



# Streetscape Implementation Plan

*The Mercado Lineal*



JUNE 2017

**BuCu West**  
Where Business Meets Culture



**ACKNOWLEDGMENTS**

*Office of Councilman Paul Lopez*

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 Toole Design Group: Bicycle Planning  
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## INTRODUCTION LETTER FROM BUCU WEST

To Westwood Residents and Stakeholders:

Like many commercial strips developed in the 1960s, Morrison Road suffers from being an arterial road for vehicles only. To help change this function, BuCu West is pleased to propose a Street Implementation Plan to attract businesses and customers, making Morrison Road a destination for both local residents and visitors.

The Morrison Road Streetscape Implementation Plan is an actionable document that

- addresses the major infrastructure issues, impeding economic development and safety along the Morrison Road Corridor
- provides clear steps for achieving a healthy community destination
- supports the development of more local businesses
- provides overall placemaking guidelines and recommendations that identify clear steps for achieving a healthy urban built environment.

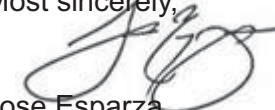
The Morrison Road Streetscape Implementation Plan is designed to be a tool used by the City and County of Denver, Westwood residents, The Consolidated Morrison Road Local Maintenance District, business and property owners, special interests groups, policy-makers, developers, designers and city staff to move towards improving the visual and pedestrian quality of Morrison Road; therefore, improving the economic viability of the neighborhood's safety and well-being.

The Plan is meant to provide a framework that can effectively guide full street reconstruction, corridor development and maintenance over the next 20 years while kick-starting investment with targeted implementation within the next 2 years. Most recently, the City and County of Denver adopted the 2016 Westwood Neighborhood Plan that highlights Morrison Road as the heart of the community and where opportunity for public spaces should be implemented. The vision for Morrison Road reflected in the Morrison Road Streetscape Implementation Plan is derived from a series of cohesive public efforts within the City and County of Denver to transform this important commercial corridor efficiently and inclusively over the next decade.

After three public meetings, technical committee meetings with representatives from city departments including Public Works, Parks, Forestry and the Office of Economic Development, individual stakeholder meetings, and one-on-one conversations with residents and business owners, the Office of Councilman Paul D. López and the consultant team have proposed a preferred design concept for the corridor. The full 1.4 mile corridor has been studied and surveyed leading to a conceptual design that can be fully implemented. We are pleased that the City and County of Denver voter's have approved the 2017 GO Bond, which allocates funding toward phased implementation of your vision for the Mercado Lineal: Morrison Road.

BuCu West thanks you for your commitment to this project and your community.

Most sincerely,



Jose Esparza  
Executive Director, BuCu West

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## PREVIOUS PLANS

Morrison Road has a long history of serving as a commuter route for regional residents. The speed of traffic combined with an arterial street superimposed upon a local street grid has resulted in significant pedestrian safety concerns, which have been studied for decades, as evidenced by the following inventory of existing planning documents:

- Safe Routes to School: Munroe Elementary Walk Audit Report (*WalkDenver 2016*)
- Westwood Neighborhood Plan *City and County of Denver (2016)*
- Morrison Road Streetscape Pre-Design Services BuCu West (*Bowman Engineering 2015*)
- ULI Healthy Places Initiative Westwood Report (*ULI Advisory Services Panel 2013*)
- Sanderson Gulch, Weir Gulch Storm Drainage Master Plan *City and County of Denver*
- Morrison Road Improvements Study *City and County of Denver (Parsons Brinckerhoff 2012)*
- Morrison Road Streetscape Enhancements *City and County of Denver (Carter Burgess 2008)*
- Morrison Road Selected Areas b/w Stuart and Alameda *City and County of Denver (Carter Burgess 2005)*
- Morrison Road Corridor Study *City and County of Denver (FHU 2003)*
- Morrison Road Roadway Plan *City and County of Denver (FHU 2003)*
- Morrison Road Conceptual Vision Plan *City and County of Denver (Christopher Smith 2000)*
- Morrison Road Framework Plan For Redevelopment *City and County of Denver*
- Southwest Quadrant Transportation Study *City and County of Denver (FHU 1991)*
- Morrison Denver Land Use and Transportation Plan *City and County of Denver (Calthorpe 2001)*

Additional information regarding planning context including concurrent plans can be found in the Westwood Neighborhood Plan (page 14) and [https://www.denvergov.org/content/dam/denvergov/Portals/646/documents/planning/Plans/Westwood\\_Neighborhood\\_Plan.pdf](https://www.denvergov.org/content/dam/denvergov/Portals/646/documents/planning/Plans/Westwood_Neighborhood_Plan.pdf)



## WESTWOOD NEIGHBORHOOD PLAN

“The Westwood Neighborhood Plan outlines the vision, recommendations, and implementation strategies for evolution and enhancement of the community, and builds on the area’s rich and storied past while setting the course for an even brighter future. The Plan provides a sound policy basis for a thriving neighborhood. The recommendations identified in the Plan provide direction to guide day-to-day decision making related to land use, public investment, private development, and partnerships. The Plan is intended to give the latitude needed to pursue unforeseen opportunities that will arise and to respond to new challenges over the coming years.

A concerted and collaborative alignment of resources is necessary for the neighborhood to attain its vision. The City and County of Denver, relevant local and State government agencies, non-profit stakeholders, residents, business and property owners, and other key parties must all be strong partners in moving the neighborhood forward.

The Neighborhood Plan proposes new transformative projects, as well as a number of smaller, “tactical” projects, which when implemented will also prove to be transformational for the neighborhood.”

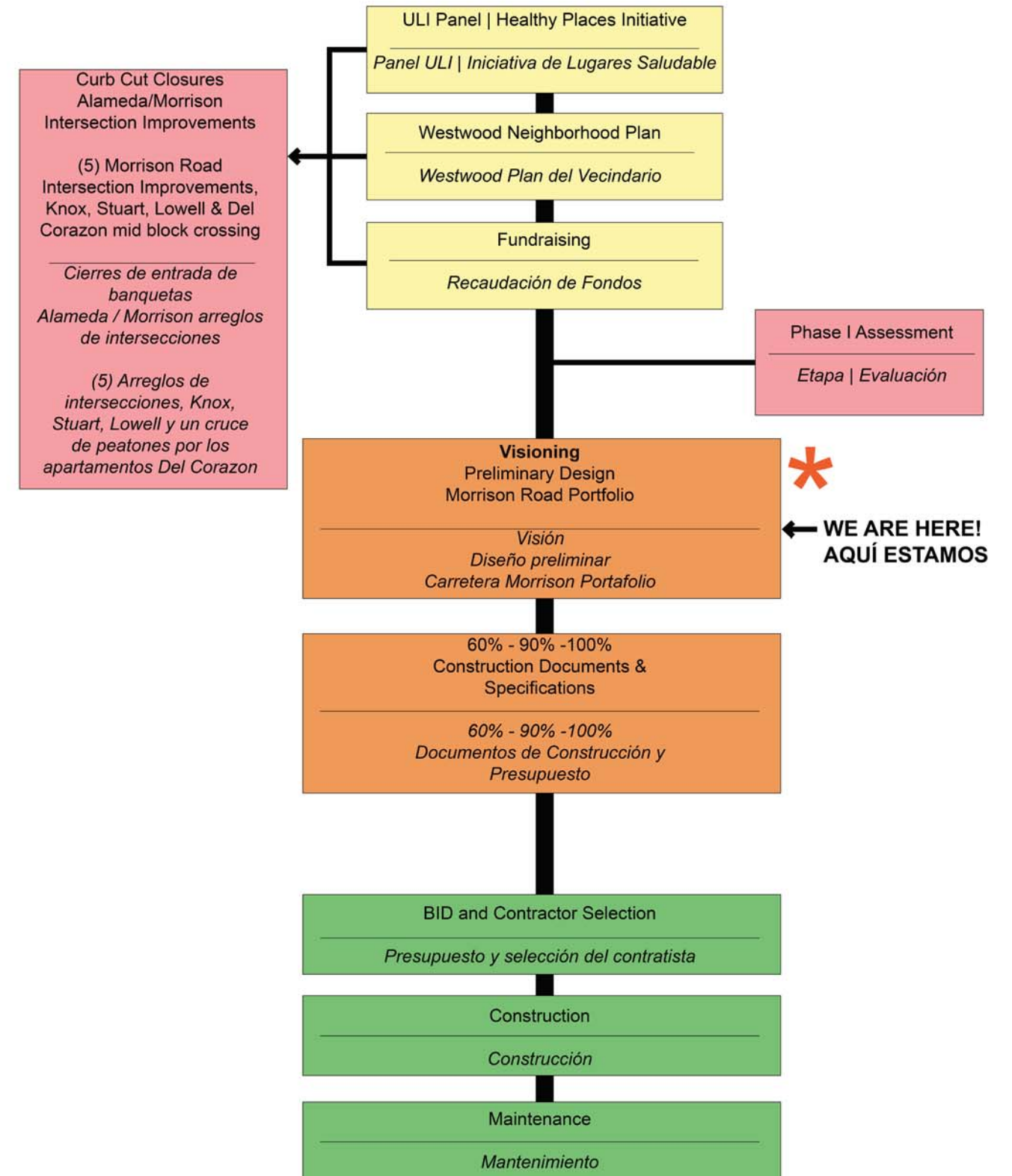
Morrison Road, and the need to improve mobility for all users, is listed as Transformative Project #1, and lists a series of recommendations that improve pedestrian safety, along the length of the corridor.

## PROCESS OVERVIEW

### MORRISON ROAD IMPLEMENTATION PLAN

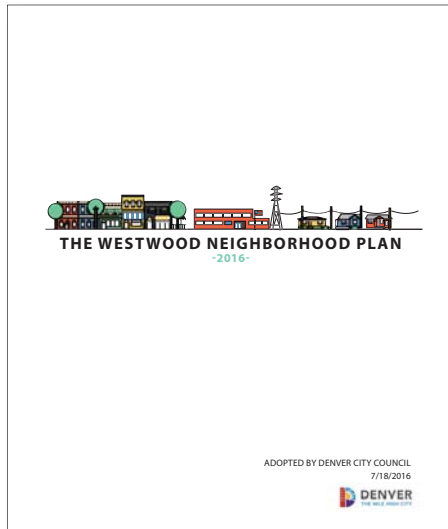
## THE BIG PICTURE: PROCESS OVERVIEW

### DESCRIPCIÓN DEL PROCESO





## PROJECT AREA



Westwood Neighborhood Plan

In the 2016 Westwood Neighborhood Plan, Morrison Road was identified as one of six projects necessary to positively transform the Westwood Neighborhood, and when implemented will “have a catalytic effect on the neighborhood.” The vision for Morrison Road involves the reconstruction of the right-of-way to improve pedestrian safety, stimulate redevelopment that propel opportunities for locally owned and operated businesses, and serve as the primary commercial district for the Westwood neighborhood. BuCu West contracted the StudioCPG Consultant Team to conduct a visioning process for the Morrison Road corridor. The purpose of the Morrison Road Streetscape Implementation Plan (MRSIP) was to develop solutions to improve pedestrian safety along and across the street and implement infrastructure improvements to improve the health, sustainability and visual appeal of the corridor, resulting in a local street flanked by residential opportunities for all residents and locally owned business that reflect the vision of a Mercado Lineal.

### PROJECT GOALS AND OBJECTIVES

The design process was guided by the following project goals:

1. Improve **PEDESTRIAN SAFETY** throughout corridor, including each intersection between Alameda and Sheridan.
2. Fulfill **AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS**: all sidewalks must be 5’ wide with no obstructions, including a 5’ “landing” at the top of every handicap ramp on each street corner and at each curb cut along Morrison Road.
3. Regulate and slow vehicular traffic.
4. Ensure that all new streetscape elements, such as furnishings, pedestrian lighting, paving, and gateways reflect the neighborhood’s vision for a **MERCADO LINEAL**.
5. Design improvements for low **MAINTENANCE** and durability – make sure each element of the new streetscape is cost-effective to maintain.
6. Identify opportunities for **GREEN INFRASTRUCTURE** improvements (drainage/water quality) that reflect the community’s vision for **SUSTAINABILITY**.



Visual simulation of proposed Plaza Tejido at the intersection of S. Osceola Street, W. Custer Place and Morrison Road



Visual simulation of proposed Morrison Road

The project area includes the entire length of Morrison Road and accompanying right-of-way as it extends from Alameda Avenue to Sheridan Boulevard. The design process considered adjacent land uses and neighboring public facilities, as well as local and regional bike routes and Safe Routes to School.



Figure 1: Morrison Road Improvements Diagram

### PROJECT SCHEDULE

The Morrison Road Streetscape Implementation Plan was initiated in January 2016 and was intended to be a year-long process. However, in late 2016 the City and County of Denver initiated a public process to identify potential projects to be funded by the 2017 GO Bond, which required voter approval. The decision was made to pause final document production and accelerate cost estimating tasks to prepare detailed cost information to present to GO Bond Transportation and Mobility Committee. Production of final project document resumed in November 2017.

# ENGINEERING FRAMEWORK

The Engineering Framework was completed as part of the initial task in the development of the Morrison Road Streetscape Implementation Plan, and provides detailed information pertaining to existing conditions within and adjacent to the right-of-way. Current and anticipated public and private sector investment along the corridor combined with economic and market fluctuations will mandate verification of existing conditions prior to design refinement and in the preparation of construction documents.

## INTRODUCTION

The Morrison Road Streetscape Implementation Plan (MRSIP) is intended to improve the public realm within the right-of-way for all users. While the movement of vehicles, bicycles and pedestrians along the corridor is of critical importance, providing pedestrian safety improvements at each crossing will create a welcoming environment that connects adjacent residential neighborhoods to Morrison Road – the Mercado Lineal of the Westwood neighborhood.

The one and a half mile stretch of Morrison Road is a multi-purpose corridor that serves as:

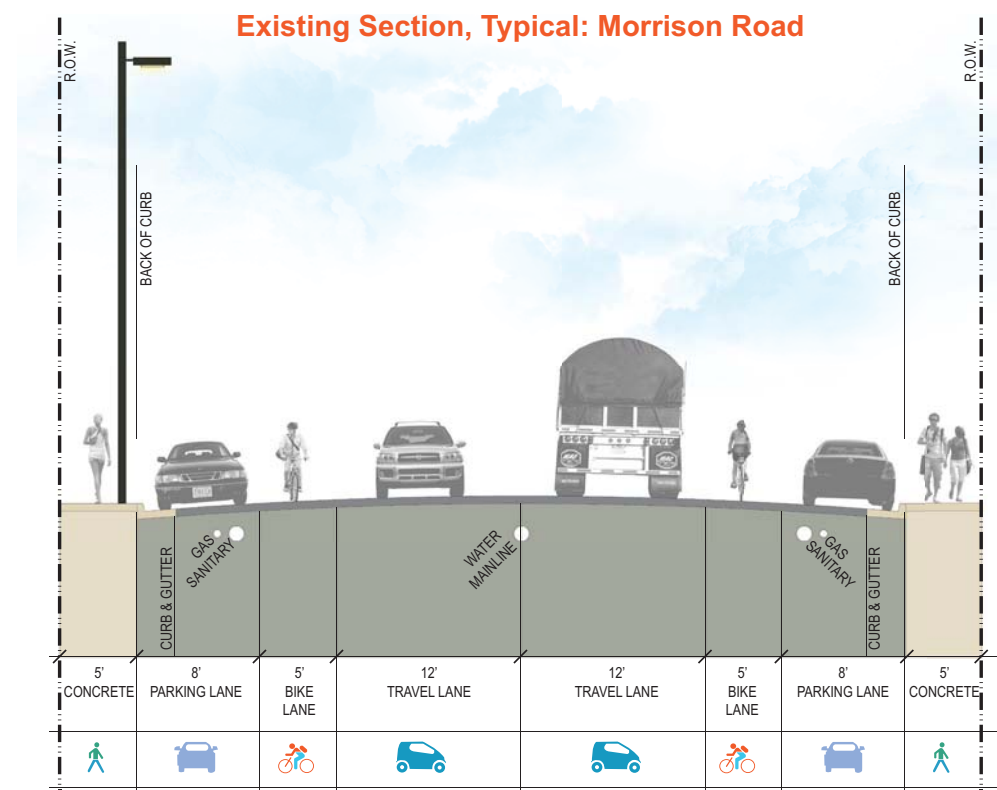
- a commuter shortcut from Alameda Avenue to Sheridan Boulevard, and connects adjacent municipalities to Denver
- a designated bike route offering short segments of delineated bicycle lanes
- a commercial district that includes on-street parking for easy access to local businesses

Each element (drive lanes, turn lanes, bike lanes, and on-street parking) occur within a narrow right-of-way measuring 60' - 65' from property line to property line, expanding to 94' on the north end of Morrison Road at the Alameda intersection.

The Morrison Road Streetscape Implementation Plan targets two types of improvements:

- Pedestrian safety and visibility in support of new City and County of Denver Vision Zero initiative
- Streetscape design elements that celebrate the cultural heritage of the community and combine to create a mercado lineal for the Westwood neighborhood.

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ENGINEERING FRAMEWORK

Table 1. Block by Block relative condition of Sidewalks and Curb & Gutter

NORTHWEST		
BLOCK	SIDEWALK CONDITION	CURB & GUTTER CONDITION
Sheridan & S. Yates St.	Poor	Poor
S. Yates St. & W. Kentucky Ave.	Fair	Poor
W. Kentucky Ave. & W. Ada Pl.	Fair	Fair
W. Ada Pl. & S. Utica St.	Good	Fair
S. Utica St. & S. Stuart St.	Good	Fair
S. Stuart St. & S. Raleigh St.	Good	Good
S. Raleigh St. & S. Quitman St.	Good	Good
S. Quitman St. & S. Perry St.	Poor	Fair
S. Perry St. W. Virginia Ave.	Fair	Fair
S. Newton St. & S. Meade St.	Fair	Fair
S. Meade St. & S. Lowell Blvd.	Fair	Fair
S. Lowell Blvd. & Alameda Ave	Good	Good
SOUTHEAST		
BLOCK	SIDEWALK CONDITION	CURB & GUTTER CONDITION
Sheridan & Tennessee Ave.	Fair	Fair
Tennessee Ave. & S. Wolff St.	Poor	Poor
S. Wolff St. & W. Kentucky Ave.	Fair	Good
W. Kentucky Ave & W. Ohio Ave.	Poor	Poor
W. Ohio Ave. & W. Walsh Pl.	Fair	Fair
W. Walsh Pl. & S. Quitman St.	Good	Fair
S. Quitman St. & S. Perry St.	Good	Fair
S. Perry St. & S. Patton Ct.	Fair	Good
S. Patton Ct. & W. Custer Pl.	Good	Good
W. Custer Pl. & S. Meade St.	Poor	Poor
S. Meade St. & S. Lowell Blvd.	Fair	Poor
S. Lowell Blvd. & W. Nevada Pl.	Poor	Poor
W. Nevada Pl. & Alameda Ave	Fair	Good

REPAIRS

**Sidewalks:** Safe pedestrian movement requires continuous sidewalks on both sides of the street with even surfaces and minimal slopes. Per CCD standards, the minimum sidewalk width is 5'-0". However, Morrison Road is classified as an arterial by the City and County of Denver, and this street classification typically mandates a wider sidewalk with a minimum dimension of 8'-0". Throughout the corridor, the existing sidewalk is typically 4'-0" in width. Several segments include colored concrete or asphalt strip adjacent to the walk. The relative condition of sidewalks is described in Table 1 as a method for prioritizing repairs.

**Curb and Gutter:** Drainage flows along the corridor are primarily conveyed in the street and are contained by the curb and gutter, which is a critical component of multi-tasking infrastructure. The relative condition of curb and gutter is described in Table 1 as a method for prioritizing repairs.

**Crossings:** Curb ramps support universal access along and across the corridor. Most intersections include crosswalks, but are not constructed to current CCD standards. Reconstruction options are constrained by the limited width of the right-of-way, acute intersection angles and unaligned intersections that are result of a diagonal road being super imposed upon the street grid. The recommended design concept integrates standard curb ramp details into each intersection to promote safety and meet ADA requirements, which may require acquisition small areas of private property to achieve intersection alignment and ADA compliance.

**Sight Triangles:** Pedestrians and bicyclists require unobstructed visibility along the street to ensure their safety, and is imperative to improving pedestrian safety within a constricted right-of-way that is also used by cyclists, vehicles and public transit.

Sight lines are triangular areas designated to remain free of obstructions so that multiple modes of transportation can see one another at a driveway entrance, curb cut, or street intersection. CCD defines three types of sight triangles:

**Intersection Corner Sight Triangles:** The area starting at the convergence of two intersecting streets' flow lines, and running back along each flow line for a total distance of 30 feet must be clear of all encroachments over 30 inches in height (other than traffic control). Also, per CCD Transportation, street trees must be 20' from the property corner at all intersections.

**Pedestrian Sight Triangles:** The area with a 10 foot leg located at the edge of any intersecting driveway or alley and a 10 foot leg located at the back of the sidewalk must remain clear of all encroachments over 30 inches in height, that are 18 inches or greater in width.

**AASHTO Sight Triangles:** Where driveways enter the travel lane, the area of a triangle with legs based on the posted speed limit and a driver's eye being 18' back from the edge of the traveled way, must be clear of all encroachments over 30 inches in height.

Each curb cut/driveway along Morrison Road requires that pedestrians have clear and unimpeded visual access to vehicles emerging from private property into the right of way. Sight lines along the corridor are severely compromised by non-compliant fences and walls located within these sight triangles.

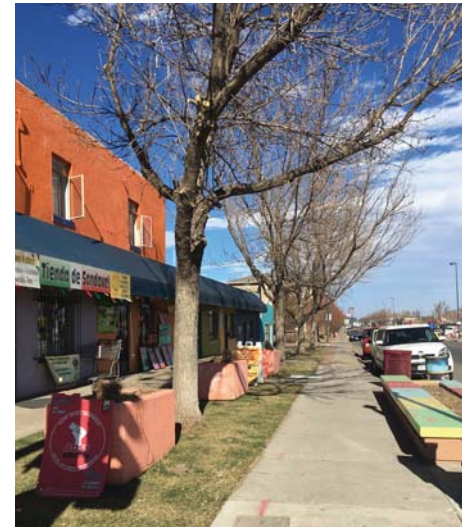
**Roadway:** Issues for repair and improvements are discussed in relation to specific intersections in the subsequent Roadway section.

**Bike Facilities:** A summary of existing conditions and opportunities for bicycle mobility and access in the study area is included in the Bike Facilities section.

IMPROVEMENTS

Prior planning efforts have resulted in important, but fragmented improvements along the corridor, starting with gateways located at either end of Morrison Road. Pedestrian improvements were construction in 2016 and include intersection improvements, pedestrian lighting and medians located within the Community Core. An important component of the MRSIP was ongoing coordination with CCD Public Works to en-

ENGINEERING FRAMEWORK



Existing streetscape at S. Perry Street and Morrison Road



Existing pedestrian crossing at W. Kentucky Avenue and Morrison Road



Existing bike rack at BuCu West on Morrison Road



## ENGINEERING FRAMEWORK



Existing decorative planter, bollard and trash receptacle. All existing planters require hand watering by the Maintenance District.



Existing mural



Existing street tree planting

sure that preliminary design components proposed for the MRSIP were coordinated and integrated with these scheduled improvements. Elements discussed during coordination meetings included pedestrian and vehicular lighting, conduit/borings for future installation of additional pedestrian lights and future irrigation, paving and scoring details to ensure continuity of design elements within the public right-of-way, drive lane, turn lane and on-street parallel parking striping and interface with existing, delineated bike lanes and pedestrian crossings.

Intersections not scheduled for immediate improvements and pedestrian connectivity along the entire corridor are the focus of the MRSIP. A conceptual exploration of opportunities at each intersection is included in the Roadway section of this document. The intersections include:

- South Yates Street
- South Wolff Street
- West Kentucky Avenue
- West Ada Place
- South Utica Street/West Ohio Avenue
- South Patton Street
- South Osceola Street/West Custer Place
- West Virginia Avenue/South Newton Street Intersection
- South Meade Street

**Amenity Zone:** Typical streetscape improvement projects throughout the City and County of Denver include a defined 5'-0" minimum 'amenity zone' - located between the back of curb and the sidewalk - where trees, site furnishings (benches, bike racks, trash cans), pedestrian lights, vehicular lights, and wayfinding/signage are located. The existing Morrison Road right-of-way averages 6'-0" between back of curb and the property line, and must accommodate an unobstructed 5'-0" with a 2% cross slope leaving 1' - 0" for "amenities" - which is not enough width to accommodate important site amenities such as pedestrian lighting and street trees.

**Bulb-Outs:** Existing and proposed bulb-outs support traffic calming, pedestrian safety and provide areas for street trees, water quality/green infrastructure, ornamental plantings and streetscape amenities. The MRSIP identifies additional locations for bulb-outs at intersections and midblock along the Morrison Road corridor.

**Medians:** Medians were constructed in conjunction with recent private redevelopment to support traffic calming and safe pedestrian crossings. Although the medians contain plant material, they are not irrigated nor was conduit provided for future irrigation. The medians will be maintained by Morrison Road Local Maintenance District, and require hand watering.

Extending medians and adding additional bulb-outs along the length of Morrison Road reduces the opportunity for dedicated bike lanes along the corridor because of the existing width of the right-of-way - there isn't enough room to accommodate all the potential elements identi-

## ENGINEERING FRAMEWORK

fied by stakeholders. Both medians and bulbouts will require bicyclists to "share the road" using sharrows (as opposed to having a dedicated bike lane). It should be noted that property owners and business owners advocated strongly for on-street parallel parking to provide parking opportunities for customers and to buffer pedestrians from traffic, which resulted in the need for sharrows as opposed to dedicated bike lanes.

**Site Furnishings:** There is currently no consistent palette of site furnishings along the corridor. The MRSIP defines a palette of streetscape furnishings and amenities to create a consistent character along the length of Morrison Road to support the vision of the Mercado Lineal.

**Public Art:** In June of 2017, the Westwood neighborhood was identified as a Creative District by the State of Colorado, which has exciting and long-term implications for the Morrison Road corridor:

#### WESTWOOD/BUCU CREATIVE DISTRICT

*A Hispanic-centric culture pervades this western Denver neighborhood along Alameda Avenue between Federal and Sheridan boulevards and can be seen in artwork expressed right on the area's light poles, building facades, electrical boxes and trash cans. Colorful murals, especially along Morrison Road, created by local painters display the heritage of generations of Latino artists and new galleries and arts-centric happenings are sprouting up each year. September's Chile Fest showcases the neighborhood at its best, with local food, art, music, dance and a farmers market. (<https://www.colorado.com/articles/colorado-creative-districts>)*

Design refinements for Morrison Road should identify opportunities to integrate public art along the corridor. The initial phases of design refinement and construction funded by the GO Bond will require that 1% of the construction budget be allocated to public art, which will be located within the public right-of-way. Effort should be made by City and County of Denver Arts and Venues to initiate the public art component with 30% Preliminary Design Construction Documents to ensure that opportunities for public art are readily available to the local arts community, and that any potential lighting and irrigation for future art installations are coordinated with the construction documents.

**Plantings:** Streetscape plantings should utilize open planters, trenches, root paths, break out zones, structural cells, or other uncompacted soil volume techniques to provide maximum soil volume.

**Trees:** Locations for planting trees are limited to behind the right-of-way, a 5' - 0" amenity zone, in bulb-outs, and/or medians. Trees behind the right-of-way can be planted 5' from an attached walk. Trees can be planted in medians that are a minimum of 12' wide, with trees planted in the center of an 5' wide planting bed located in the 5' - 0" amenity zone, and spaced at 25' apart, minimum.

**Shrubs/ Groundcovers:** Streetscape shrubs and groundcovers should be the heartiest of plants and withstand heat, salt, magnesium chloride, compaction and foot traffic.

**Planters:** Many private property owners have constructed raised planters adjacent to the right of way, which contributes to the existing character of the corridor. The Maintenance District is responsible for maintaining planters within the right-of-way and property owners are responsible for maintaining planters and other elements that are located on private property.

**Irrigation:** Street tree and planter beds located within the public right-of-way require a permanent irrigation system. Costs for corridor-wide irrigation are included in the Opinion of Probable Costs (Appendix B). Water costs should be considered by the local maintenance district in determining annual assessments. A further discussion of irrigation requirements is included in the Irrigation section.

**Lighting:** A discussion of street and pedestrian lighting is included in the Lighting Section.



## ENGINEERING FRAMEWORK



View from Morrison Road to Downtown



Existing streetscape at Paloma Villa



Existing S. Yates Street and Morrison Rd.

## ROADWAY

Conceptual design focuses on a roughly 1 ½ mile stretch of Morrison Road that runs diagonal to the street grid starting at South Sheridan Boulevard and ending at Alameda Boulevard. This diagonal alignment results in awkward and unsafe intersections that are difficult to maneuver by both pedestrians and vehicles. A consequence of diagonal alignment is that many vehicles use this segment of Morrison Road as a shortcut resulting in increased travel speeds along the length of the entire corridor. In 2016 during the course of this project, the posted speed was reduced from 35 MPH to 30 MPH as a result of repeated requests from business owners and local residents. During public workshops conducted in conjunction with this project, it was suggested that the speed limit should be reduced from 30 MPH to 25 MPH.

Of the 19 intersections along this corridor, seven intersections received traffic calming and streetscape improvements in 2016/2017:

- West Tennessee Avenue
- South Stuart Street
- South Raleigh Street
- South Quitman Street
- South Perry Street
- South Lowell Boulevard
- Alameda Avenue/Knox Court

The MRSIP provide conceptual design for improvements of the remaining intersections to ensure pedestrian safety and continuity along the length of the entire corridor.

The following discussion explores opportunities and constraints related to street reconstruction, modifications to flowlines, drainage and signing and striping at each intersection. This analysis is based on information provided in the Morrison Road Streetscape Pre-Design Engineering Assessment, a topographic survey prepared by Bowman Consulting Group, and on-site field reconnaissance.

**South Yates Street**

South Yates Street is a three-way “T” intersection connecting to the southbound lane of Morrison Road. The pavement at this intersection appears to be in fair to poor condition. There are signs of minor cracking of the existing pavement. The existing curb and gutter shows signs of minor damage.

There are no storm drainage inlets located at this intersection, and due to the roadway cross slope on Morrison Road (which appears to exceed 4% cross slope) and the approach roadway grade of Yates Street, it appears that the drainage along the west side of the intersection turns the corner at Yates and continues north down Yates. With this being a “T” intersection, the drainage along the east side of Morrison Road continues north towards Kentucky Avenue.

The existing intersection configuration has an angle of approximately

## ENGINEERING FRAMEWORK

60 degrees. The *AASHTO Policy on Geometric Design of Highways and Streets 2011* recommends intersecting streets should meet at a 90 degree angle and an intersection alignment should be adjusted to avoid an angle of intersection of less than 60 degrees. While this intersection technically fits within this criteria, investigation of alternatives to modify this intersection configuration to improve access, safety and the angle of intersection resulted in a recommendation to realign the intersection to a 90 degree angle.

The existing curb ramps at this intersection do not meet current Americans with Disabilities (ADA) criteria due to the lack of a four foot landing behind the ramp. Reconstruction of these ramps is recommended and final design should result in compliant intersections that may necessitate acquisition of additional right-of-way to accommodate a new curb ramp.

**South Wolff Street**

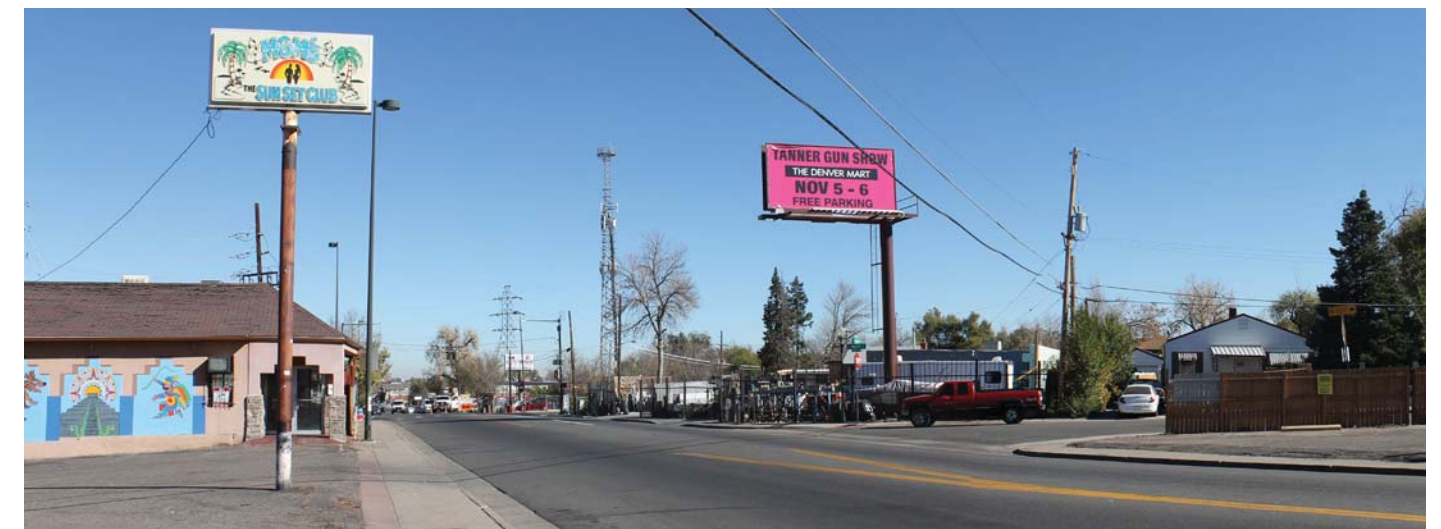
Wolff Street is a “T” intersection along northbound Morrison Road approximately 250 feet south of the Kentucky Avenue intersection. Wolff Street is not a through street, and ends approximately 600 feet south of the intersection. The pavement and curb and gutter at this intersection appear to be in fair condition.

There are no storm drainage inlets located at this intersection, but there is a concrete cross-pan at the intersection. There are signs of water staining in this cross-pan which may be the result of inadequate drainage. Modifications to the existing flowline to improve drainage are recommended. Realignment of this intersection is recommended. While there are curb ramps at this intersection, they do not meet current ADA criteria. Ramp alternatives, including bulb outs should be integrated into final design.

**West Kentucky Avenue**

Kentucky Avenue is a signalized four-way intersection. There are curb ramps at this intersection but they do not appear to meet current ADA criteria. In addition to traffic signal poles, there are also multiple power line poles, utility boxes and fire hydrants that will need to be relocated to accommodate curb ramp and sidewalk improvements.

The 2013 Sanderson Gulch Major Drainage Plan and Flood Hazard Area Delineation prepared by Matrix Design Group, Inc. for the Urban Drainage and Flood Control District (UDFCD) proposes a new outfall system (storm drain) along Kentucky Avenue from South Yates Street to Lowell Avenue and continuing south to Garfield Lake, which will result in significant impacts to the Kentucky Avenue and Morrison Road intersection. It is recommended that any proposed improvements to this intersection be coordinated and constructed with the new outfall system project to minimize impacts to the intersection and to ensure significant pedestrian safety enhancements at all four corners of this intersection.



Existing S. Wolff Street and Morrison Road



## ENGINEERING FRAMEWORK

**West Ada Place**

West Ada Place is a “T” intersection along southbound Morrison Road. The pavement and curb and gutter at this intersection appears to be in fair condition. There appears to be adequate grade along the existing roadway.



Existing W. Kentucky Avenue and Morrison Road intersection

There are no storm drainage inlets located at this intersection, and due to the roadway cross slope on Morrison Road and the approach roadway grade of West Ada Place, it appears that the drainage along the west side of the intersection turns the corner at West Ada Place and continues north down St. Vrain Street. With this being a “T” intersection, the drainage along the east side of Morrison Road continues north towards the inlets at West Ohio Avenue.

The existing intersection configuration has an angle of approximately 60 degrees, which is unsafe for both pedestrian and vehicular traffic. As a result, realignment is recommended to modify this intersection configuration to improve access, safety and the angle of intersection.

There is a curb ramp at the northwest quadrant of the intersection but it does not meet ADA slope and landing criteria. Without providing a curb bulb at this location, right-of-way and modifications to existing properties will be necessary to bring this ramp to current standards.

There is no curb ramp at the southwest quadrant of the intersection. Due to the relatively steep grades around this leg of the intersection, acquisition of additional right-of-way may be necessary to accommodate a new curb ramp.

Due to the relative proximity to the signalized intersection at Kentucky, a right in-right out only configuration should be considered.

**South Utica Street / West Ohio Avenue**

South Utica Street and West Ohio Avenue are two “T” intersections on opposite sides of the street located within approximately 150 feet of each other. The pavement and curb and gutter at these intersections appear to be in fair condition.

There is a double (10 foot) Type 16 inlet located along the east curb line between the intersections. There are no inlets along the west side of Morrison Road with most of the drainage appearing to flow north towards Stuart Street.

## ENGINEERING FRAMEWORK

The South Utica Street existing intersection configuration has an angle that is close to 90 degree, and realignment is recommended. The West Ohio Avenue existing intersection configuration has an angle of 43 degrees, which is unsafe. Due to the proximity of existing buildings at this intersection, a realignment of this intersection could be challenging and costly. However, bulb-outs should be explored during final design to improve pedestrian and vehicular safety.

While there are existing curb ramps at these intersections, they do not meet current ADA criteria due to the lack of a four foot landing behind the ramp. Bulbouts will likely be necessary to bring these ramps into compliance.

**South Patton Court**

South Patton Court is a “T” intersection along northbound Morrison Road approximately 200 feet north of the South Perry Street intersection. The pavement and curb and gutter at this intersection appear to be in fair condition.

There are multiple storm drainage inlets at this intersection. There is a single (5 foot) Type 16 Inlet at the southeast quadrant of the intersection on Morrison Road and a double (10 foot) Type 16 inlet on South Patton Street. There is a single (5 foot) Type 16 Inlet on South Patton Street at the northeast quadrant of the intersection. These inlets collect the drainage running along the east side of Morrison Road. There are no inlets along the west side of Morrison Road at this location with the drainage continuing north to an inlet at the Osceola/Custer intersection.

The existing intersection configuration has an angle of 48 degrees which is unsafe. There are existing curb ramps at this intersection for crossing South Patton Court, not at the Morrison Road crossing. The ramp at the south leg of the intersection appears to meet ADA criteria, but will need to be updated with truncated domes and could benefit from directional design, while the ramp on the north does not meet ADA criteria and will need to be reconstructed. A bulbout at this corner should be explored during final design for street reconstruction. Because of the angle of this intersection, and the proximity to the signalized intersection at Perry Street, adjusting the intersection to remove the left turn movement from Patton Court onto southbound Morrison Road should be evaluated.

**South Osceola Street/ West Custer Place**

The stretch of Morrison Road between this intersection (South Osceola/West Custer) and Meade Street to the north appears to be a sump - a low flat area with roughly one foot of grade change between the 800 feet between these two intersections. Lowering the roadway to improve drainage could prove costly due to multiple underground utilities and existing curb cuts. There are multiple storm drainage inlets along this stretch of road.

There are multiple storm drainage inlets at South Osceola Street/West Custer Place intersection. There is a single (5 foot) Type 16 Inlet at the southeast quadrant of the intersection along with two single (5 foot) Type R inlets at either side of the bulb out at the west side of the intersection. While Morrison Road is relatively flat at this location, there is roughly two feet of grade change east down Osceola and Custer Street at this intersection with more inlets along both roadways.

South Osceola and West Custer Street merge at the Morrison Road right-of-way, resulting in a 70' wide intersection. The MRSIP proposes to close this intersection and use the vacated right-of-way to develop Plaza Tejido. The neighborhood has access to Morrison Road at the nearby Meade Street and South Patton Court intersections. A drainage analysis and traffic impact analysis should be completed in conjunction with final design. Eliminating this dangerous intersection to create a public plaza adjacent to the Morrison Road right-of-way would improve pedestrian safety and create opportunities for local events and public art.



## ENGINEERING FRAMEWORK



Existing S. Osceola Street, W. Custer Place and Morrison Road intersection

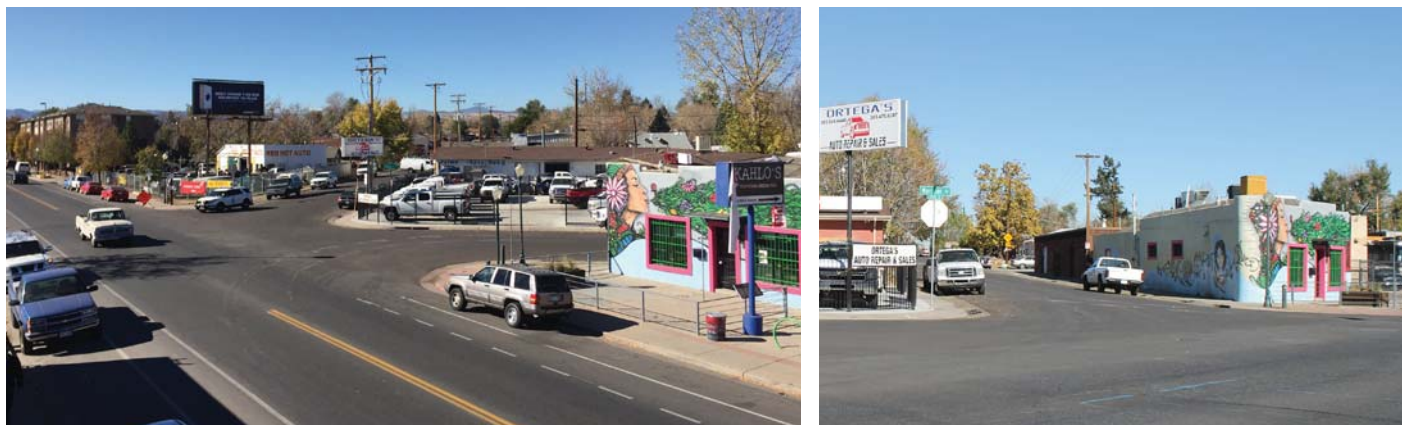
**West Virginia Avenue/South Newton Street Intersection**

West Virginia Avenue and South Newton Street also merge at Morrison Road. Due to the intersecting angle of these two streets, there is an approximately 25' by 100' portion of unchannelized asphalt. While there are stop signs at West Virginia Avenue and South Newton Street, the current configuration allows drivers to make multiple turning movements to and from Morrison Road, West Virginia Avenue and South Newton Street across the unchannelized asphalt. This results in driver confusion and creates significant potential for accidents. Existing curb ramps are spaced over 100' apart. Closure of this intersection would eliminate a dangerous intersection and provide an opportunity to develop Plaza de Artistas, a small public plaza within the existing Morrison Road right-of-way.

There are no inlets along Morrison Road at this intersection, but there are multiple single (5 foot) and double (10 foot) Type 16 inlets along both West Virginia and South Newton Street.

**South Meade Street**

South Meade Street is a four way intersection. The pavement and curb and gutter at this intersection appear to be in fair condition. There are no storm drainage inlets located at this intersection. There is a concrete



Existing S. Newton Street, W. Virginia Avenue and Morrison Road intersection

cross-pan across the west leg of the intersection directing drainage south towards existing inlets. The drainage along the east side of Morrison Road either continues south down Morrison Road or runs east down South Meade Street.

## ENGINEERING FRAMEWORK

While there are curb ramps at these intersections, they do not meet current ADA criteria. Bulbouts are necessary to achieve ADA compliance.

**BICYCLE FACILITIES**

Bicycle infrastructure on Morrison Road currently consists of conventional, non-buffered bicycle lanes adjacent to on-street parking and a segment of the corridor with shared lane markings (sharrows). The city developed dedicated bicycle facilities in 2013 by reallocating pavement width from a center left turn lane.

The bike lanes begin on the north at S. Lowell Boulevard and end at W. Tennessee Avenue on the south, with the shared lane segment located near S. Raleigh Street/S. Stuart Street (750 ft in length). The bike lanes are not continuous at the intersections with S. Perry Street and W. Kentucky Avenue.



Existing S. Meade St. and Morrison Road intersection

**Planned Bicycle Network Connections**

The local and regional bicycle network offers significant opportunities for local and regional connections on bicycle boulevards using streets that align with the north/south and east/west grid of streets. It should be noted that there are limited opportunities along Morrison Road to develop dedicated bicycle lanes, and any subsequent bicycle lanes would need to be fully integrated with priorities identified by MRSIP stakeholders such as wide sidewalks, amenity zones and on-street parallel parking. Existing and proposed bicycle facilities located on the north/south and east/west grid flank Morrison Road on all sides, and should serve as the primary and secondary bicycle routes within the Westwood neighborhood (see Proposed Alternative Bike Route Diagram on page 37).

Existing and planned bicycle connections (proposed under other studies and initiatives) within and adjacent to the project area include:

- S. Knox Court (bike lanes north of Alameda, existing; bicycle boulevard south on Alameda, proposed)
- W. Kentucky Avenue (bike lanes, planned)
- W. Dakota Avenue/S. Meade Street/W. Custer Place/W. Virginia Avenue (bicycle boulevard, planned)
- S. Stuart Street/S. Raleigh Street (bicycle boulevard, planned)

Denver Moves identifies neighborhood bikeways (NBW, formerly known as bicycle boulevards) as streets that are designed to give priority to non-motorized users and discourage through traffic by motorized vehicles. On NBWs, a dedicated lane or shared space within the street (such as a bike lane) is not necessary because non-motorized users' preference is communicated through the roadway design, signage and traffic calming measures. These existing and proposed facilities are shown in Figure 2.



**Potential Trail Connections**

Morrison Road should be connected to the Weir Gulch Trail using shared lane routes on side streets. The best connections are likely to be made from the planned bicycle boulevard on Stuart Street or via W. Ada Place to S. Wolff Street.

**Impacts of Redevelopment**

The segment of Morrison Road near S. Raleigh Street with shared lane markings has a recently constructed concrete raised median, developed in conjunction with newly constructed residential developments flanking Morrison Road (Denver Contract No. 2014-0486-08, Morrison Road Median Design). The design includes a mid-block crossing for pedestrians. Intersection improvements and mid-block bulb-outs will be constructed in this central section of the corridor in 2016 as part of a separate project (Denver Contract No. 2014-0486-08, Denver Pedestrian Improvements – Morrison Road).

The creation of the existing bicycle lanes in other portions of the corridor was achieved by reallocating space from a center left turn lane. Constructing a raised median along this section of the street, which currently has shared lane markings, precludes adding bike lanes to this section in the future without reconstructing the median or sidewalk curbs. Continued redevelopment and construction of similar raised medians will continue to compromise the provision of desired streetscape improvements that require a 5'-0" amenity zone and 5'-0" sidewalk as well as on-street parking in support of local businesses.

Figure 2: Denver Bicycle Facilities Map of Project Area  
(Source: [www.denvergov.org/content/dam/denvergov/Portals/708/documents/Facilities%20Map\\_City\\_36x60.pdf](http://www.denvergov.org/content/dam/denvergov/Portals/708/documents/Facilities%20Map_City_36x60.pdf))



**Potential for Bike Infrastructure Enhancements**

A segmented bicycle facility along Morrison Road has already been implemented, but has not provided the type of safe, user friendly neighborhood bike access that residents are seeking. During public engagement, it was noted that the majority of users are seeking to cross Morrison Road safely, not for access along the corridor. Parents especially stated the need for safer crossings so that their children could ride their bikes to school. During public workshops, local preferences indicated support to transfer dedicated bike routes to the north/south/east/west street grid to leverage the existing grid of dedicated bike facilities, and to reconfigure the street section to prioritize pedestrians, on-street parking and an amenity zone for street trees and furnishings. Residents expressed a preference for pedestrian safety along the corridor, and for safe pedestrian crossings at each intersection. The existing bike lanes on Morrison Road are not continuous and do not provide safe access across important intersections. This is problematic, as approximately 85 percent of bicycle/motor vehicle crashes in Denver occur at intersections.

**South Perry Street**

Due to the width of the existing bulb-outs and the presence of left turn bays at S. Perry Street, there is not adequate pavement width to continue the bike lanes along Morrison Road through the intersection (approximately 32 ft, excluding the parking lane). See Figure 3 for the current configuration of this intersection. Providing continuous bike lanes through this intersection would require eliminating the left turn bays or reducing the width of the bulb-outs, which jeopardizes pedestrian safety. Adding shared lane markings on the through lane approaches to this intersection and an intersection crossing treatment using double chevrons could be a temporary solution for encouraging drivers to share the intersection space with people riding bicycles until street reconstruction is initiated (see Figure 4).



Figure 3: Morrison Road at S. Perry Street - Existing Configuration (Google Earth)



Figure 4: Possible Bike Facility Configuration Intersection Crossing Treatment (Source: NACTO Urban Bikeway Design Guide)



ENGINEERING FRAMEWORK

**West Kentucky Avenue**

Adequate pavement width exists at W. Kentucky Avenue for this intersection to be reconfigured to allow the bike lanes to continue up to and through the intersection (approximately 48' at Kentucky, see Figure 5). Figures 6 and 7 provide images from the MUTCD depicting designs which would allow the bike lanes to be dotted to the intersection. These designs would provide greater delineation of the bike lanes and more comfort for bicyclists riding along the Morrison Road corridor.

Figure 5: Morrison Road at W. Kentucky Avenue - Existing Configuration (Google Earth)



Additional options for bike lane configurations at these intersections could include intersection crossing treatments (see Figures 4 and 9) or combined bike lane/turn lane designs (see Figure 8).

For additional visibility, green paint could be added to the bike lane or crossing treatments in order to draw drivers' attention to the potential presence of people riding bicycles in this area. Figure 9 shows a location in Denver (11th Avenue and Delaware Street) where green paint has been applied for this purpose.

ENGINEERING FRAMEWORK

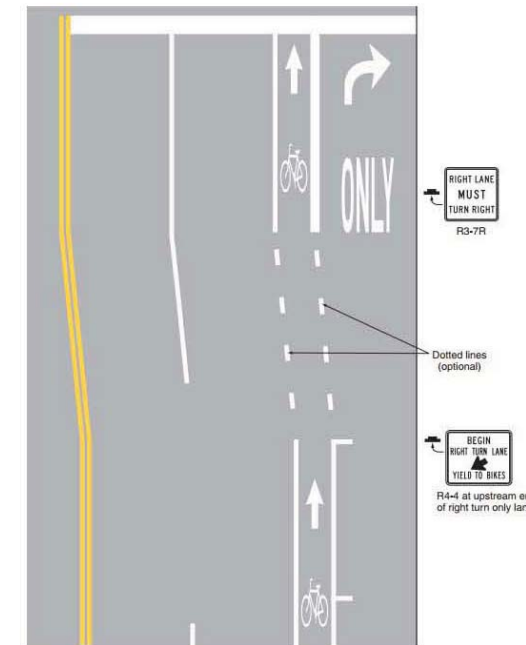


Figure 6: Example of Bicycle Lane Treatment at Parking Lane into a Right Turn Only Lane (MUTCD Figure 9C-5)

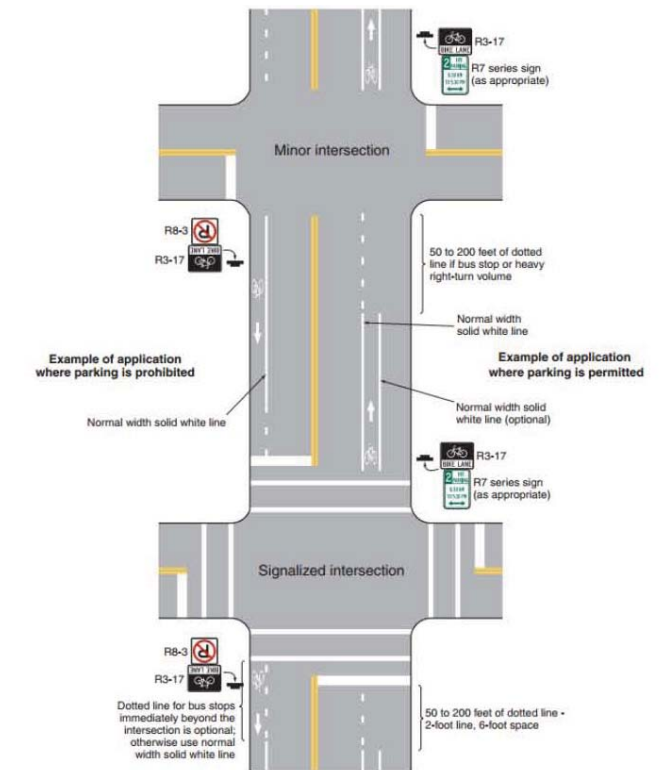


Figure 7: Example of Pavement Markings for Bicycle Lanes on a Two-Way Street (MUTCD Figure 9C-6)



Figure 8: Combined Bike Lane/Turn Lane at Intersection (from NACTO Urban Bikeway Design Guide)



Figure 9: Green Pavement Markings for Bicycle Intersection Crossing: Denver



## ENGINEERING FRAMEWORK

**Connections to the South Knox Court Bicycle Corridor**

One of the critical bicycle connections to Morrison Road exists on the northern end at Knox Court (outside of the project area) to connect to the Knox Court neighborhood bikeway. It is recommended that bicycles be routed to and from Knox Court south of the intersection with Alameda Avenue in order to avoid this automobile-oriented intersection. The Alameda/Morrison Road intersection was recently reconfigured in 2017. To this end, CCD has installed a TOUCAN signal (a signal allowing for pedestrian and bicycle crossings, but restricting vehicle crossings) at the intersection of Knox Court and Alameda Avenue. The MRSIP recommends designing a bypass of the Morrison Road/Alameda Avenue intersection for bicycles that connects Knox Court to southern neighborhood bikeways as shown in Figure 10. The bypass should be clearly marked with wayfinding signs and pavement markings.



Figure 10: Morrison / W. Alameda Ave Intersection (Google Earth). Existing South Knox Court Bicycle Corridor should connect to South Knox Court south of Alameda and leverage the existing north/south street grid to connect to existing and planned bicycle facilities south and east of Morrison Road.

## ENGINEERING FRAMEWORK

**IRRIGATION: CONCEPTUAL DESIGN**

Currently, there is no irrigation along the Morrison Road corridor. Planter beds and medians are hand-watered by the maintenance district. The goal for the MRSIP is to design and implement an irrigation system that will irrigate all plant material within the right-of-way, including public plazas with a focus on water conservation technologies and system efficiency to minimize water consumption and maintenance costs.

The proposed irrigation system should be composed of a combination of equipment to properly cover the ROW landscaped areas. Shrub beds should use low volume drip irrigation for the plant material and the street trees should use low volume deep root bubbler systems. The system should be zoned such that different plant materials, exposures and elevation will be considered and will be irrigated on separate zones.

The source for irrigation will be potable water and should be coordinated during design refinement. There is no purple pipe available.

**Site Water Analysis**

The main hydraulic component in irrigation system design is the identification of the water requirements to irrigate all components within the district. During final design, the irrigation consultant should determine the irrigation water needs for the entire corridor based on a seasonal and peak season flow basis utilizing historical weather data for the area. This information should be utilized to size the irrigation tap (or taps!) required for the build-out of the Morrison Road Streetscape Implementation Plan - from Alameda to Sheridan, and then phased according to GO Bond funding. It is imperative that the irrigation system be designed to accommodate full build out of the entire corridor.

The appropriate backflow device should be located such that it is accessible by the Maintenance District and testing, and should have an approved vandal resistant cover. The irrigation tap assembly should include a master valve and flow sensor that will allow the controller be able to provide information about flow, send alarms and shut down in emergencies.

The mainline and lateral lines should be installed in sleeves, inter-connecting all tree or planting pits. High Density Polyethylene (HDPE) mainline may be considered as an alternate for polymerizing vinyl chloride (PVC) mainline installed in sleeves.

The controller should be an weather based evapotranspiration (ET) based controller, power will need to be coordinated during final design.

**Water Efficient Requirements****Drip Irrigation**

The use of a drip system should be used in all shrub bed areas, no spray type irrigation should be allowed. Minimum requirements will be:

- Pressure compensating emitters, point source
- In-line emitter tubing, grid layout within area
- Pressure regulation at the control valve assembly (min. of 30 PSI, max. 50 PSI)
- Filtration at the control valve assembly (min. 150 mesh)

**Sprinkler Heads**

Pop-up or rotor heads that utilizes high efficiently spray nozzles with an average distribution uniformity (DU) of at least .70. This may include conventional rotors, stream rotators or high efficiency pop-up spray nozzles. The DU must be verified by manufacture documentation or third party tests.

- Minimum pop-up height: 4"
- Sprinkler bodies shall have built in pressure regulating stems and check valves



**ENGINEERING FRAMEWORK**

- Maximum spacing for the sprinkler heads to be head to head (the radius is max. spacing). It would be recommended that the spacing to be determined by reducing the radius by 10% to better accomplish the 70% DU.
- The turf may use a combination of pop-up sprays on areas 25' or less and short to medium range rotors in areas greater than 25'.
- Overspray of hard surfaces and areas outside of the project limits will not be permitted.
- Sprinkler heads will be zoned such that different plant materials, exposures and elevation will be considered and will be irrigated on separate zones.
- Pop-up heads cannot be zoned together with rotator or rotor heads.

**Controllers**

Automatic irrigation system controllers shall be weather based (ET) or soil-moisture based, that automatically adjust irrigation in response to changes in plants' needs as weather conditions change.

- Weather-based (ET) controllers without integral rain sensors or communication systems that account for local rainfall, shall have a separate wired or wireless rain sensor which connects or communicates with the controller.
- Soil-moisture based controllers are not required to have rain sensors.
- Controllers shall have a minimum of 3 programs or schedules and minimum of 3 start times per each schedule or program.
- Web base access to obtain alarms and reports should be required.

**STREET AND PEDESTRIAN LIGHTING**

The current vehicular street lighting locations can be reused, with the option of replacing the existing “hockey puck” style luminaires with improved color and lower maintenance LED alternatives. The existing acorn pedestrian lighting may need to be relocated in order to meet locational and other criteria. Additionally, the current acorn style luminaires should be replaced with LED luminaires, or if funding permits, replaced with the new Morrison Road standard (1130A LED/1130B LED Ripon Series by Sternberg), which was installed in conjunction with the 2017 intersection improvements.

**Light Source**

LED white light sources with color temperatures (CCT) of 3000 – 3500K are recommended. White light offers many benefits when compared to yellow light from High Pressure Sodium (HPS). The ambience is perceived as being brighter and more natural for a pleasant quality and with greater visual clarity for a general feeling of improved comfort and security as recognition of people's faces and other details are visually sharper. This is a critical component to lighting improvements along Morrison Road as it will improve pedestrian visibility at night as well as illuminate both the sidewalk and amenity zone. LED white light sources have better energy efficiency than high-pressure sodium lamps. LED sources can dim for “tuning” the

IES Criteria for streets at 35MPH or above:

Average Luminance (cd/m <sup>2</sup> )	Average Uniformity Ratio (Lave/Lmin)	Maximum Uniformity Ratio (Lmax/Lmin)
0.6	3.5	6.0

appropriate level of light which can also subtly change depending on time of night reducing light levels and saving more energy, which will be cost effective for the Maintenance District. White light is a superior choice for making streets safe, comfortable and enjoyable during night hours, and LEDs are desirable for energy efficiency, controllability, and lower maintenance.

**ENGINEERING FRAMEWORK**

**Dark-Sky Luminaires**

Dark-Sky compliance is desired and lighting improvements should adhere to a maximum 3000K CCT without light emitted at angles higher than parallel to horizontal. Dark-Sky luminaires are recommended not only because they will reduce light pollution and sky glow but also reduce the glare potential for both pedestrians

IES Pedestrian Lighting Criteria (continuous layout)

Average Horizontal Illuminance (footcandles)	Minimum Vertical Illuminance (footcandles)	Illuminance Uniformity Ratio (Eave/Emin) - Horizontal
0.5	0.2	4

and drivers, making Morrison Road safer for residents and visitors. Their warm 3000K color light is very comfortable at night in pedestrian-centric communities.

**Street Lighting Criteria**

Since the current speed limit is less than 35 miles per hour, the Illuminating Engineering Society (IES) has no recommendations for luminance or illuminance levels. The consultant team recommends IES criteria for 35 miles per hour and over be used as target values.

**Streetlight Design Recommendations**

- Luminaire performance should be reviewed to verify distribution, light output, color temperature (CCT), and BUG ratings (Backlight Uplight Glare).
- Ideally, the streetlighting should be dark sky friendly (U0 rating), and low glare (G0 or G1), with a CCT matching the pedestrian luminaires to blend in with the overall lighting quality.

**Pedestrian Design Recommendations**

The current Pedestrian Lighting is a decorative “Acorn” style luminaire on a decorative pole.

- All pedestrian lighting will need to be separately metered, installed and maintained by the Maintenance District. New pole spacings may be considered to meet design criteria listed above.

**Luminaires**

Early in the planning process, the consultant team collaborated with BuCu West and City Councilman Paul Lopez to identify a preferred pedestrian light fixture and pole that reflected the desired character of the Mercado Lineal, and that could be installed at intersection scheduled for improvements in 2017. The new Morrison Road standard luminaire is Dark-Sky Compliant (1130A LED/1130B LED Ripon Series by Sternberg).

**Coordination Issues: Future Development**

The consultant team recognizes the need for continuous coordination with representatives from future public and private sector construction projects to ensure continuity and consistency of streetscape improvements and the integration of new construction with preliminary design concepts for Morrison Road street reconstruction and streetscape improvements. Conversely, it is important that a representative from each project be updated regarding the status of the MRSIP and every attempt to ensure that improvements within and/or adjacent to the public right-of-way be coordinated. Items requiring immediate attention include:

- Vehicular Street Lighting
- Pedestrian Lighting
- Borings/Conduit Location
- Paving: Score joints, concrete finish, etc.

## PUBLIC OUTREACH

### INTRODUCTION

The public involvement process for the Morrison Road Streetscape Implementation Plan focused on active engagement of the Westwood community. The consultant team leveraged prior outreach efforts, including the Westwood Neighborhood Plan and the ULI Healthy Places Initiative by using both projects as a springboard for future visioning. BuCu West and the consultant team developed a series of interactive work sessions that allowed participants to provide immediate feedback on evolving alternatives and identify attributes that could be integrated with proposed engineering solutions. The Westwood neighborhood was assured that as design refinement progresses, there will be additional opportunities for public input to ensure that final design reflects the vision of the community.



### BUCU WEST

The BuCu West office on Morrison Road served as the project's information hub, and provided updated information regarding the overall visioning process, public meeting dates, and project information including the Public Survey Questionnaire, Engineering Framework, Streetscape Alternatives and Proposed Refinements. BuCu West served as the primary liaison to the Westwood community, including Morrison Road business owners, property owners, Council District 3 and the City and County of Denver Public Works and other divisions.



### STAKEHOLDER INTERVIEWS

Individual meetings were conducted with Re:Vision, St. Charles Town Company, and Westwood Unidos to provide an opportunity for one-on-one discussion about the interface of the streetscape project with private development and non-profit initiatives. Additionally, BuCu West staff conducted over 65 individual discussions with local residents to identify issues and concerns regarding potential streetscape improvements.



### PUBLIC WORKSHOPS

#### December 2015 Project Overview - BuCu West Gathering

The consultant team prepared a brief presentation regarding the visioning process and project timeline for presentation at the BuCu West year-end celebration. Local residents, property owners and business owners attended and were provided a project schedule.

#### January 2016 Project Launch - Workshop #1

A workshop was conducted on January 28, 2016 at BuCu West offices located on Morrison Road. Property owners, business owners, neighborhood residents, non-profits and city departments assembled for a brief overview of the project process and interactive visioning exercises.

The work session included two exercises to identify existing positive attributes of Morrison Road and desirable outcomes of potential improve-



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PUBLIC OUTREACH



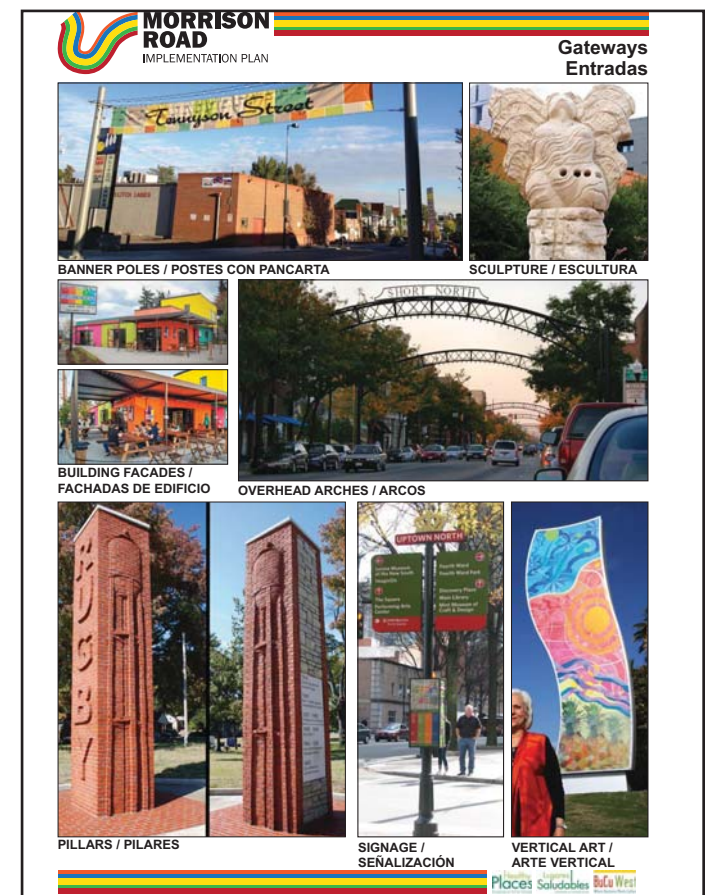
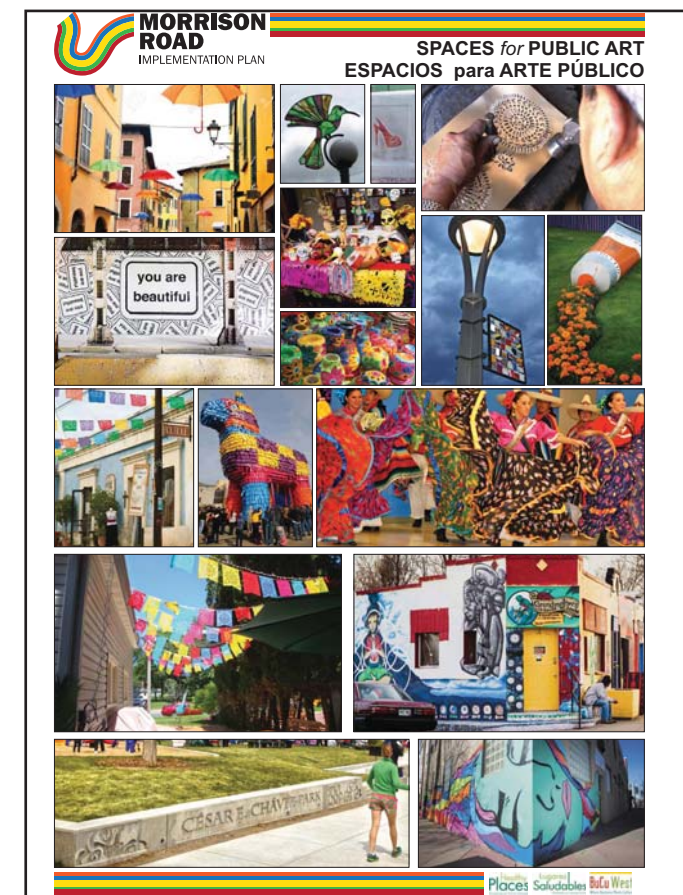
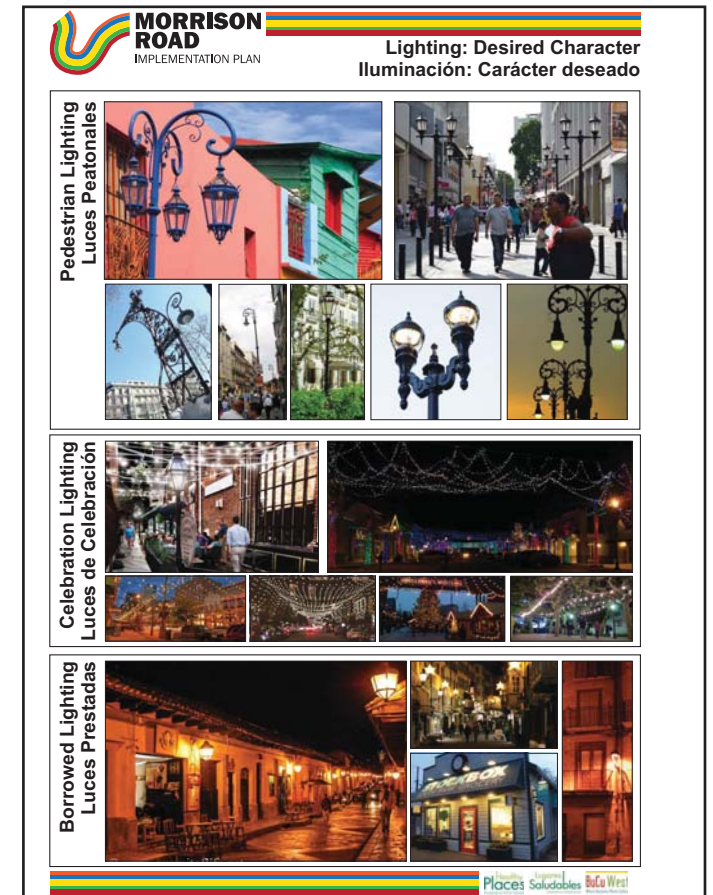
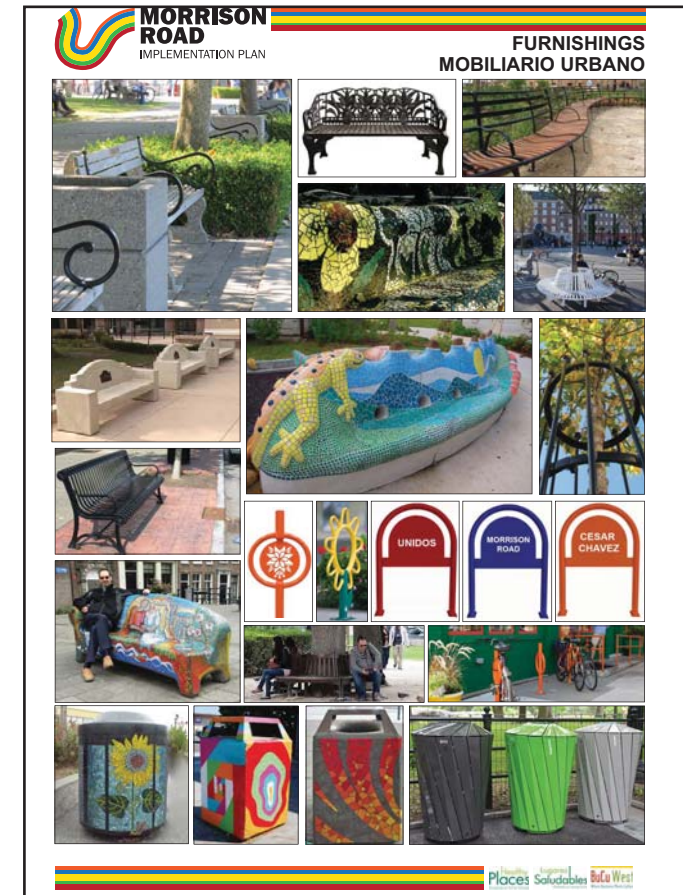
ments, a brief overview of work generated to-date, and an overview of the 25-year planning efforts associated with Morrison Road. The following responses were generated by meeting attendees:

- Murals are an important contributing component to the street.
- Morrison Road transects the entire neighborhood.
- Morrison Road is very colorful and color matters because it expresses the heritage of the community.
- Morrison Road reminds me of where I came from.
- The people and culture: this area is unique to Denver.
- Eclectic uses and the colors are defining characteristics of the street.
- Arts, culture and the diversity of murals define us.
- The views to both the mountains and the city are spectacular.
- The new stoplight at Perry has helped to control traffic speeds.
- The potential of the street and the support we are seeing from the City are exciting.
- Understanding that things are going to change – and are changing!
- The community’s shared goals and vision should be captured and included as part of the improvements.
- Morrison Road is becoming the epicenter of Denver – there is future here!
- What is happening here is exciting – My Dad has owned property here for 60 years and he always had a vision for the corridor, and that this corridor would be great for local businesses and now that is finally happening.
- There is history here!
- People take ownership and pride in knowing the history of this street and our neighborhood.
- This is a diagonal road that creates a lot of unique opportunities, but also a lot of hazards and safety issues.
- The revitalization potential of the street is enormous.
- This is our own downtown here on Morrison Road.
- I am excited about the new fitness center that will offer classes and programs on Morrison Road!
- The people! The people! The people! The people here are wonderful, caring and dedicated to the neighborhood.

**April 2016 Workshop #2**

The primary purpose of the April Workshop was to present the Draft Engineering Framework, and ask workshop participants to identify specific streetscape elements that reflected the desired character of attributes identified in Workshop #1. Image boards were assembled for each of the following elements: Street Safety, Furnishings, Lighting, Gateways,

PUBLIC OUTREACH





## PUBLIC OUTREACH

Public Art and Paving. Participants were asked to identify their preferences. Overwhelmingly, the responses indicated a strong preference for elements that reflected and celebrated the latino culture and an emerging theme based on Mercado Lineal: a safe and welcoming environment that promoted activity along the street edge. An additional component to Workshop #2 focused on maintenance regimes required for upkeep of an urban street, which allowed participants to more fully understand the long-term costs and sustainability of options and preferences.

**June 2016 Workshop #3**

The third workshop focused on integrating engineering solutions to improve pedestrian safety and access along and across Morrison Road. Alternatives were developed that integrated required elements such as ADA compliant walks and ramps with an amenity zone wide enough to accommodate street trees and the preferred streetscape elements identified in Workshop #2. The primary purpose of Workshop #3 was to affirm the priorities and vision regarding streetscape character from Workshop #2, explain how those elements could potentially be integrated and reflected in engineered solutions that improved pedestrian safety, and to solicit feedback from participants regarding the proposed street sections and intersection configurations. Workshop participants moved through a series of stations and were prompted to draw and write directly on graphic enlargements of the entire corridor, individual intersections and street sections. Comments reflected an emphasis on the following elements:

- The street section should accommodate two lanes of traffic and on-street parking as well as pedestrian amenity zone and ADA compliant sidewalks.
- Existing dedicated bike lane should be converted to a sharrow, and north/south and east/west bike routes should compliment the current north/south Knox Court bike route and provide safe connections ACROSS Morrison Road to link residential development to schools, parks, and the Mercado Lineal.
- On street parking should remain to serve both existing and future businesses, and parking regulations should be enforced to prevent long-term parking by both residents and auto-oriented repair businesses.
- Two dangerous angled intersections should be closed (W. Virginia/S Newton and W. Custer Place/S. Osceola) and converted to public plazas for gathering and local celebrations.
- Screening and fencing regulations should be enforced to improve sight lines at angled intersections.
- Safe mid-block crossings for kids and bikes are important to encourage connections from residential development to the Mercado Lineal, and to link to Safe Routes to School in conjunction with Munroe Elementary.



## VISION PLAN

**STREETSCAPE DESIGN CONCEPT**

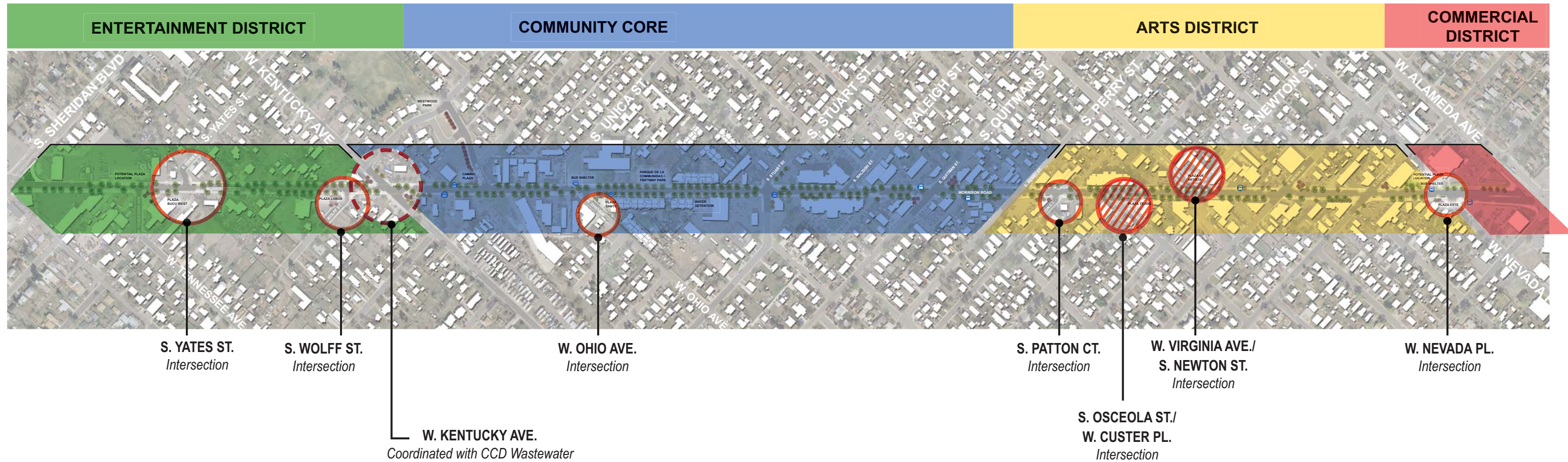
The fundamental component to the proposed design concept for Morrison Road is a reconstructed street section, which accommodates critical elements associated with a revitalized neighborhood commercial corridor, and reflects the community's vision for the Mercado Lineal. The street section includes on-street parking, ADA compliant sidewalks, a 5'-0" amenity zone for street trees and furnishings, and intersection improvements to improve pedestrian safety and visibility. Intersection improvements include bumpouts, the realignment of several "angled" intersections to create "T" intersections, and proposes the closure of two extremely dangerous intersections that are transformed into small public plazas adjacent to the Morrison Road right-of-way.

To fulfill the expectations of the community and to create a pedestrian friendly environment as outlined in the Westwood Neighborhood Plan, the street section should be reconstructed to provide adequate width for ADA compliant sidewalks and an amenity zone, improve pedestrian safety at each intersection and along the length of the entire Morrison Road corridor and reduce traffic speeds.






Visual simulation of proposed design concept for Morrison Road looking northeast towards Downtown Denver





**PROPOSED INTERSECTIONS IMPROVEMENTS**

-  Intersection Reconstruction
-  Intersection Reconstruction and Drainage Improvements coordinated with CCD Wastewater
-  Plaza - Intersection Closure

**PROPOSED DISTRICTS**

In anticipation of phased implementation and due to diverse land uses along the corridor, the study is divided into four districts:

**Commercial District:** The Commercial District extends from W. Alameda Avenue to W. Nevada and serves as the primary entrance to the Mercado Lineal from Downtown Denver and north and eastern neighborhoods. There are currently two large commercial structures with surface parking. The turning movements and traffic signalization promote vehicular access from westbound Alameda, eastbound Alameda and S. Knox Court. The Morrison Road Streetscape Implementation Plan did not include any improvements to the W. Alameda Avenue / Morrison Road intersection as CDOT was in the process of construction improvements to this intersection during the course of this project. The improvements were completed in 2017.

**Arts District:** The Arts District extends from W. Nevada Place to S. Perry Street, and is home to Re:Vision and a significant number of small locally owned businesses.

**Community Core:** The Community Core extends from S. Perry Street to W. Kentucky Avenue and includes Paloma Villas (home to BuCu West) and Del Corazon, a new multi-family developments with significant presence along Morrison Road.

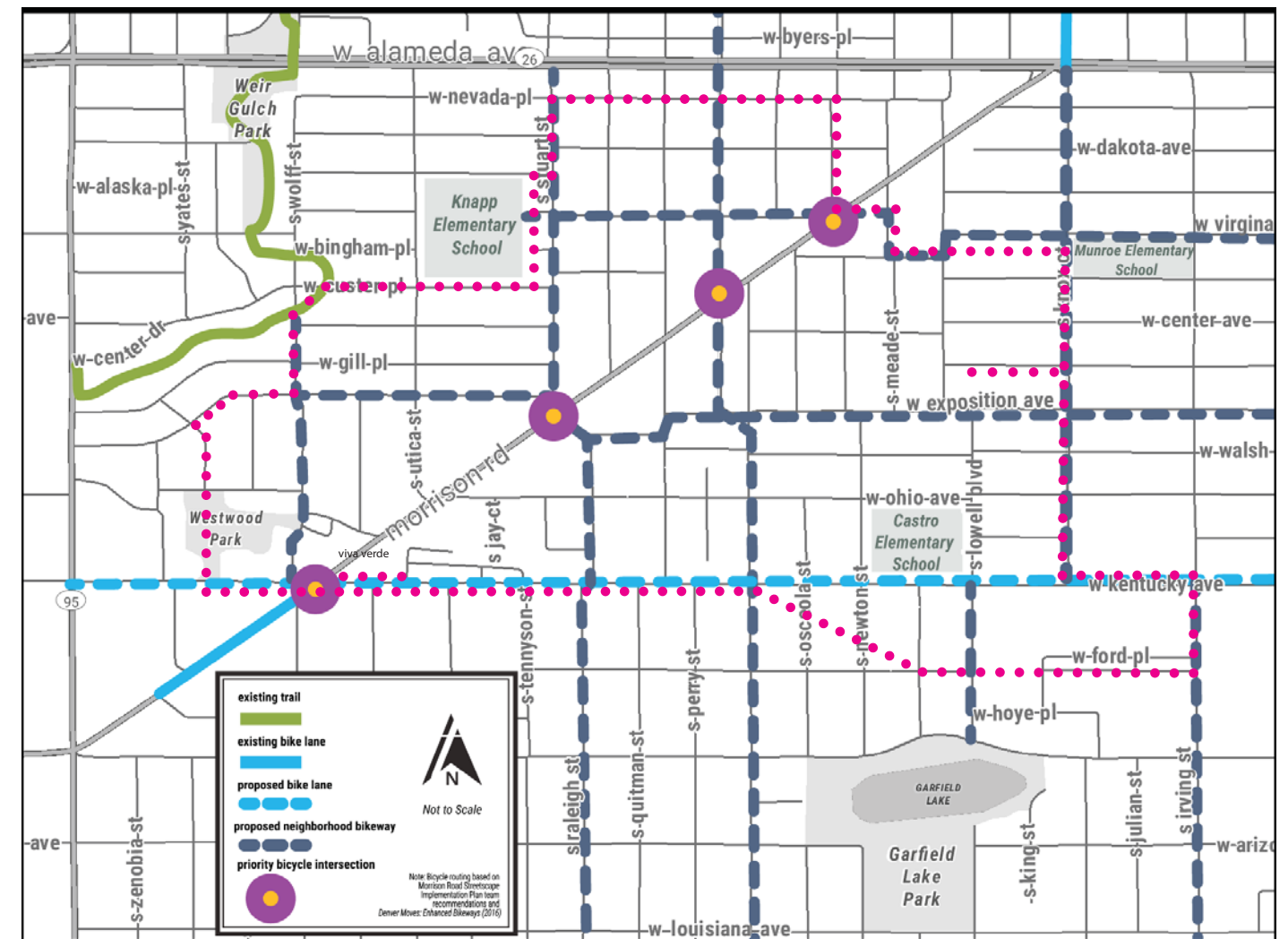
**Entertainment District:** The Entertainment District extends from W. Kentucky Avenue to Sheridan Boulevard and includes a number of restaurants, night-clubs and the Kitchen Network, a commissary kitchen started in 2004.



### BICYCLE ROUTES: LOCAL AND REGIONAL NETWORK

The typical reconstructed street cross section is comprised of sharrow travel lanes, which permit bicycles to share the travel lane with vehicles along a diagonal road that cuts across the established street grid and provides significant opportunities to connect with north/south and east/west bike routes, including W. Virginia Avenue, S. Patton Court, S. Stuart Street and S Wolff Street. It should be noted that workshop participants prioritized on-street parallel parking over dedicated bike lanes along the length of Morrison Road, and identified established north/south and east/west bike routes that leverage the existing street grid as prime opportunities for commuting cyclists. The primary purpose of Morrison Road sharrows is to provide local residents with safe, on-street bike access to local destinations along Morrison Road.

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Proposed Alternative Bike Route Diagram

●●●●●●●● Via Verde Neighborhood Greenway



### RECONSTRUCTED STREET SECTION

The proposed typical cross section for the 60' - 65' Morrison Road right-of-way is comprised of (2) 11'-0" sharrow travel lanes, on street parking (8'-0", both sides of the street), sidewalks (5'-0", both sides of the street) and amenity zones (5'-0", both sides of the street). The amenity zone will accommodate pedestrian lighting, street trees in planter beds, stormwater streetside planters, gateway elements, and furnishings (benches, bike racks, trash/recycling receptacles, wayfinding and regulatory signage). An allowance has also been made for 6" construction easement and 6" curb.

In the Entertainment District, the right-of-way transitions from approximately 60' to over 90', which accommodates vehicular traffic that is crossing and turning off of northbound and southbound Sheridan Boulevard onto Morrison Road. While the street section for the Entertainment District will require further

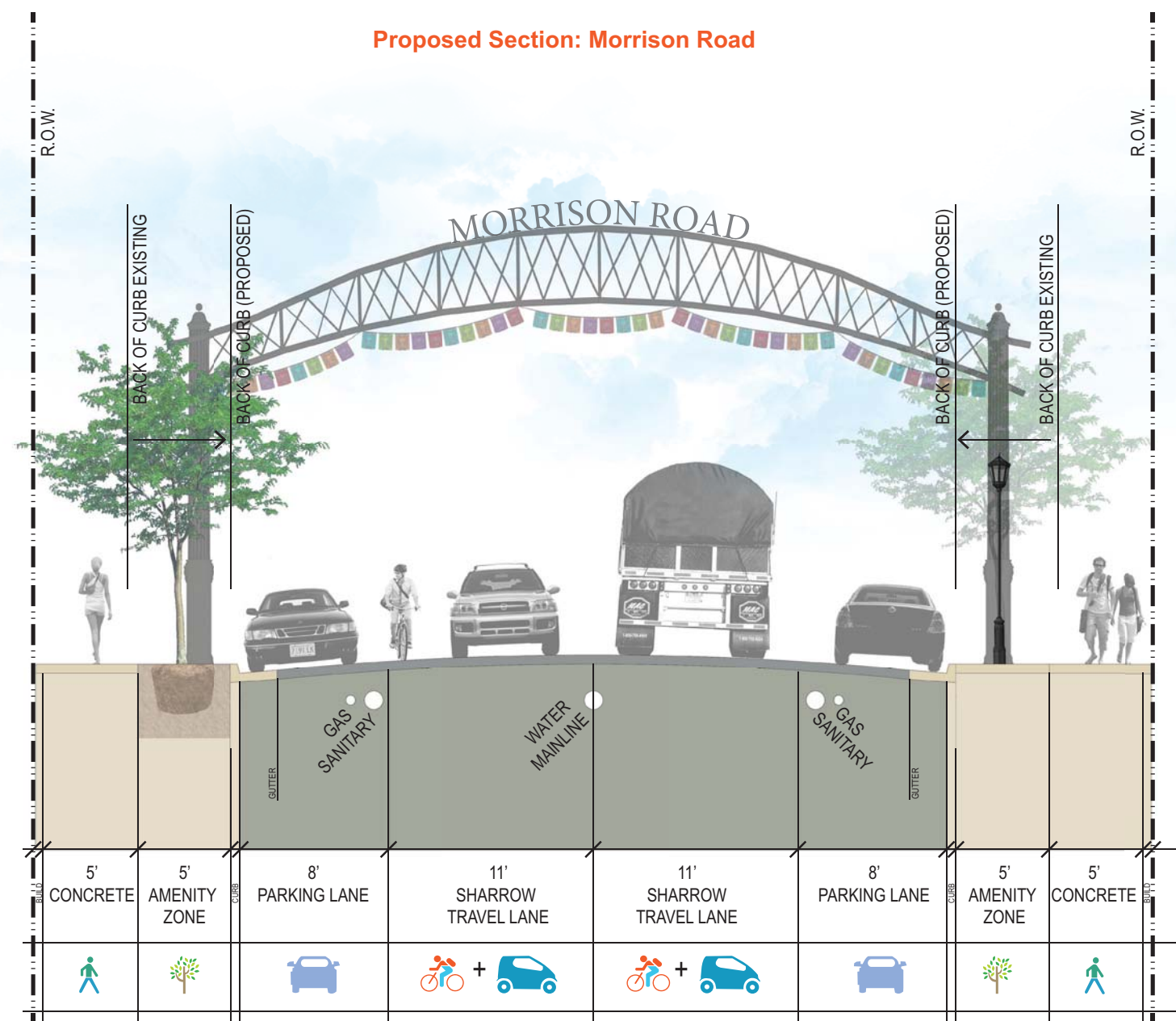
study and coordination with CDOT, it is important to note that the street section in this District should be reconfigured to slow the speed of vehicular traffic entering the corridor from Sheridan Boulevard. The primary focus of streetscape improvements in the Entertainment District is to improve pedestrian safety, lighting, and visibility to create a welcoming environment for residents, business owners, and customers during daytime and evening hours. The concept builds upon existing uses such as dance halls and night clubs, and accommodates new daytime entertainment and retail with additional pedestrian amenities and on-street parking. Unique resources such as the Kitchen Network are encouraged to activate the street plazas with specialty food concepts in order to maximize the redevelopment potential of the District.

### PUBLIC PLAZAS ON MORRISON ROAD

The Morrison Road Streetscape Implementation Process prompted local residents and stakeholders to seek opportunities for public gathering and community celebration within the context of the newly reconfigured street. The concept of locating small plazas adjacent to the public right-of-way was initiated by private development. Re:Vision, Paloma Villa and Del Corazon include small, but useful areas that expand the perceived width of the public right-of-way and provide small areas for use by residents, but are also available and the public. Building upon these initial improvements, design concepts explored opportunities for plazas without the need for negotiation with private property owners by identifying opportunities within the existing right-of-way.

In combination with opportunities to improve pedestrian safety, the proposed closures of S. Osceola Street /W. Custer Place and the W. Virginia Avenue /S. Newton Street intersections create opportunities for small to mid-size public plazas. Realignment of several intersections from acute angle to "T" intersections also create an opportunity for small paved areas along the entire length of Morrison Road. Realignment will generate additional right-of-way on one side of the intersection, which should be designed to accommodate seating, pedestrian lighting and streetscape amenities.

There are two additional opportunities to explore the expansion of the on-street public plaza system. As redevelopment occurs along Morrison Road, individual projects should explore opportunities to align usable and publicly accessible spaces with the right-of-way. This is especially important at the W. Ada Place intersection due to the potential connection between Westwood Park and Morrison Road. The Trust for Public Land works with neighborhoods to purchase parcels that contribute to the health and vitality of a neighborhood, and would be potential partner in exploring options for future acquisitions.

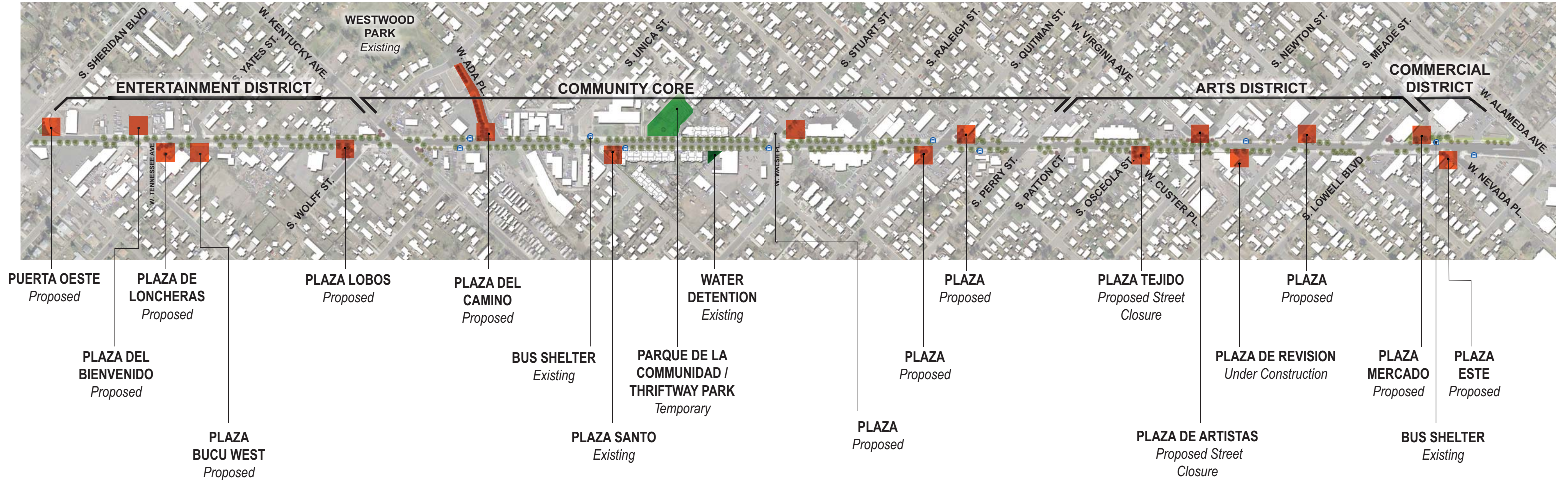


Amenity Zone includes pedestrian lights, planters, street trees, stormwater streetside planters, gateway/ arches, benches, bike racks, trash & recycling receptacles, wayfinding, and signage.





Proposed Plaza Locations on Morrison Road



Visual Simulation: Plaza de Artistas at the current intersection of W. Virginia Avenue and S. Newton Street



Visual Simulation: Plaza Tejido at the current intersection of S. Osceola Street and W. Custer Place





**INTERSECTIONS**

In 2017, several intersections were reconstructed with bumpouts and pedestrian lighting, but the majority of intersections along Morrison Road require significant improvements to promote pedestrian safety, pedestrian visibility and expand opportunities for streetscape amenities such as lighting, street trees and furnishings. Many intersections that bisect the street grid and create acute/obtuse angles can be realigned into “T” intersections. W. Kentucky Avenue is currently signalized and generates significant traffic from Sheridan Boulevard. Future downstream drainage projects at Weir Gulch will eventually require significant upgrades to both the infrastructure and configuration of the Morrison Road / W. Kentucky intersection. Proposed improvements under the MRSIP are minimal, and are intended to improve pedestrian safety and visibility in the short term as the city moves forward with the implementation of the Weir Gulch drainage improvements by the city’s Wastewater Division.



Existing W. Ohio Ave and Morrison Road intersection.

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**West Alameda Avenue**

Intersection improvements at the Morrison Road and W. Alameda Avenue intersection were completed by CDOT in 2017, and opportunities for additional amenities are limited to potential street trees, sidewalk and pedestrian lights.



Scale: 1"=100'-0"

**West Nevada Place**

Intersection improvements at the Morrison Road/W. Nevada Place intersection include realignment of W. Nevada Place to create a “T” intersection and bulbouts to improve pedestrian safety and visibility. There will need to be negotiations with private property owners regarding potential closure of curb cuts in cases where a property has multiple curb cuts or an elongated curb cut.

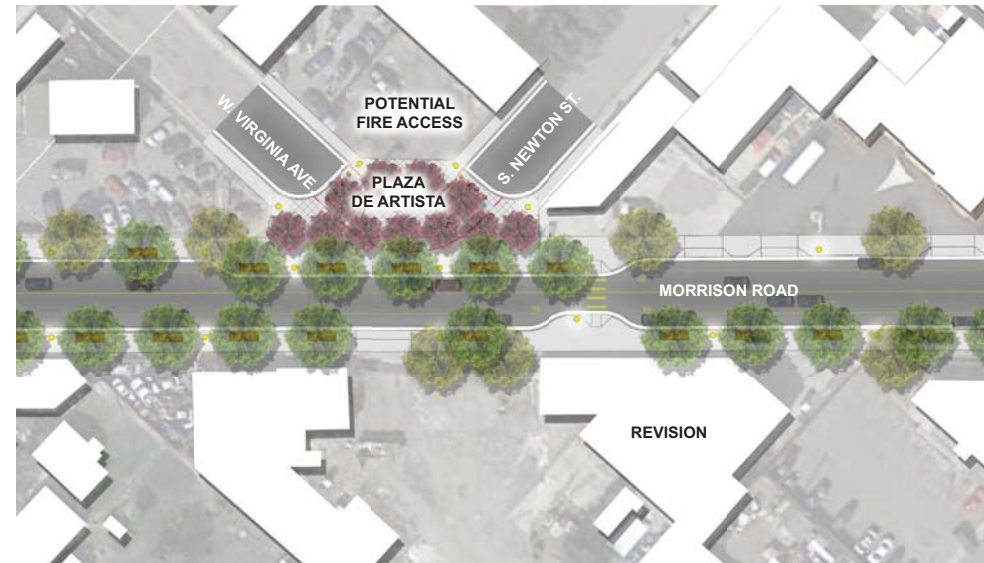


Scale: 1"=100'-0"



VISION

**West Virginia / South Newton Street**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and the W. Virginia Avenue and S. Newton Street intersection include potential closure of this intersection to create "Plaza de Artistas" within the Morrison Road Arts District. A midblock bumpout is proposed in front of Re:Vision to create a safe north/south pedestrian connection between the plaza and Re: Vision.

**South Osceola Street / West Custer Place**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and the S. Osceola Street and W. Custer Place intersection include potential closure of this intersection to create "Plaza Tejido" within the Morrison Road Arts District. A midblock bumpout is proposed east of Paloma III to create a safe north/south pedestrian connection that fulfills the goals of Safe Routes to School associated with Munroe Elementary and WalkDenver's 2016 Walk Audit Report.

**South Patton Court**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and S. Patton Court intersection include realignment of S. Patton Court to create a "T" intersection and bulbouts to improve pedestrian safety and visibility. There will need to be discussions with private property owners regarding potential closure and reduction of overall length of curb cuts that are wider than current standards.

VISION

**South Quitman Street**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and S. Quitman Street intersection include extended bulbouts to allow safe pedestrian crossings on both Morrison Road and S. Quitman Street.

**South Raleigh Street**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and the S. Raleigh Street intersection include a pedestrian refuge, which narrows the drive lanes and slows the turning movements of vehicles headed north on S. Raleigh Street. The intersection includes bumpouts on the north and south side of Morrison Road to improve pedestrian safety and visibility.

**West Walsh Place / South Stuart Street**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and W. Walsh Place and S. Stuart Street intersection include realignment of S. Stuart Street to create a "T" intersection and bulbouts to improve pedestrian safety and visibility. There will need to be negotiations with private property owners regarding potential closure and reduction of overall length of curb cuts that are wider than current standards in cases where a property has multiple curb cuts or an elongated curb cut.



VISION

**West Ohio Avenue and South Utica Street**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and W. Ohio Avenue include the realignment of W. Ohio Avenue to create a "T" intersection. S. Utica Street and W. Ohio Avenue intersections include new extended bumpouts to provide opportunities for aligned pedestrian ramps.

**West Ada Place**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and W. Ada Place are limited due to the existing slope and grades associated with privately owned land. However, West Ada Place links Morrison Road to Westwood Park and way-finding signage and pedestrian lighting are proposed to improve local connectivity. This connection would create an important link within the neighborhood and should be explored as a part of comprehensive neighborhood connectivity improvements.

**South Wolff Street**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and the S. Wolff Street intersection include realignment of S. Wolff Street to create a "T" intersection and bumpouts to improve pedestrian safety and visibility.

VISION

**South Yates and West Tennessee Avenue**



Scale: 1"=100'-0"

Intersection improvements at the Morrison Road and S. Yates Street intersection include the realignment of S. Yates Street to create a "T" intersection and bumpouts to improve pedestrian safety and visibility. Improvements at the W. Tennessee Avenue intersection include bumpouts and amenities that compliment a future food truck court associated with the Kitchen Network and Plaza BuCu West.



VISION



Benches



Circular Bench to be located in plazas



Bollards and Bike Racks

FURNISHINGS

Throughout the conceptual design process, there was a desire to integrate both traditional and colorful elements into the furnishings palette. Workshop participants consistently favored simple design over ornate, contemporary elements. Seating within the proposed public plazas should be designed to limit any potential for cut-through vehicular traffic and there was support for a system of modular cast stone benches with no back or front, allowing 360° use designed to encourage a range of social activity, from two people in conversation to the gathering of larger groups. Configurations can meander around tree trunks under canopy shade and can be used to create garden edging and low walls. The system should be heavy weight, so it can be installed without anchorage, but also serve as a barrier to vehicle access.

There was desire to explore a variety of seating elements, including benches that were integrated with planters. For the plazas, circular benches that wrap around tree trunks and provide seating under the shade of deciduous trees was preferred.

Trash and recycling receptacles, tree guards (to protect street trees planted in the amenity zone adjacent to parallel parking) and bollards were included in the family of streetscape elements.

LIGHTING

Early in the design process, the project team was tasked with identifying options for pedestrian lights to ensure that future installations would match improvements under construction at the start of the project. The light fixture is the **1130A LED/1130B LED Ripon Series by Sternberg** with banner arms and planter arms.



Trash Receptacle



Tree Guards\*



Newly installed pedestrian lighting with banner and planter arms

PUBLIC ART

For many Denver residents, locally installed public art is not only part of the city's regional identity, it serves as a major conduit for engaging local citizens and visitors through art.

Morrison Road business owners and property owners, in collaboration with local Westwood residents, have developed a series of murals that reflect the heritage of the community as well as issues facing the neighborhood and its residents. This local public art program is an important component to the Arts District and serves as a springboard for future opportunities to integrate public art elements into the public realm and the Mercado Lineal. As the streetscape design is refined, opportunities for public art should be integrated into the public right-of-way.

City and County of Denver Arts and Venues should be engaged in the next phase of the design process to ensure local involvement and to coordinate public art opportunities with street reconstruction so that the streetscape design and public art are integrated. Phase I of Morrison Road will be designed and constructed as a GO BOND project, which will require the project to include a "1% for Public Art" element or elements. This component should not be initiated at the conclusion of the project, but rather in tandem with design refinement to more fully engage the artist in the overall streetscape design process, and to ensure that any lighting and/or irrigation necessary to support the art installation are fully integrated with street reconstruction.

WAYFINDING

Wayfinding refers to information and signage systems that guide people through a physical environment and enhance their understanding and experience of a community. Wayfinding is particularly important in built environments such as neighborhoods, commercial districts and transportation corridors. As the built environment becomes more complicated, people need visual cues such as maps and symbols to help guide them to their destinations, public facilities and local and regional attractions. Effective wayfinding systems contribute to a sense of well-being, safety, and security.

In urban settings, wayfinding specialists develop signage and information systems for both pedestrians and motorists, who each have unique challenges navigating streets and roadways. These information systems help people develop "mental maps" of the terrain and simplify their routes to the extent possible.

Morrison Road currently lacks a comprehensive wayfinding system. There are several important local and regional destinations that would benefit from a signage palette that reflects that spirit of the Mercado Lineal.

VISION



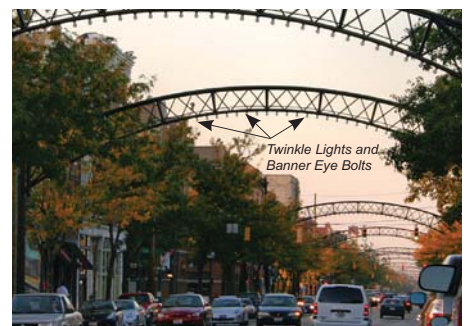
Public Art Opportunities: Should reflect the heritage and colors of the community



Wayfinding and Signage



Planters with integrated seating; Stormwater Streetside planters



Gateways



## VISION



Existing gateway at Sheridan Boulevard



Papel Picados



Twinkle lights at Larimer Square, Denver.

**GREEN INFRASTRUCTURE AND SUSTAINABILITY**

Green infrastructure and sustainability will likely be expressed through ultra urban green infrastructure elements such as streetside stormwater planters. The planters are located in the amenity zone and work as a water quality treatment system. Water flows into the system where it goes through the processes of infiltration, absorption, adsorption and plant uptake, and cleans the water before it enters the underdrain where it then flows into the stormwater sewer.

**GATEWAYS**

A well-known and cherished gateway element exists at the Sheridan/Morrison Road intersection. This is a sculptural element that reflects the cultural heritage of the community. However, there are no gateway or public art elements located at the Alameda/Morrison Road intersection, nor any signage or wayfinding elements to assist visitors in locating local public facilities.

As conceptual design progressed, project stakeholders explored options for gateway elements and expressed a preference for a series of overhead arches that complimented the existing pedestrian streetlights and would create a distinct identity for the Mercado Lineal. Tentative locations for the arches include the eastern edge of the Arts District at W. Nevada Place, the center of the Arts District at one of two of the proposed plazas and one arch in the Community Core and Entertainment District.

Each arch should be designed to include branding elements such as "Morrison Road", "Mercado Lineal" or the name of the adjacent plaza, opportunities to hang papel picados, flags and/or banners and "twinkle" lights that are integrated with the pedestrian light system to activate only at night. As conceptual design and construction budgets are refined, the community should prioritize specific locations for potential gateway elements that can be phased over time due to the projected cost of each element.



Visual Simulation: Proposed Gateway Element

