The Main Street Bridge - Supporting Transportation Systems

October 28, 2015
So what is the Transportation System
Project Background
SOUTH INNERBELT STUDY
Existing Condition

The Problem

- 44 Ramps in 3.5 Miles (including left side entrances and exits)
- Lack of lane continuity
- 70/71 Overlap
- Congestion
SOUTH INNERBELT STUDY
2001

Highway Safety Program
• 6% Columbus Freeway Miles
• 27% of Columbus Freeway Crashes
• 900 Accidents per year
SOUTH INNERBELT STUDY

Goals

- Improve Safety
- Reduce congestion
Solution had to consider:

- Historic Sites and Neighborhoods
- Downtown businesses, redevelopment & hospitals
- Parks, wetlands and streams
- Neighborhood interest in closing the gap
- Constructability
SOUTH INNERBELT STUDY

Proposed Improvements

FREEWAY IMPROVEMENTS

- Entrances and Exits on the Right
- Eliminate Weaves
- Fix Geometric Configuration & Lane Continuity
- Add Capacity

- Improves safety, traffic flow and accessibility
- Optimizes existing freeway footprint
- Opportunities for gateways, caps and pedestrians
70-71 Innerbelt Downtown Project Components
## Enhancement Funding – Project History

<table>
<thead>
<tr>
<th>Feature</th>
<th>Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainline Highway</td>
<td>Funded from 2% of Project Budget - ODOT</td>
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<tr>
<td>Urban Avenues</td>
<td>Funded from 2% of Project Budget - ODOT</td>
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<tr>
<td>Bridge Crossings “Base Build”</td>
<td>Included in Project Budget – ODOT</td>
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<tr>
<td>Enhanced Bridge Crossings</td>
<td>Funded from Separate Bridge “Cap” Fund – ODOT, MORPC, CITY</td>
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</table>
Main Line Highway ("Trench") Enhancements

- Continues design aesthetic established by I-670 for Innerbelt

Proposed Design Features:
- Patterned Retaining Wall
- Decorative Metal Fencing
- Arched Piers at Crossings
- Full Height Retaining Wall as part of project
Urban Avenue Enhancements

Proposed Design Features:

- Sidewalks & Curb Extensions ("Bump-Outs")
- Street Trees: in Tree Lawn or raised curbed Planting Areas
- Decorative Street Lights & Masts: black Esplanade tear-drop & mast arms
- Trench Edge Buffer Planting: Top soil, shrubs, and ground cover
- Screening Wall: masonry piers w/ black metal fence
- Street Furniture: black metal bike racks, trash receptacles, benches
Bridge Crossing Enhancements

Proposed Design Features:

- Wider Pedestrian Sidewalks
- Bike Accommodations
- Decorative Safety Fence
- Parapet Wall & Decorative Pylons
- Decorative Street Lights & Masts
Overview of Project Bridges –
A Product of Public Involvement
Bridge Crossing Design Goals

Directions from the city and community:

- Hide the Freeway
- Make the Bridge Crossings Inviting
- Use Complete Street Principles
- Integrate Bridge Crossings into Neighborhood Character
Standard Highway Bridge

Main Street - today
Enhanced Bridge

Main Street – as enhanced bridge

Design Features:

- Safer for Pedestrians
  - Wider Sidewalks
  - Removal of Free-flow Ramps

- Attractive Bridge
  - Raised Planters
  - Decorative Parapet Wall and Fence
  - Upgraded Street Lights
  - Upgraded Mast Arms

- Full-Height Retaining Walls
  - Future Cap-capable
Voting Summary – All Groups (June 2007)

<table>
<thead>
<tr>
<th>Bridge Connection</th>
<th>Total Score</th>
<th>(# of red, high priority votes)</th>
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<tbody>
<tr>
<td>Long Street</td>
<td>93</td>
<td>(19)</td>
</tr>
<tr>
<td>Broad Street</td>
<td>90</td>
<td>(18)</td>
</tr>
<tr>
<td>High Street</td>
<td>82</td>
<td>(18)</td>
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<td>Front Street</td>
<td>77</td>
<td>(16)</td>
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<tr>
<td>Main Street</td>
<td>75</td>
<td>(13)</td>
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<tr>
<td>Third Street</td>
<td>68</td>
<td>(10)</td>
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<tr>
<td>Spring Street</td>
<td>66</td>
<td>(11)</td>
</tr>
<tr>
<td>Parsons Ave.</td>
<td>55</td>
<td>(6)</td>
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<tr>
<td>Town St./Bryden Rd.</td>
<td>49</td>
<td>(7)</td>
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<tr>
<td>Oak Street</td>
<td>43</td>
<td>(4)</td>
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<tr>
<td>Fourth Street</td>
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<td>(3)</td>
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<tr>
<td>Grant Avenue</td>
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<td>(3)</td>
</tr>
<tr>
<td>18th Street</td>
<td>12</td>
<td>(2)</td>
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<td>Short Street</td>
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<td>(2)</td>
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Overview of Project Bridges – Phased Implementation
COLUMBUS CROSSROADS PROJECT

Phasing

PHASE 1
I-71/I-670 Interchange

PHASE 3
East Innerbelt

PHASE 2
East Interchange

PHASE 4 - South Innerbelt

PHASE 5
East Freeway

PHASE 6
West Interchange

Phase 6A
Outbound Downtown Connections

Phase 6B
Phase 6C

Phase 6D

Phase 4A
Inbound Downtown Connections

Phase 4B
South Innerbelt

Mound Street Connector
PHASE 1: BRIDGE ENHANCEMENTS (2014)
Spring & Long Street Bridges

Long St. Bridge & Cap

Spring St. Bridge
PHASE 2 BRIDGES
Main, Grant, Parsons, & 18th Bridges
PHASE 2: BRIDGE ENHANCEMENTS
Main, Grant, Parsons, & 18th Bridges

Main St. Bridge

18th St. Bridge

Parsons Ave. Bridge

Grant Ave. Bridge
PHASE 3: BRIDGE ENHANCEMENTS

Broad, Oak, & Town Bridges

Phase 3 Plan View

Town St. Bridge  Oak St. Bridge  Broad St. Bridge
PHASE 4 BRIDGES
Front, High, Third & Fourth Bridges
PHASE 4: BRIDGE ENHANCEMENTS

Proposed Concepts

Front St. Bridge

High St. Bridge

Third St. Bridge

Fourth St. Bridge
Main Street Bridge
Aerial Photograph of Existing Bridge
Main Street Bridge
Proposed Aesthetic Concept
Main Street - Bridge Design Challenges
2009 Type Study – 2 Span Steel Girder

Issues:

- Full Detour Assumed
  - Access Issues with:
    - Children’s Hospital
    - COTA Routes
    - Public Health Center
    - Freeway Ramps

- Minimum Clearance
  - 15’-1 ¼” Provided

At this time, it is assumed that the profiles of Ramp N4 and/or Main Street can be adjusted to make up the 5” deficit during the next stage of plan development.
Revisions:

- Phased construction
- Added pier to reduce depth
- Haunches to increase clearance during construction
Vertical Clearance During Construction

Phase 2
Vertical Clearance During Construction

Phase 3

Parsons Avenue and east abutment shifted east for new I-71 ramp construction
2013 Final Design

Vertical Clearance During Construction:

- 14’-7 ½” to existing pavement
- Milled to 15’-0” minimum
Superstructure Phasing

- Provides one lane each direction, left turn lane to Parsons Avenue, sidewalk
- South sidewalk placed last to provide additional MOT lane width
Substructure Phasing – Phase 1

Sheeting
Braced Cofferdam
Wire Faced MSE
Abutment/Wall Design – “Cap Capable”

- 100 Ft of trench wall designed as “cap capable” for future use
- Resulted in 2.5’ of additional footing width, thicker stem wall
Pier Design

- Piers 1 and 2 designed to act as combined pier/retaining wall
  - Pier 1 = 14.3’
  - Pier 2 = 11.5’
Pier/Bearing Design

- How much wind load is there on a tree?
  - We took our best estimate...
  - Then added more shear blocks!
Pier 1 Design – Microtunnel Coordination

- 54” I.D. Existing Microtunnel
- Approximately 7.7’ from CL Pier 1
- Footing placed 3’ eccentric to column to avoid influence on microtunnel
- Dead load eccentricity and horizontal earth offset each other, making the design efficient
Superstructure Design

- Used two diaphragm types due to variable web depth

- 11’-0” interior and 6’-6” exterior girder spaces to equate loading and camber due to weight of planters
Aesthetic Details – Precast Planters & Fencing

- Precast planters made of 3 simple shapes
  - Large box (P-1)
  - Small box (B-1)
  - Arc (P-3)
Aesthetic Details – Fencing Safety Cable

- Safety cable added inside top fence rail tube and end pilasters
- Concern over pressure from wind-blown tree
Aesthetic Details – Tree Anchors

- Tree root ball stabilized by galvanized steel frame anchored to deck
Summary

Cost Estimate - $9,000,000

Scheduled Sale Date – July 14, 2016

Questions?

Ohio Department of Transportation