

DESIGN NARRATIVE

Interstate 70/US 63 Interchange Enhancements

Columbia, Missouri



August 31, 2023

INTRODUCTION

Missouri Department of Transportation (MoDOT) is undertaking a project to reconstruct the Interstate 70 (I-70) and US 63 interchange and construct fly over ramps west of the interchange. The preferred design alternative for the interchange is a Single Point Urban Interchange (SPUI) with fly over ramps connecting US 63 to the south with I-70 to the west. The project also includes improvements at the US 63/Clark Lane intersection north of the highway. The City of Columbia, Chamber of Commerce, Boone County, University of Missouri, and community partners (referred to as CITY) recognize that the interchange project is the opportunity to create a signature gateway into the community. This CITY partnership is funding urban design, hardscape, and landscape enhancements to create a signature entrance to the City of Columbia and Boone County.

FUNDING & NON-PARTICIPATING ENHANCEMENT

The City of Columbia and its partners are allocating three million dollars (\$3,000,000) towards enhancement components that are non-participating items in standard MoDOT interchange projects. Enhancement components are considered upgrades from standard materials and equipment, aesthetic treatments, and landscaping. The CITY understands that maintenance agreements will be required for enhancement components.

PURPOSE OF THE DESIGN NARRATIVE

This design narrative establishes the enhancement components and a palette of materials and plantings for the I-70/63 interchange and that can also be incorporated into other city gateway interchanges and intersections along I-70.

The materials selected for the interchange reflect the architecture of downtown and the higher education campuses in order create civic infrastructure that is enduring, both in material durability and style/aesthetics over time. Materials are also selected to comply with MoDOT requirements. The enhancement components are an upgrade of standard MoDOT construction and pay items for an interchange project.



ALTERNATIVE A

Cost - \$80.3M (2022 \$)
Clark 2045 LOS – C
Clark 2045 Average Delay – 34 seconds
Interchange 2045 LOS – C
Interchange Average Delay – 25 seconds
Conley 2045 LOS – D
Conley Average Delay – 36 seconds

Design-Build
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Improvements at the Connector and I-70 pavement improvements east of Stadium to the Connector are included in the STIP

- NB US63 to WB I-70 & EB I-70 to SB US 63 flyover ramps
- Single Point Urban Interchange (SPUI)
- Improvements at Clark Lane & US 63
- SPUI interchange reduces crashes by 6%
- Cost shown include mainline I-70 widening

It is understood that the project is funded for the MoDOT Design-Build procurement process and could involve an interchange configuration that is different than the preferred SPUI interchange configuration. Therefore, the enhancement design is described in terms of components that can be applied to any interchange configuration. The design narrative describes the intent and expectations for the enhancement funding.

INTERCHANGE ENHANCEMENT CONTEXT

The plan diagram illustrates the interchange enhancement relationships to the existing development context. The new interchange will provide bicycle and pedestrian accommodation across Interstate 70 to provide the missing connections between existing commercial and residential centers on both north and south sides of the highway. Beyond the interchange, the sidewalks and shared use path is intended to connect to the following:

- 1) Commercial centers along Clark Lane.
- 2) Residential areas north and east of the commercial centers and to coordinate with the SS4A project along Clark Lane.
- 3) Hinkson Creek Trail connections north of the interchange.
- 4) Commercial and residential south of the interchange.
- 5) Hinkson Creek Trail connection south of the interchange.

HOW TO USE THE DESIGN NARRATIVE

The content of this document has been guided by a series of meetings with the steering committee, MoDOT leadership, and community engagement. It represents the design direction and outlines the design intent and specifications for each Enhancement Component. The illustrative renderings provide guidance on how each component is to be incorporated and how the components intersect in the design with one another. Image examples provide additional design direction to illustrate the design intent. Components are intended to be applied to interchange designs different than a SPUI to reflect the design intent illustrated in the renderings.



CITY OF COLUMBIA MATERIAL PRECEDENTS

The materials that are selected for the interchange have been inspired by the traditional, contemporary, and transitional architecture and masonry structures of Columbia. The architecture of the city and its higher education campuses are design references for the interchange bridge. They include the following materials:

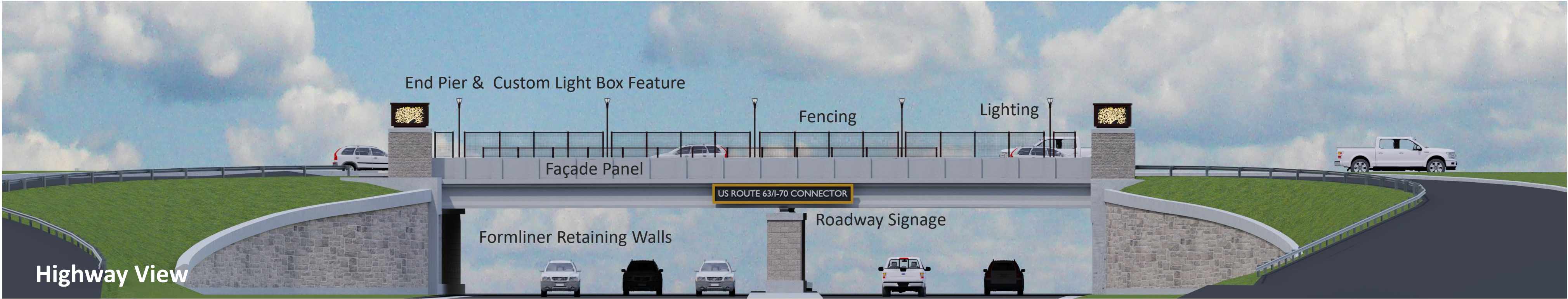
- Traditional and contemporary architecture
- Historic columns
- Buff limestone in ashlar pattern or cut panels
- Buff or white architectural precast
- Red, rust, or rose brick with white or light accents
- Black, bronze or dark accents

The CITY views this interchange as an important opportunity to create new civic infrastructure that will represent the city for decades to come. The primary goals of the appearance of the interchange is that authentic materials are used appropriately, and that the application of materials is enduring over time. Therefore, cast in place and precast concrete have been selected to be compatible with Columbia's limestone buildings and limestone architectural accents. Earth tone clay pavers or micro-exposed aggregate concrete is preferred over red stamped color concrete.

RENDERINGS

The following renderings provide direction on the design intent. Refer to the renderings, design narrative text, and the example images for each component





ENHANCEMENT COMPONENTS

Formliner MSE Retaining Wall – provide curving retaining walls that are setback from each side of I-70 to address the grade change and provide an upper planting area alongside the on and off ramp areas. Use the MoDOT standard ashlar cut stone pattern formliner for all retaining walls. Provide smooth-formed top caps and transitions. REFERENCE: I-270 and Olive Boulevard interchange, Creve Coeur, MO.



Example of ashlar formliner patterns and curved retaining walls

Formliner Bridge Column Wall – provide a formliner wall at the center column support for the bridge. Use the MoDOT standard ashlar cut stone pattern formliner for all retaining walls. Provide smooth-formed top caps and transitions. Alternate: provide a formliner column at each end of the width of the bridge. REFERENCE: I-70 and US 40/Wentzville Parkway interchange, Wentzville, MO.



Formliner wall at the center columns

Formliner Vehicular Barriers/Bridge Facade – provide cast in place or precast concrete barriers per renderings and examples. Panels to have inset panel design. Align the fence panel, post, and lighting pole spacing with the bridge façade panel design per renderings. REFERENCE: I-270 and Olive Boulevard interchange, Creve Coeur, MO.



Example of formliner panels on the pedestrian side of the bridge and the highway side of the bridge.

Concrete Coating – coat all precast and formwork concrete with protective coating for exposed concrete surfaces. Material to be a color coating. Color to be determined but in the buff limestone range. REFERENCE: I-70 and US 40/Wentzville Parkway interchange, Wentzville, MO.



Example of buff colored coating on formliner walls and features

ENHANCEMENT COMPONENTS

Roadway Signage – provide roadway signage at the center and on both sides of the bridge to identify US 63 and 70 Connector . Signage to be dimensional and made up of overlapping multiple panels with raised lettering. Signage colors to be University of Missouri black and gold. Obtain exact colors from the University. REFERENCE: I-64 and Hanley Road bridge, Richmond Heights, MO.

Decorative Fencing – provide semi-custom powder coated steel fencing for surface mounting on the concrete barrier. The fencing design will be standard rectangular or square grid fence panels with custom solid top and bottom rails and posts at the ends of each fence section. Coordinate the post locations with the light pole locations to have 4” of less gap between the fence post and light pole. Light poles can take the place of fence post if light poles are custom square tube type to match dimensions of the fence post. Align the fence panel, post, and lighting pole spacing with the bridge façade panel design per renderings. Material to be USA steel, galvanized and powder coated, lattice or metro design, as manufactured by Ametco or equal. REFERENCE: US 67/N Lindbergh Boulevard and Olive Boulevard interchange, Creve Coeur, MO.

Bike/Ped Barrier - provide semi-custom powder coated steel fencing for surface mounting on the bridge deck at the shared use path. The fencing design will match the decorative fencing on the concrete barrier. REFERENCE: Interstate 270 and Dorsett Road interchange, Maryland Heights, MO.

Light Poles – provide a contemporary and transitional post top luminaire on a round straight pole. The lighting should blend with the various styles of downtown and the campuses without being traditional. Refer to Decorative Fencing/Barrier design information for fencing and light pole coordination. Luminaires to be LED, dark-sky compliant, and full cut off as manufactured by Lumec, UrbanScape LED Post-Top or equal.

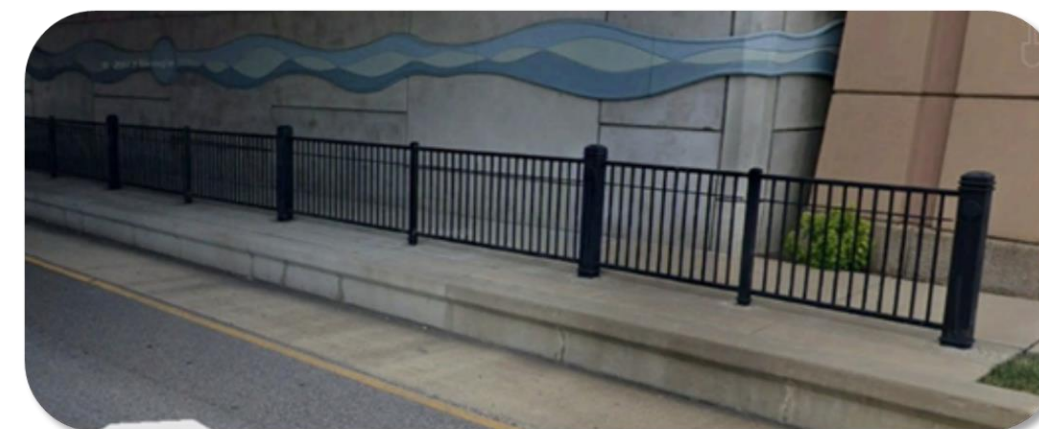
Examples of transitional luminaires and pole combinations that blend with downtown and campus light standards



Example of dimensional roadway signage



Example of grid fencing



Example of bike/ped barrier



ENHANCEMENT COMPONENTS

End Piers – provide four (4) precast end piers to receive concrete barrier/bridge façade and fencing and terminate each end of the bridge. These piers can be designed for areas at grade, beyond the bridge and abutment. They will be at a scale that is large enough to be in proportion with the interchange size and configuration. Each pier will hold a custom light box. Coordinate the pier cap with the design of the light box and lighting components.

Light Box – provide a custom powder coated metal cube fabrication with a solid top and laser cut side panels for each pier. Fabricate the top to have a flat pyramidal roof and overhang lip for drainage management. Fabricate the side panels to have a frame and removable laser cut panels for maintenance access, cleaning, and to be replaced with different designs.

Provide an internal white, translucent and UV resistant light cube with hidden LED and color changing light sources to provide backlighting of the laser cut panels. Design the light cube to be easily removed, cleaned and facilitate light source maintenance and replacement. The panel design will represent the McBaine Burr Oak on the Lewis and Clark National Historic Trail. Refer to example images. The final panel design will be reviewed and approved by the CITY.

Bridge Lighting – provide lighting under the bridge on each side of the bridge girders and on the roadway signage to create a light gateway at the interchange. Provide lighting on the roadway signage. REFERENCE: Michigan City Interchange rendering.



End piers terminate the bridge façade, fencing and bridge



Example images for the light box. McBaine Burr Oak at bottom right



Example of girder lighting under the bridge

ENHANCEMENT COMPONENTS

Decorative Pavement – provide full depth clay pavers and install pavers over the bridge deck with a spray-applied waterproof membrane, concrete base, and polymeric sand setting bed and joints. Pavers to match Downtown Columbia City Hall Streetscape with buff-colored bands and red/brown infill pavers in herringbone pattern. Pavers are to be located at the large islands over the bridge, between the shared use path and the curb, and at nosing on all other islands. Alternate: micro-exposed aggregate concrete with Missouri River pea gravel and river sand or equal. Expose the concrete with a concrete surface retarder such as Select-Etch by Brickform or equal. Exposure depth to be determined but will be in the 1/8” to 3/16” range.

Avoid red colored and stamped concrete that fades to pink.



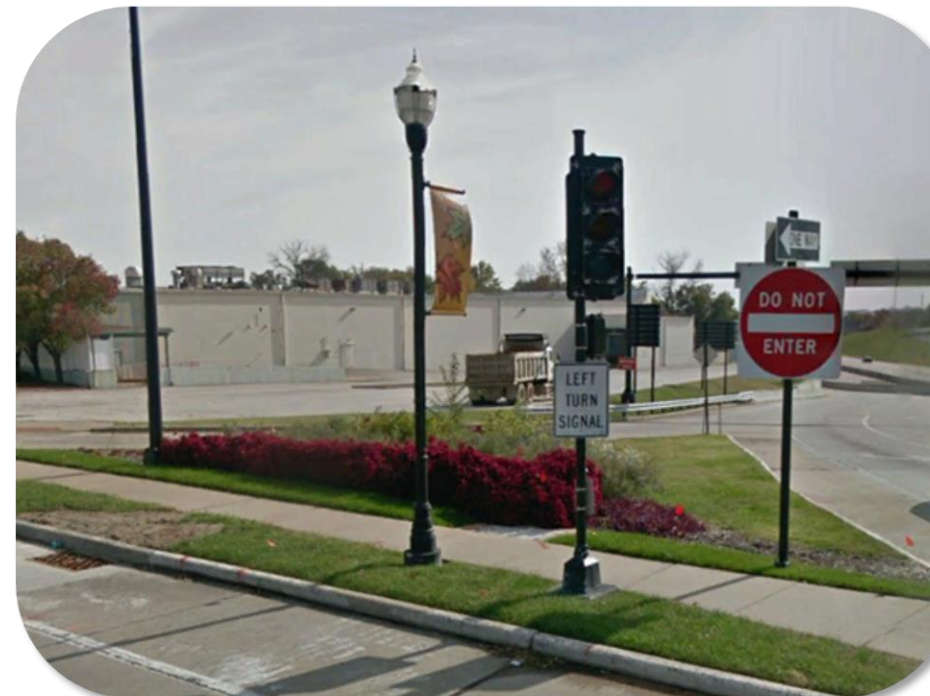
Match red/brown and buff colored pavers at City Hall downtown. Provide bands and herringbone pattern.

Dish Planters – provide precast, fiberglass or GFRC dish planters, 9’ diameter minimum, 18” height minimum with drainage holes such as Nexus Bowl Planter as manufactured by The Chandler Company or equal. Provide drip irrigation to the planters or modular irrigation system by Tournesol Site Works or equal. Fill planters with drainage layer and composted planting mix to support ornamental grasses, perennials and annuals.



Example of large diameter dish planters.

Signage posts, Signals, Equipment and Guardrail Finishes – provide power coated poles, equipment cabinets, hardware, fittings, sign posts, backs of signs, guardrail, etc. Provide tubular metal sign posts. Not u-channel. Final color to be determined. REFERENCE: Interstate 141 and Big Bend interchange, Ballwin, MO.



Example of powder coated signage and light poles .

ENHANCEMENT COMPONENTS

Planting Beds – provide cast in place concrete planter curb, 6” height, 12” depth and 6” wide, to define the planting bed from the lawn areas in the large triangle islands created by the on and off ramps. Excavate construction fill and debris to 30” depth in all planting beds and backfill with composted planting mix to support native and hearty trees, shrubs, perennials, and groundcovers.



Bald Cypress (Future)



Flowering Crabapple



Prairie Dropseed



Native Forbs and Grasses



Concrete Planter Curb

Bald Cypress Grove (Future) – provide Bald Cypress in a grove arrangement on all four triangle islands. Provide ornamental trees above and below the retaining walls. Plantings to be native. REFERENCES: Interstate 141 and Big Bend interchange, Ballwin, MO and I-270 and Olive Boulevard interchange, Creve Coeur, MO.



Example of interchange planting at 141 and Big Bend



Example of Bald Cypress grove at 141 and Big Bend (Bald Cypress Grove is future at this stage)

PARTICIPATING BICYCLE AND PEDESTRIAN ACCOMMODATION

The new interchange will support a fully integrated active transportation network with bicycle and pedestrian accommodation per the City of Columbia and Federal Highway Administration policies and adopted plans. These components are considered prerequisite and not enhancement components. Reference documents include but are not limited to the following:

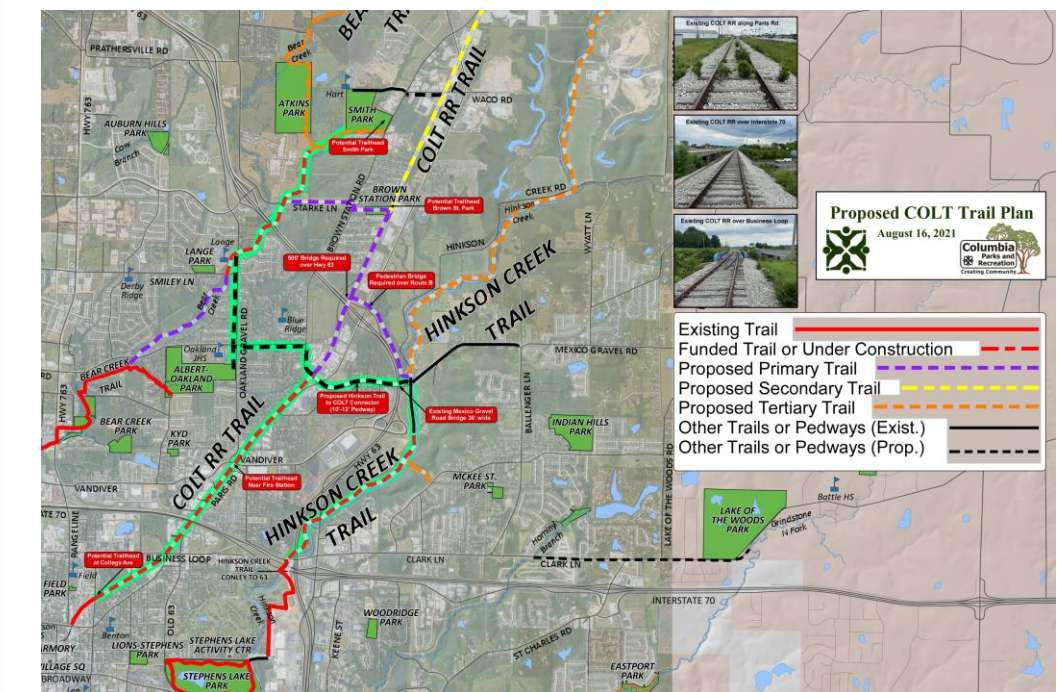
- City of Columbia Vision Zero Policy and Action Plan.
- City of Columbia Complete Streets Policy, 2004.
- City of Columbia Sidewalk Master Plan, 2023 – planned pedestrian connector.
- CATSO Unfunded Needs List – bicycle and pedestrian connectivity at the Interstate 70/US 63 interchange.
- City of Columbia Bicycle/Pedestrian Commission – safe bicycle and pedestrian accommodation at I-70-/US 63 interchange is the commission's top priority.
- City of Columbia Hinkson Creek Trail and all other active transportation network plans
- MoDOT Engineering Policy Guide 642.2, Consideration of Pedestrian Facilities – addressing gaps in the pedestrian network with evidence of foot traffic, mitigation of a man-made barrier, pedestrian access to and from commercial uses and residential areas with low car ownership.
- Federal Highway Administration STEP Initiative, June 9, 2021 – countermeasures to improve pedestrian crossing locations and reduce crashes.

The presence of pedestrians and cyclists along the shoulders of the I-70 Connector demonstrates a current need for safe bicyclist and pedestrian facilities across the interchange. This is also the time to coordinate the Hinkson Creek Trail implementation that is located under the highway, west of the interchange.

The following components are considered participating enhancement components to meet MoDOT and FHWA policy guidance.



Working toward Vision Zero



The Trail Plan includes Hinkson Creek Trail



Cyclists are sharing the road with vehicles on the connector



Pedestrians are using the shoulders and crossing the road between vehicles

PARTICIPATING BICYCLE AND PEDESTRIAN ACCOMMODATION

Shared Use Path – provide a 10' concrete shared use path on the west side of US 63. Locate the path west of the interchange and curb lines to have a 5' minimum buffer. Between travel lanes and the eastern edge of the path. The path will be concrete to provide a smooth and durable path for walking, cycling, micro-mobility and accessible mobility in a suburban setting. The concrete path will extend across the large paver islands on the bridge to identify the path location visually. The concrete shared use path will intersection other sidewalk and trail networks that are existing and/or planned to coordinate with the interchange project.



Concrete shared use path on west side of interchange

Crosswalks and Pavement Markings - provide pedestrian crosswalks both sides of US 63 and a shared use path crosswalks on the west side of the interchange in the north-south direction to traverse the Interstate 70. Provide crosswalks at all vehicular crossings of the SPUI interchange other any other type. The shared use path is planned for the west side of the interchange to facilitate a connection to the Hinkson Creek Trail. The crosswalks will be marked with reflective white and green high-visibility pavement markings such as Transpo Color-Safe MMA or equal.



Pavement markings for shared use path

Crosswalk Lighting – include the lighting of all crosswalk areas in the interchange lighting design.

Pedestrian Pushbuttons and Accessible Pedestrian Signals – provide and mount on 8'-15' posts on each side of the crosswalk. Provide a 15' if pole is also housing a vehicle signal head for the "pull-thru" indication for the dual lefts. All signal elements to be ADA/PROWAG compliant and meet MoDOT's ADA checklist.



Example of pushbutton location for cyclist

Passive Detection for Bicyclists – at the shared use path locations, provide passive detection (radar, video, in-pavement micro radar) to actuate the crossing without the need for a bicyclist to dismount and reach the pedestrian button. Provide pedestrian pushbutton locations that can be reached by both pedestrians and bicyclists while mounted.



Example of in-pavement micro radar detection

CITY INVOLVEMENT AND REVIEW

The CITY understands that design-build teams will evaluate interchange configurations and arrive at their proposal. They understand that these proposals may differ from Alternative A. The CITY is expecting the teams to incorporate the Enhancement Components as described and illustrated to any interchange configuration to reflect the design intent and the enhancement budget.

The CITY will guide the development of the enhancement components of the design-build proposals through multiple meetings with the teams. The members of the current steering committee will remain involved in the project to provide consistent direction and enhancement funding.

Designs and materials will be reviewed with the CITY prior to sign off.

Please coordinate your questions through the MoDOT management team and to arrange a meeting with Lochmueller and the CITY during the proposal phase.

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