 2018	Project Design Team presented initial design concepts to the Metro Working Group.
January 2019	Draft Concept Design Package submitted.
March 2019	Revised Concept Design Package submitted.
April 2019	Final Concept Design Package submitted.
May 2019	Draft Design Documentation Package and White Paper submitted.
October 2019	Revised Design Documentation Package and White Paper submitted.
January 2020	Second Revised Design Documentation Package and White Paper submitted.
February 2020	Final Design Documentation Package submitted.
March 2020	Draft MRDC and Architectural Standard/Directive Drawings updates submitted.



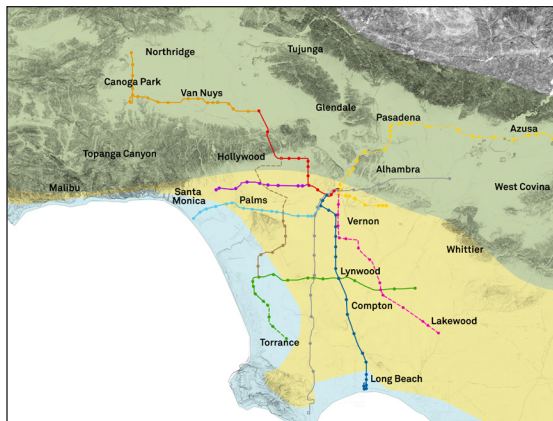
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3.0 Design Solution

In response to the lack of landscaping guidelines for station plazas, the Project Design Team developed recommendations for plant palettes, typical plaza layouts, tree wells and planters. The design solutions are intended to provide landscaping elements that enhance the user experience, reduce maintenance, enhance safety and security at stations, and offer a streamlined set of recommendations to provide consistent design principles across the system.

3.1 Plant Palette Recommendations

A standard plant palette was developed to provide direction on recommended plant species that allow for design flexibility. Recommendations for species are organized into designated microclimate zones based on Sunset Western Garden Collection classifications (Figure 3-1 and 3-2), as well as performance-based solutions. The three microclimate zones identified are coastal, basin, and inland. The four performance-based qualities identified are accent, shade trees, screening, and stormwater. In addition, a list of non-recommended species based on lessons learned by Metro Facilities/Property Maintenance has been provided for consideration in selecting plant species.



Microclimate Zones

- Inland: Sunset Zones 18, 19, 20, 21
- Basin: Sunset Zones 22, 23
- Coastal: Sunset Zone 24

Figure 3-1 Plant palette zones based on Sunset Western Garden Collection classifications.



Coastal Region



Basin Region



Inland Region

Figure 3-2 Plant palette recommendations.



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3.2 Typical Station Plaza Layouts

Plaza layouts for six scenarios are proposed: aerial platform, aerial platform over street, at-grade side platform, at-grade center platform, underground station (Figure 3-3), and underground station with an activated edge. These layouts are to be used as a guideline for developing landscape plans for typical station conditions.

3.3 Tree Wells

Guidelines for four tree well conditions are proposed (Figure 3-4, left to right): flush tree well with stabilized DG, stormwater tree well, raised tree well, and flush tree well with grate. The preferred option is to have flush tree wells with stabilized DG or stormwater tree wells to provide ease of maintenance, and reduce any accessibility issues.

3.4 Planters

Four proposed guidelines for planters are proposed (Figure 3-5, left to right): stormwater planter, standard low planter, standard prefabricated planter, and standard raised planter. The stormwater planter is the preferred option as it provides sustainable water collection on site. For additional information, see “Table 3-1 Key Design Features” on page 8.

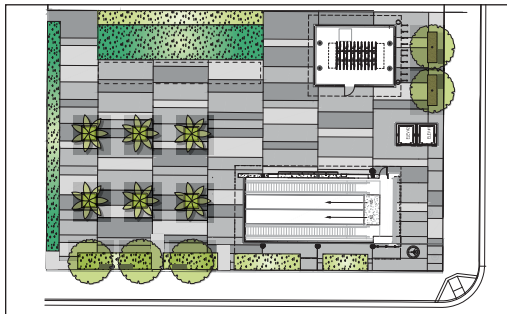


Figure 3-3 Illustrative plan for underground stations.

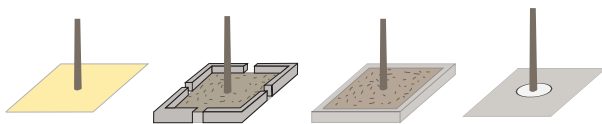


Figure 3-4 Illustrative design solutions for tree wells.



Figure 3-5 Illustrative design solutions for planters.



Figure 3-6 Proposed landscaping with low shrubs and 6' plus tree limbs to ensure clear sightlines at future Bowesville station, Trillium Line Extension Project. City of Ottawa. Courtesy of NORR.

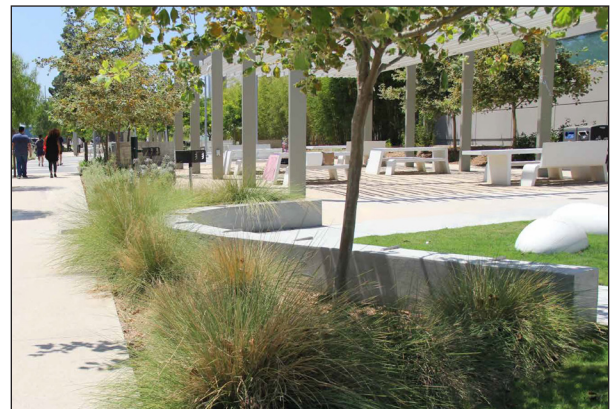


Figure 3-7 California native low groundcover and tall tree canopies provide clear sightlines. Ishihara Park, City of Santa Monica.



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Table 3-1 Key Design Features

Design Feature	Rationale
1. Use palm trees only as an accent tree or station identifier, provided that the distance from the tree to the edge of the trackway is sufficient distance to prevent palm fronds from falling on track or OCS. Palm trees shall not be used as a shade tree.	Palm trees do not typically offer significant shade and can pose a maintenance issue in close proximity to rail operations as a result of yearly pruning of fronds. Further, California only has one native palm species, and many non-native species are not efficient in terms of water use.
2. Locate shade trees at intentional gathering areas, e.g. shade trees with benches along perimeter of transit station plaza at bus stops or pick-up/drop-off areas. Do not place shade trees at the back of station plazas if there are no surrounding active uses.	Placing shade trees only at intentional gathering areas and transfer points provides shading where passengers need it most, and discourages loitering in lower-activity areas.
3. Mulch shall only be used in planters at the back of plazas where it will not cause ongoing maintenance issues.	Pedestrian traffic through planters with mulch can cause the mulch to degrade and spread outside the planter.
4. No trees are to overhang into Metro rail right-of-way or over station portal canopy structure or vents. Provide minimum 10' clearance between mature tree canopy and rail line. Trees may overhang adjacent city property such as sidewalks and open space, provided trees are maintained to avoid branches interfering with traffic movement.	Trees encroaching into the Metro rail right-of-way can cause safety issues for rail operations and increased maintenance requirements.
5. Planter between track and ramp, or track and edge of ROW must be minimum 8' wide where feasible; 10' wide is preferred for tree maintenance access where feasible.	The minimum planter width allows ease for routine maintenance. Narrow planters should contain species that do not spread and will not require ongoing maintenance.
6. Mature tree canopy shall be minimum 10' horizontal distance from the Metro Pin to preserve visibility.	The minimum distance will allow clear sightlines to the Metro Pin from the street and other important vantage points.



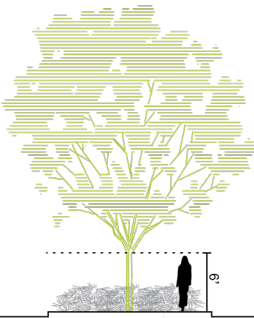
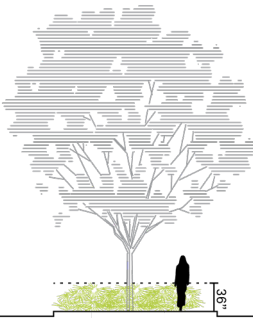
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Design Feature	Rationale
7. Maximum amount of plant species used per station shall be (5) species per station, with the exception of stations that exceed 10,000 SF of planting area. Planting areas beyond 10,000 SF may include (1) additional species per 1,000 SF. When preparing a planting design for stations, plant massings are encouraged. Plant massings shall meet a minimum quantity of no less than (5) individual plants per species in each grouping.	Limiting the total amounts of species used per station will minimize the maintenance requirements per species at each site.
8. Plant palettes specified within this document shall be utilized to select species for specific microclimate zones or performance qualities outlined. Metro discourages use of plants specified on the non-recommended plant palette. Designer to ensure species selection complies with local jurisdiction codes with a preference towards native and drought tolerant species. All plant material shall be replaced with the originally specified species.	Landscaping is an element of design variability. Plant palettes are to allow flexibility depending upon specific station conditions. A pre-approved list with a wide variety of appropriate plant materials will provide variation systemwide as well as assist with project delivery, and sustainability goals.
9. Planter walls shall be designed as cast-in-place concrete with a minimum height of 2'-6" and maximum height of 4'-0", 6" thickness, and matte finish graffiti coating. Walls of the planter to be slanted to discourage sitting, sleeping, or other unwanted activities. Soil depth/volume needed will vary per plant species. Select appropriate species per site conditions and planter wall size.	Minimum and maximum height will allow appropriate soil depth for tree planting and help discourage sitting. Finish will help deter graffiti.



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Design Feature	Rationale
10. All projects shall optimize on-site retention and biofiltration of stormwater quality design volume as required by local building codes. Biofiltration plant material will be selected to tolerate dry and submerged conditions, capture and infiltrate runoff, reduce water flow velocity, and filter particulates.	Optimizing stormwater retention follows agencywide goals to improve station sustainability. Appropriate planting material for stormwater management will ensure successful performance.
11. To maintain a walkable surface where trees are provided, use flush tree well with stabilized DG surface. DG should be used instead of tree grates at property edge, adjacent to bus transfer locations. Ensure specifications of stabilized DG meet ADA requirements. Non-stabilized DG shall not be used. In all other areas, mulch or plantings shall be provided in the tree well. Tree grates to be an exception.	This design approach will reduce tripping hazards and promote open pedestrian travel at the edge of plazas. Stabilized DG meets ADA requirements and reduces maintenance associated with scattering of unstabilized DG.
12. Landscape shall be designed to allow trees and plants to attain their ultimate mature height and spread. To avoid impediments to CCTV camera views and pedestrian access, trees shall be placed and maintained to allow for full camera view at mature size. Tree limbs must be 6' or more above finished surface, and trees must be clear of OCS poles at maturity. To prevent concealment issues, mature shrubs shall not exceed 36" in height (CPTED), except where plants are screening Metro-designated equipment or perimeter walls.	Planting material shall not compromise site safety and security. <div>   </div>



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Design Feature	Rationale
13. Irrigation components such as controllers and backflow preventers shall be located to minimize vandalism, and away from bike parking facilities and shared mobility device parking areas, while also providing easy access by maintenance personnel. Irrigation systems shall be designed to avoid overspray outside of planting areas and conflict with bike shelters and shared mobility device parking areas. Ensure that irrigation equipment is screened from public view.	Irrigation equipment will be easy to access and maintain while providing proper operation and screening.
14. Plants shall be selected from the recommended plant palette for the microclimate zone where the station is located.	Properly selected planting materials will promote environmental adaptability and reduce additional resources to maintain the vibrance of the plantings.
15. Biofiltration plant material shall be selected to tolerate dry and submerged conditions, capture and infiltrate runoff, reduce water flow velocity, and filter particulates.	Appropriate planting material for stormwater management will ensure successful performance.
16. Select plants with moderate growth rates, low maintenance, and natural forming hedge with a mature height less than 3'-0" where visibility is required.	Easily maintainable planting materials will ensure successful performance of plant species while providing clear sightlines.
17. Plants shall provide year-round interest with form, texture, and flowers.	Plants with seasonal interest create a dynamic and attractive landscape throughout the year.
18. If agaves or similar species are provided, they shall be planted such that the distance from the edge of plaza or sidewalk to center of the plant is equal to or greater than the total max spread of the plant.	Proper placement of these planting materials will help avoid injury to passerby from spines and thorns, but will also discourage intrusion into planting beds.
19. Landscape layout and materials shall be designed to allow access for maintenance crews to remove trash without damaging plantings.	To minimize maintenance requirements.



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Design Feature	Rationale
20. Design of station landscaping shall consider and reinforce pedestrian path of travel and ease of access for disabled passengers.	To enhance user experience, provide ease of travel, and provide intuitive wayfinding throughout the station site.
21. Metro standard paving shall be used up to the edge of the property line, and shall not encroach into City right-of-way.	To avoid need for special permits or perpetual maintenance requirements for public sidewalks.
22. All paving and landscaped areas shall have a minimum 1% slope away from all thresholds, including elevators and escalators.	To avoid water intrusion into structures and reduce need for maintenance.
23. Bike storage, bike racks, and bike share stations shall have 5' clearance from planting area.	To ensure ease of access to and around bike racks and prevent damage to landscaped areas.
24. Prohibit use of softscape planting materials, such as turf or other low soft planting material that may encourage loitering.	To avoid loitering, camping, and similar unwanted activities.
25. Specify smaller trees and shrubs near roof canopies.	To avoid damage from the extension of large tree roots to structural elements, such as concrete rebars, and waterproofing.
26. Irrigation equipment shall include a weather-based irrigation controller, master valve, flow sensor, and EZ Flo Fertigation. All drip irrigation shall be in-line drip. Utilize an underground rainwater and runoff capture cistern for on-site irrigation.	To provide the most efficient irrigation system.

Note: This table provides a summary of key features only and is not an exhaustive list of all design features. Project design documentation provides complete details and requirements, and is available upon request.

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METRO SYSTEMWIDE DESIGN

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