VENETIAN CAUSEWAY
(Venetian Way)
Project Development & Environment (PD&E) Study
FROM NORTH BAYSHORE DRIVE TO PURDY AVENUE

FM No. 422713-2-22-01

Efficient Transportation Decision Making (ETDM): 12756

Project Advisory Group (PAG)

Meeting No. 2

February 24, 2015

Florida Department of Transportation - District 6

Project Team

VENETIAN ISLANDS HISTORIC BRIDGES

PROJECT MANAGER
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CONSULTANT PROJECT MANAGER:
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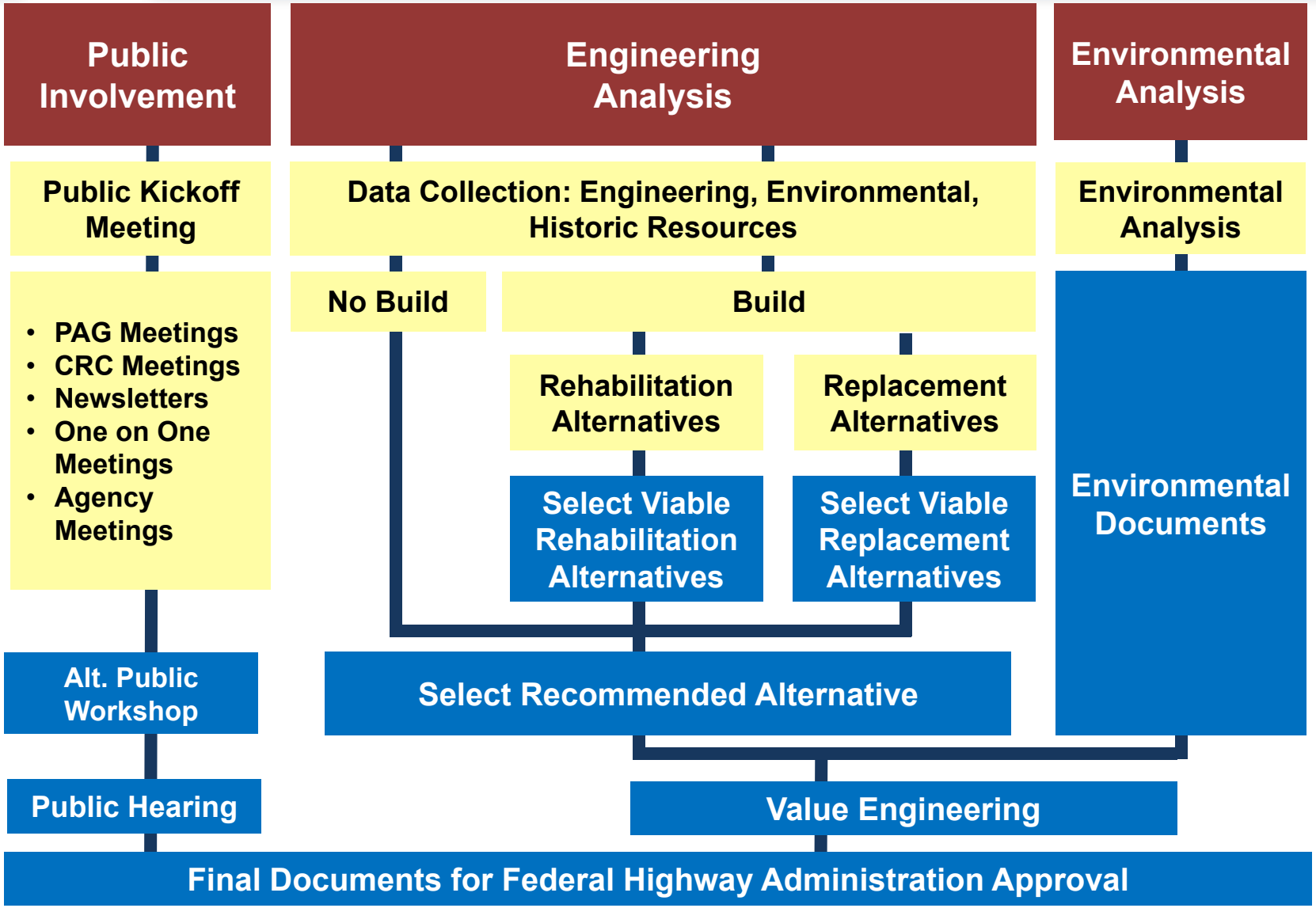
EAC Consulting, Inc.

U.S. Department of Transportation
Federal Highway Administration

Agenda

- PD&E Process and Status
- Purpose of Project Advisory Group (PAG) Meeting #2
- Study Parameters
- Alternatives Matrix and Flowchart
- No-Build Alternatives
- Build Alternatives
- Other Considerations
- Summary

PD&E Process and Status



Purpose of PAG 2

The purpose of the PAG is to ensure that the range of stakeholder views regarding possible improvements to the Venetian Causeway is clearly understood and fully considered by the project team.

- Alternatives being considered as part of the study will be presented for input.
- The presentation will address the ability of the alternatives to safely carry traffic, pedestrians and bicyclists.
- The possible impacts of the different alternatives on the environment, historic resources, aesthetics and the public will also be presented.

Study Parameters

Purpose and Need for Project

The purpose of the proposed project is to examine the potential replacement or rehabilitation of the twelve existing bridges (ten low-level fixed spans and two movable bascules).

Bridge No.	DOT Bridge #	NBI Condition Rating			Appraisal /Present Posted	Scour/Storm Evaluation		Bridge
		Sufficiency Rating		Deficiency FO/SD		Scour Depth		Exist Est. pile
		2011	*2014**	*2011/2014*	*2014*	*Year 1998*		*1927 and Renovation*
						100 Year	Category 5	
1	874459	32.6	19	FO/SD	5 Tons	26.9 ft	26.9 ft	40-54 ft
2	874460	52	45.9	FO	11 Tons	19.6 ft	29.1 ft	20-28 ft
3	874461	55.5	46	FO	11 Tons	25.0 ft	31 ft	20-28 ft
4	874463	55.5	46	FO	11 Tons	25.0 ft	31 ft	20-28 ft
5	874465	47.9	36.5	FO	11 Tons	19.6 ft	25.9 ft	20-28 ft
6	874466	57.6	48.2	FO	11 Tons	22.6 ft	28.2 ft	20-28 ft
7	874471	55.5	46	FO	11 Tons	22.0 ft	27.3 ft	20-28 ft
8	874472	55.5	46	FO	11 Tons	22.6 ft	28.9 ft	20-28 ft
9	874473	64	48.7	FO	11 Tons	24.2 ft	35.5 ft	20-28 ft
10	874474	57.5	32.1		11 Tons	25.0 ft	30.1 ft	20-28 ft
11	874477	64	41	FO	11 Tons	25.3 ft	31.6 ft	20-28 ft
12	874481	68.1	43.6		16 Tons	15.8 ft	19.4 ft	20-28 ft

*Based on FDOT Bridge Information July 1st 2014

FO= Functionally Obsolete

SD= Structural Deficient

EST.= Estimated

Study Parameters

Historic Resource-Venetian Causeway

Prudent and Feasible – Build Impacts

- Constructed in 1926
- Oldest causeway in Florida
- Listed on the National Register of Historic Places
- Listed as Historic in the Cities of Miami and Miami Beach

Section 106 of National Historic Preservation Act

Cultural Resources Assessment Survey

- Establish Area of Potential Effect
- Identify and Document Resources
- Evaluate Significance according to NRHP Criteria

Evaluation of Effects --Determination of Effects Case Study
Apply Section 106 Criteria of Effects

All Alternatives assessed in terms of their effects to resources

- Rehabilitation according to the Secretary of Interiors Standards likely No Adverse Effect
- Replacement Will be Adverse Effect

Finding of No Adverse Effect- Processes Concluded

Finding of Adverse Effect - Develop MOA and Section 4(f) Programmatic or Individual Statement Documentation

Section 106/4(f) Processes Required for Historic Structures

Excerpts from FDOT PD&E Manual (Part 2, Chapter 13)
13-2.4.2 Programmatic Section 4(f) Evaluations

Under a Programmatic Section 4(f) Evaluation, certain conditions are laid out such that, if a project meets the conditions, it will satisfy the requirements of Section 4(f) that there **are no feasible and prudent alternatives and that there has been all possible planning to minimize harm.**

Alternatives and Findings

1. **Do Nothing.** The do nothing alternative has been studied and **is not feasible and prudent** because it does not correct the situation that causes the bridge to be considered structurally deficient and functionally obsolete to the degree where the bridge poses serious and unacceptable safety hazards to the public or places intolerable restriction on transport or travel.

Processes Required for Historic Structures – Cont'd

2. Build a new structure at a different location without affecting the historic integrity of the old bridge, as determined by procedures implementing the National Historic Preservation Act (NHPA). Demonstrate that investigations have been conducted to construct a bridge on a new location or parallel to the old bridge, **but this alternative is not feasible and prudent.**

3. Rehabilitate the historic bridge without affecting the historic integrity of the structure, as determined by procedures implementing the NHPA. Show that studies have been conducted of the rehabilitation measures, but because the bridge is so structurally or geometrically deficient, it cannot be rehabilitated to meet either the minimum acceptable load requirements or the minimum required capacity of the highway system on which it is located without affecting the historic integrity of the bridge.

Processes Required for Historic Structures – Cont'd

Measures to Minimize Harm

For bridges that are to be rehabilitated according to the Secretary of the Interiors Standards, the historic integrity of the bridge is preserved, to the greatest extent possible, consistent with unavoidable transportation needs, safety, and load requirements.

For bridges that are to be rehabilitated to the point that the historic integrity is adversely affected or that are to be moved or demolished, the FHWA ensures that, in accordance with the Historic American Engineering Record (HAER) standards, or other suitable means developed through consultation, fully adequate records are made of the bridge. In addition, other mitigation measures will be developed in consultation with the appropriate agencies, such as SHPO, USCG, as well as the Cities, County, residents, and locally affected parties.

Study Parameters

Hurricane Resistance

- **Low Causeway Bridges**
  - Below Anticipated Storm Surge
    - 100 Year Storm Surge – Elevation 8 ft to 12 ft
    - Wave Crests – 7 to 8 ft above Storm Surge

I-I0 Escambia Bay, FL. - Hurricane Ivan - 2005

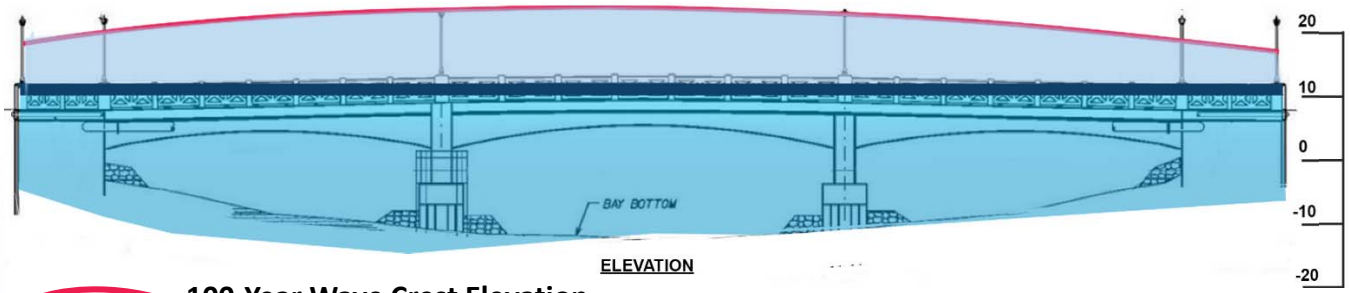
Hurricane Resistance

100 year Peak Storm Surge Heights

- 7.7' (FEMA) to 11.6' (Current Study)
- Wave crest is storm surge plus 70% of the maximum wave height. Causeway bridges are mostly below this elevation.

Wave Forces

- Vertical will be in the 10 to 14 kip/ft range or 500 to 700 kips (250 to 350 tons) per 50 ft span!
- Horizontal wave forces will be in the 4 to 6 kip/ft range or 200 to 250 kips (100 to 125 tons) per 50 ft span! (Equivalent to a collision with a barge drifting at approximately half a knot)



Location	Design Wave Height (ft)	Wave Crest Elevation (ft-NAVD)
End Bent 1	9.3	18.1
Pier 2	13.7	21.2
Pier 3	12.9	20.6
End Bent 4	7.5	16.8

100-Year Water Surface Elevation (storm surge) and the 100-Year Wave Crest Elevations.

Study Parameters

Vessel Collision Resistance

- All Causeway Bridges must consider Risk of Vessel Collision
- West Bascule Bridge – over Intracoastal Waterway
  - 80 Tug & Barges per Year (each direction)
  - 500 to 600 Other Larger Vessels (each direction)
- East Bascule Bridge – over Tide Relief Channel
  - Mostly Recreational and Smaller Commercial Craft Only

Study Parameters

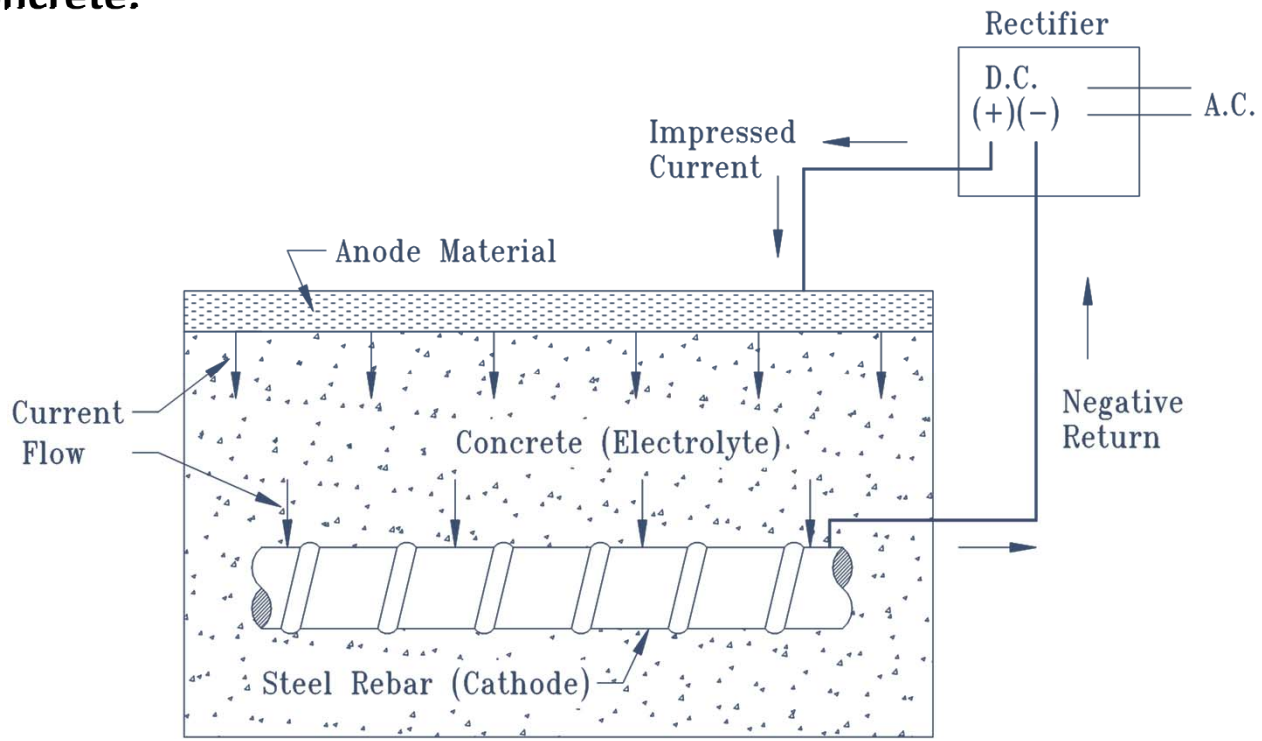
Rehabilitation Parameters

- **Meet current safety standards**
- **Maintain National Register of Historic Places listing**
- **Minimize environmental impacts**
- **Rehabilitation *Service Life – 25 years**
- **Typical Section – improve functionality**
- **Structural Capacity – meet current standards for:**
  - Load carrying capacity
  - Foundation stability
  - Hurricane resistance
  - Vessel collision resistance
- **Bridge Railings and End Treatments**
  - Preserve historic character
  - Meet current standards
- **At a minimum, maintain the existing bridge clearances**
- **Maintain traffic during construction**
- **Maintain utility services during construction**

**** Cathodic Protection will be utilized to decrease future corrosion***

Rehabilitation Parameters – Cathodic Protection (CP)

- **CP is an electrochemical method of corrosion protection that takes advantage of the electrochemical nature of corrosion by transforming a metal into a non-corroding cathode.**
- **CP is the only proven technique to decrease the corrosion of reinforcing steel in concrete.**



Build Alternatives

Replacement Parameters

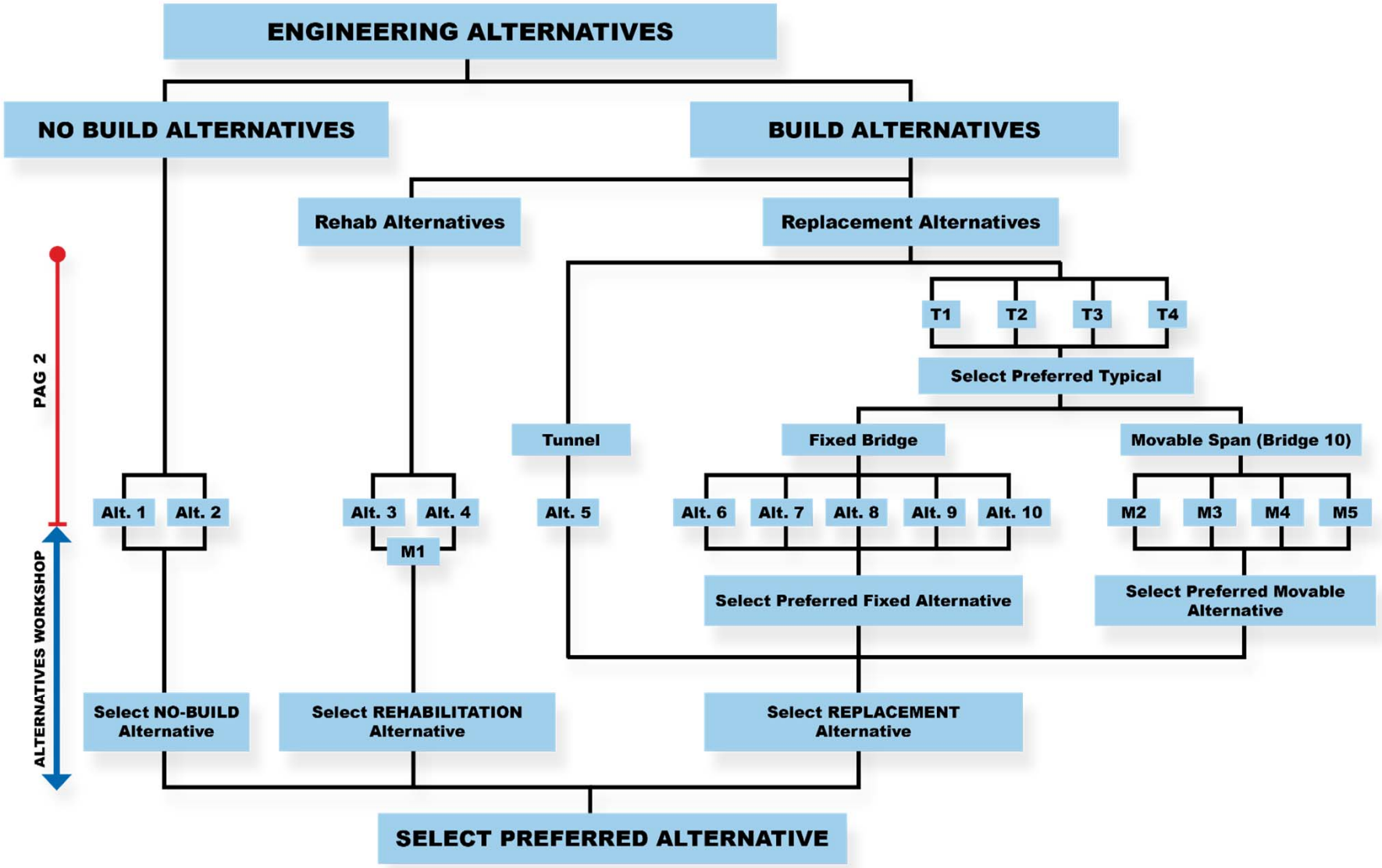
- Meet current standards and loading requirements
- Minimize environmental impacts
- Service Life – 75 years
- Bridge Railings maintain or improve views of the water
- Seek opportunities to improve the existing bridge clearances. Variances may be required.
- Maintain traffic during construction
- Maintain utility services during construction
- Accommodate high pedestrian and bicycle traffic

	Pedestrians	Bicycles
8-hour volume	375	679
Peak hour volume	90	208
Average hourly volume	47	85

Alternatives Matrix

Alternative	Description	
1	Do Nothing	NO BUILD
2	Transportation System Management	
Rehabilitation Alternatives		BUILD ALTERNATIVES
3	Fixed Bridge Rehab w/out Beam Strengthening	
4	Fixed Bridge Rehab with Beam Strengthening	
M1	Bascule Bridge Rehabilitation	
Replacement Alternatives		
Typical Section Alternatives		
5	Tunnel	
T1	Venetian Railing	
T2	Wyoming Railing TL-4 at coping	
T3	Wyoming Railing TL-3 at curb and Original Venetian Railing at Coping	
T4	Wyoming Railing TL-3 at curb and Custom Railing at Coping	
Fixed Bridge Alternatives		
6	High Level Fixed Bridge	
7	Arched Beams	
8	FIB With Arched Fascia (FA)	
9	FIB (F)	
10	Flat Slab (FS)	
Movable Bridge Alternatives		
M2	Swing Bridge	
M3	Vertical Lift Bridge	
M4	Double Leaf Bascule Bridge	
M5	Single Leaf Bascule Bridge	

Alternatives Flowchart



No-Build Alternatives

Alt. 1

Alt. 1 - Do Nothing

- Existing Deficiencies will Remain
- Continued Deterioration
- Extensive Periodic Repairs and Maintenance

Does not meet purpose and need for project

No-Build Alternative

Alt. 2

Alt. 2 – Transportation System Management

- Enhanced Bus service
- Facilitate Pedestrians and Bicyclists

- Existing Deficiencies will remain, but safe bridges required for effective TSM

Does not meet purpose and need for project

Alternative Corridor

Corridor Analysis

FDOT PD&E Manual (Part 2, Chapter 13) - Build a new structure at a different location without affecting the historic integrity of the old bridge, as determined by procedures implementing the National Historic Preservation Act (NHPA). Demonstrate that investigations have been conducted to construct a bridge on a new location or parallel to the old bridge (allowing for a one-way couplet), but, for one of the following reasons, this alternative is **not feasible and prudent:**

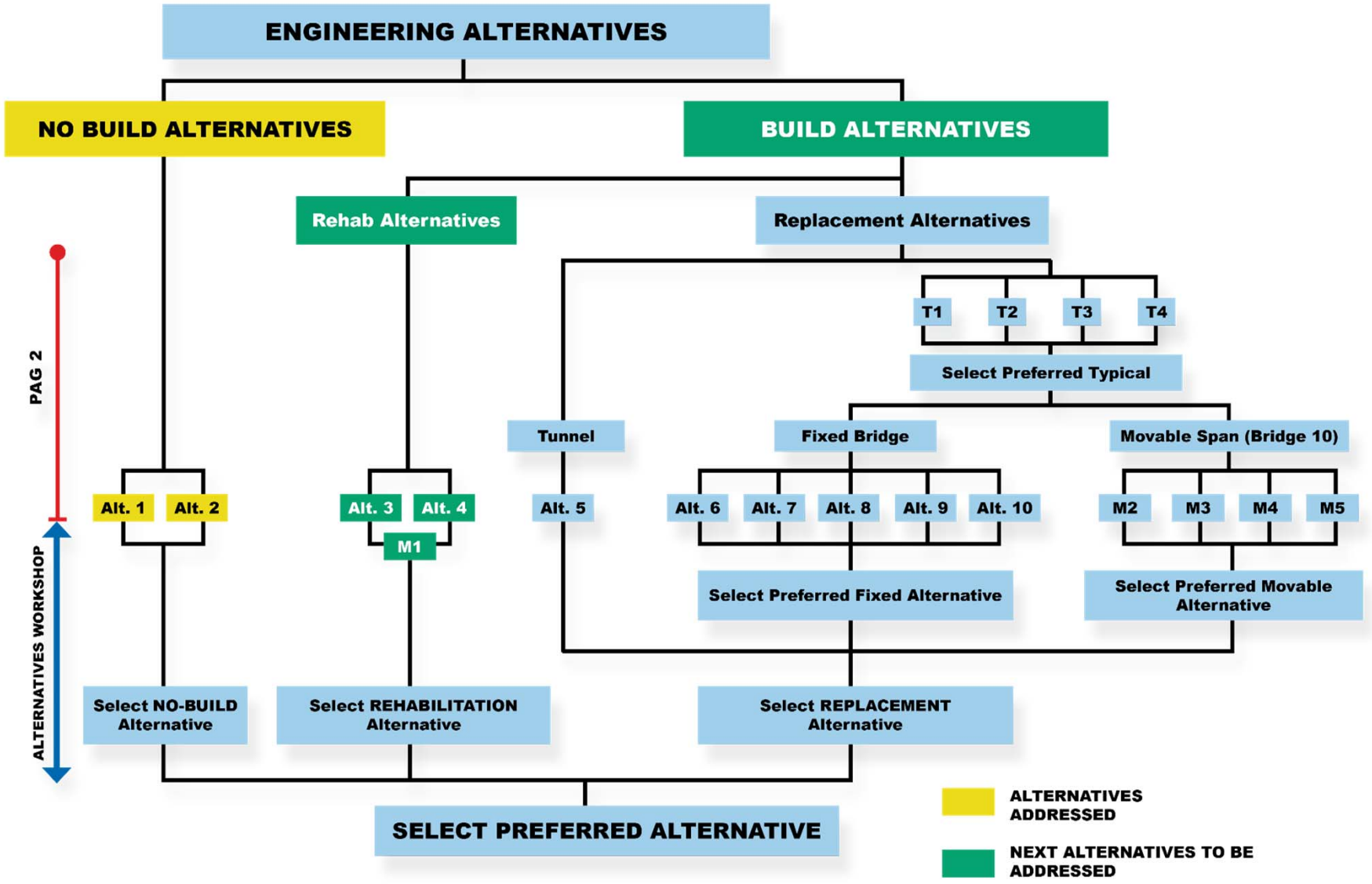
1) Terrain - the existing bridge has already been located at the only feasible and prudent site,
2) building a new bridge away from the present site would result in social, economic, or environmental impact of extraordinary magnitude,
3) the new site would **not be feasible and prudent** where cost and engineering difficulties reach extraordinary magnitude, and
4) **It would not be feasible and prudent** to preserve the existing bridge, even if a new bridge were to be built at a new location.

No-Build Alternatives

Alternative Corridor – Cont'd

Does not meet purpose and need for project

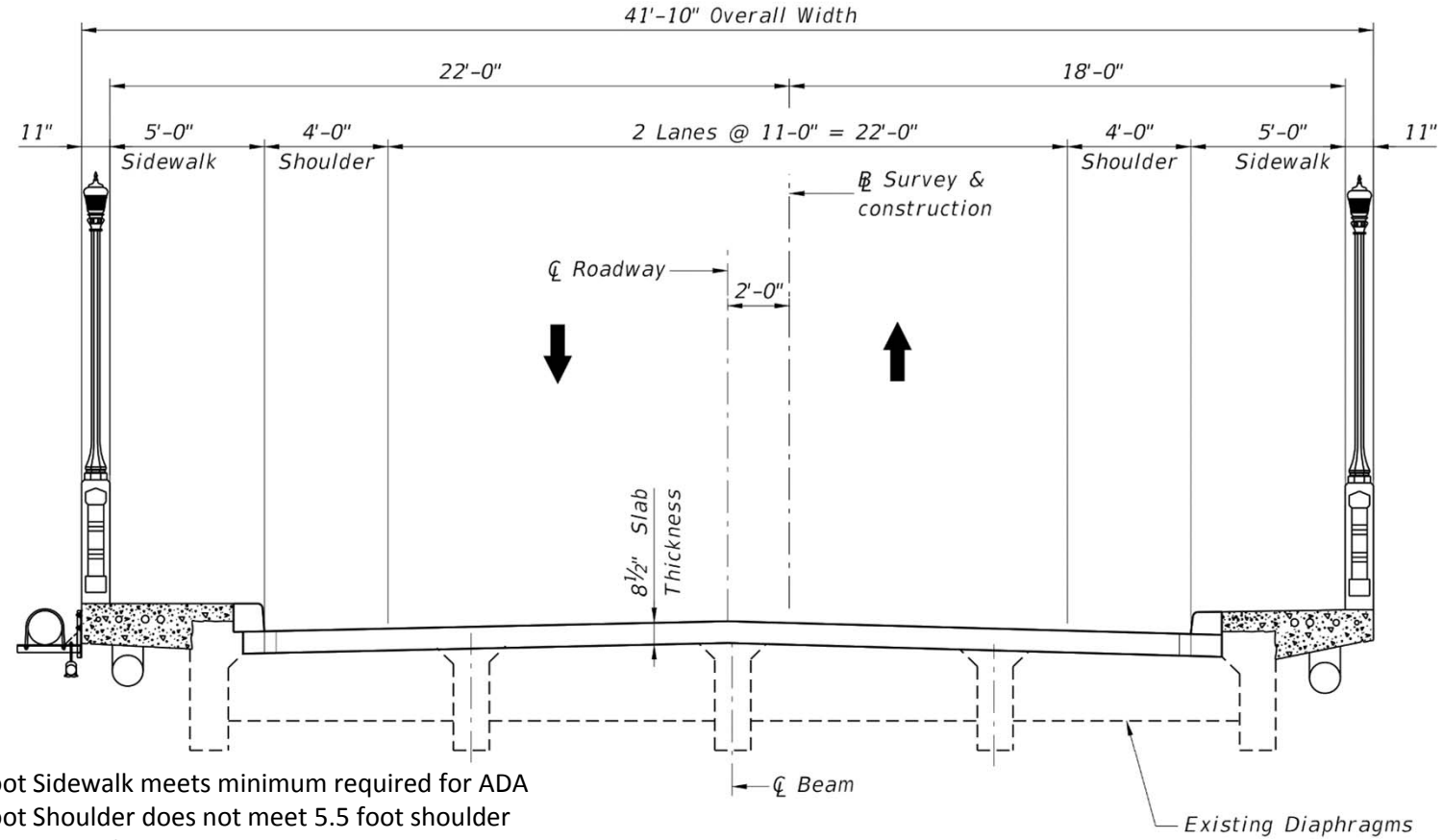
Summary and Next Steps



Rehabilitation Alternatives

Alt. 3

Alt. 3 - Fixed Bridge Rehab w/out Beam Strengthening



- 5 foot Sidewalk meets minimum required for ADA
- 4 foot Shoulder does not meet 5.5 foot shoulder requirement for bike lane

Rehabilitation includes:

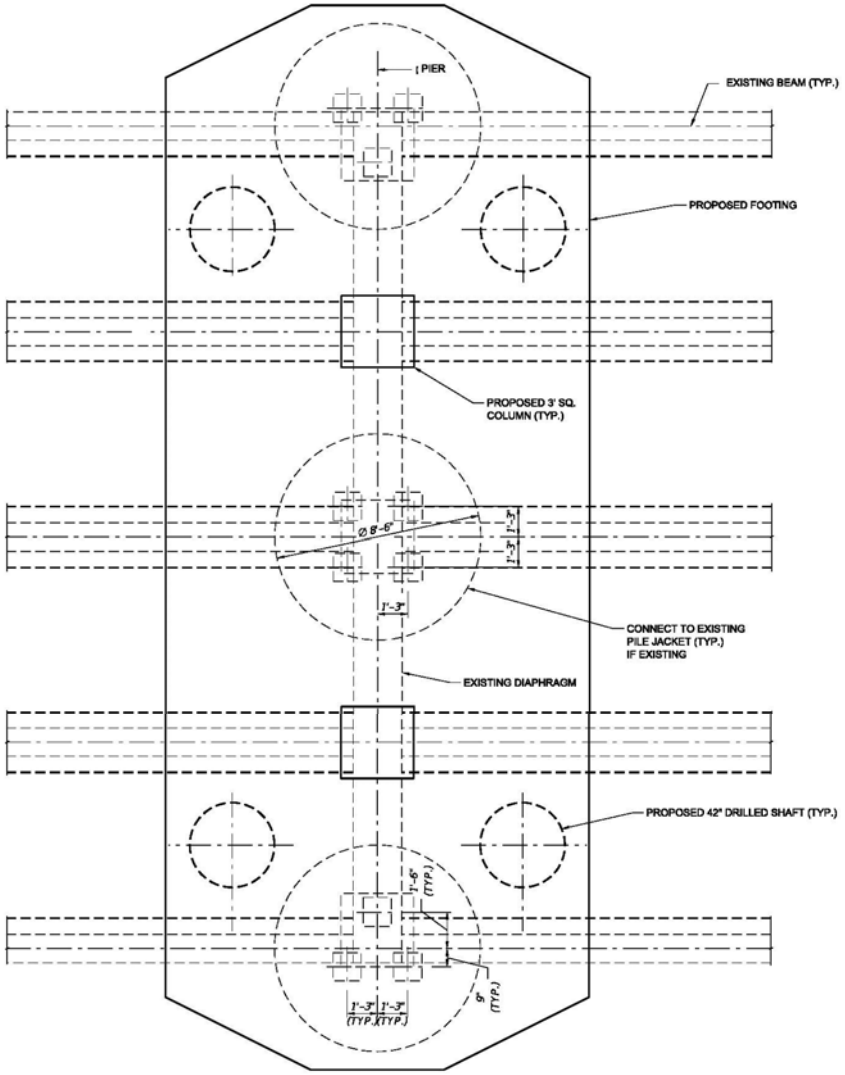
- Deck Replacement and Foundation Strengthening
- 41'-10" Overall width to remain
- Venetian Railing to remain

Typical Section

Rehabilitation Alternatives

Alt. 3 & 4 –Foundation Strengthening

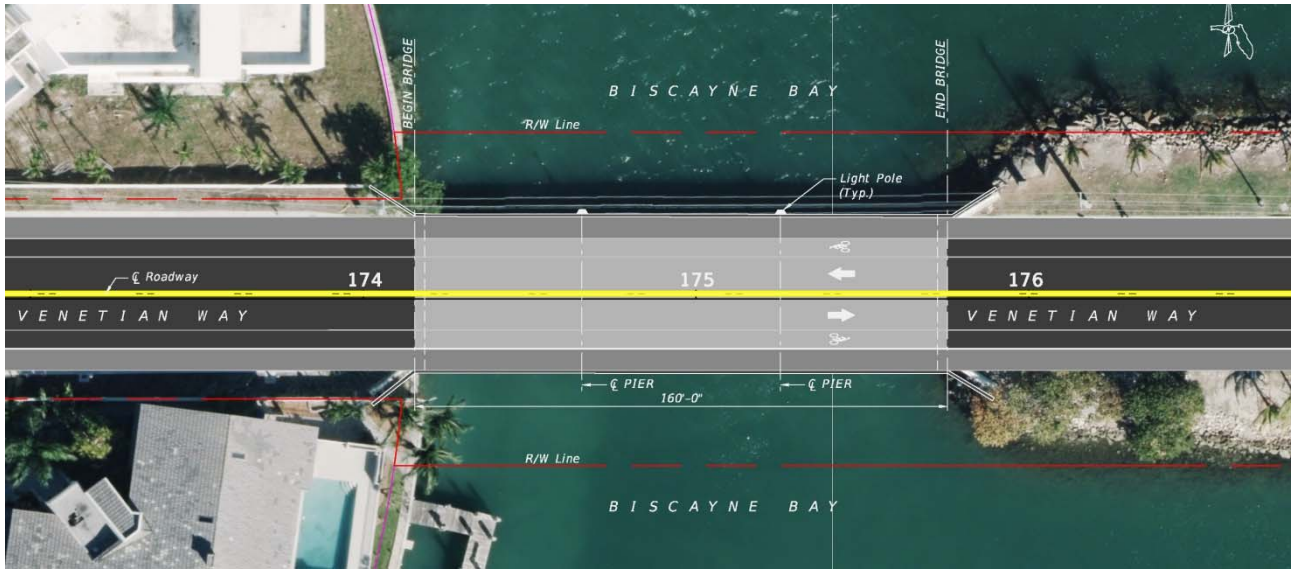
- Repair concrete spalls and cracks
- Extend Service Life
- Cathodic protection
- Footing Encasement
- Pier Strengthening for wave vulnerability
- Riprap placement at foundations for scour protection



Rehabilitation Alternatives

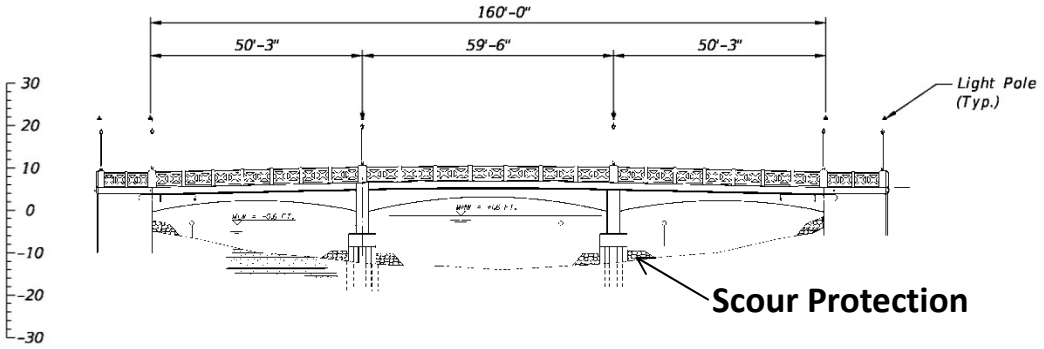
Alt. 3

Alt. 3 - Fixed Bridge Rehab w/out Beam Strengthening



Plan View

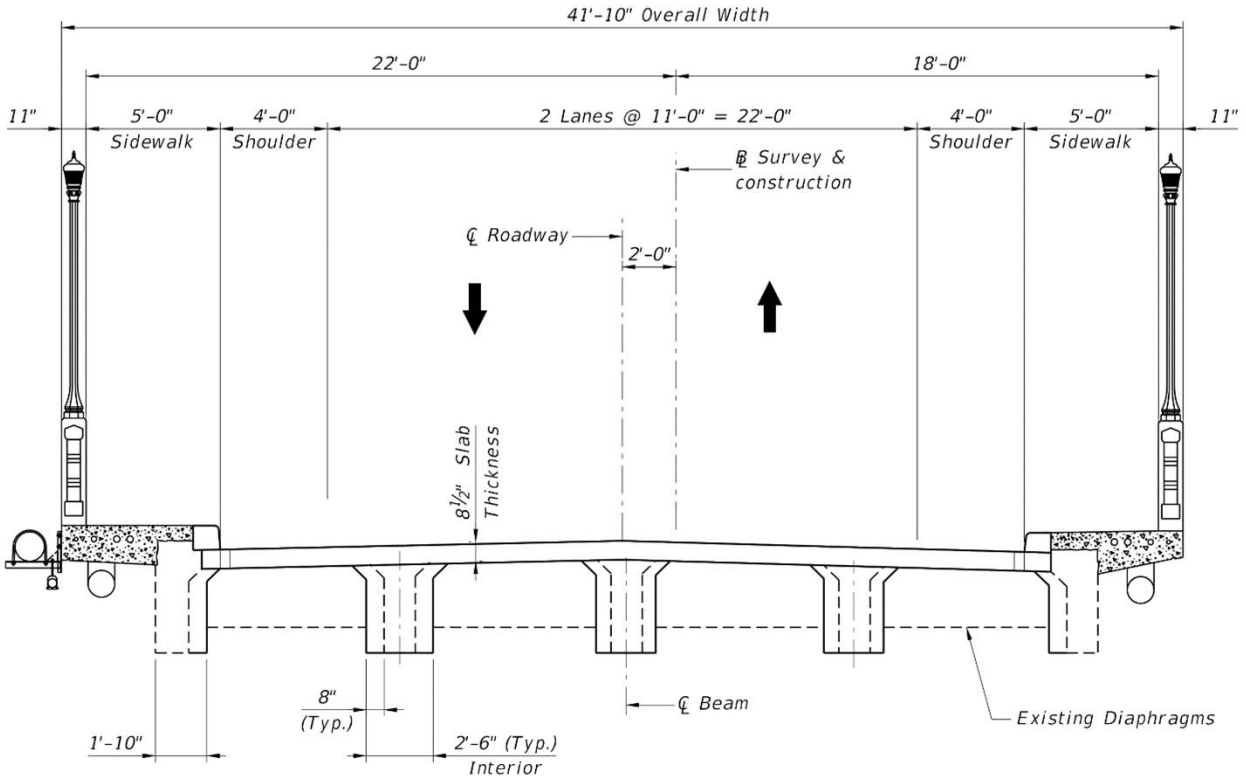
- **Estimated Cost Range:**
  $22 - $25 Million
  (Does not include cathodic protection)



Alt. 4

Rehabilitation Alternatives

Alt. 4 - Fixed Bridge Rehab with Beam Strengthening



Typical Section

- 5 foot Sidewalk meets minimum required for ADA
- 4 foot Shoulder does not meet 5.5 foot shoulder requirement for bike lane

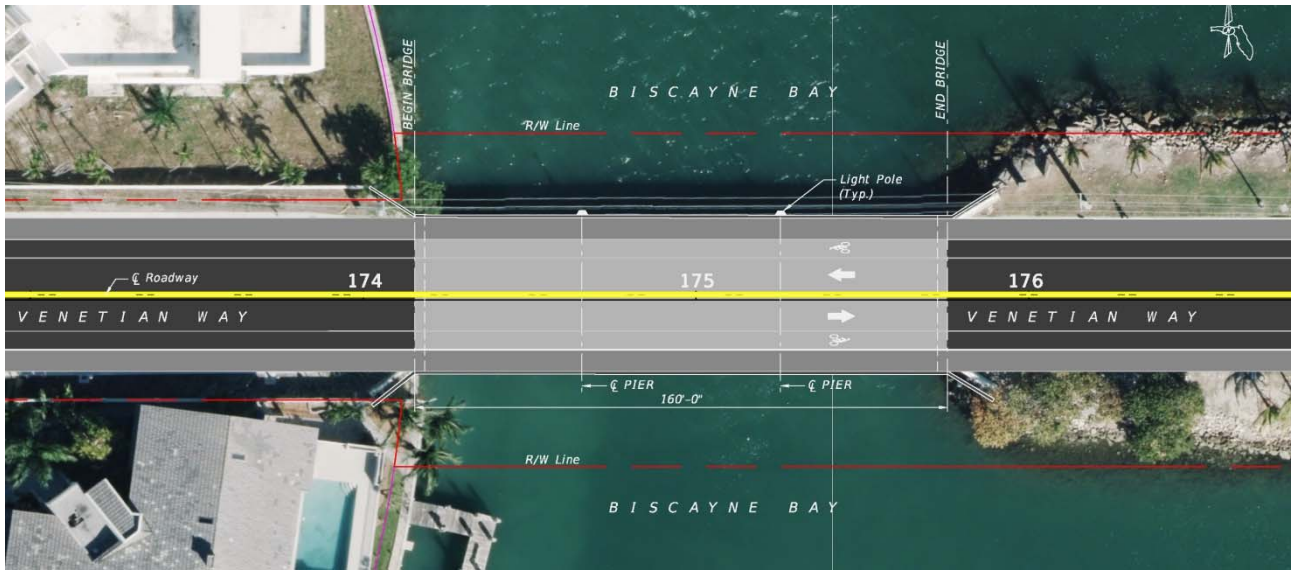
Rehabilitation includes:

- Deck Replacement Beam and Foundation Strengthening
- 41'-10" Overall width to remain
- Venetian Railing to remain

Alt. 4

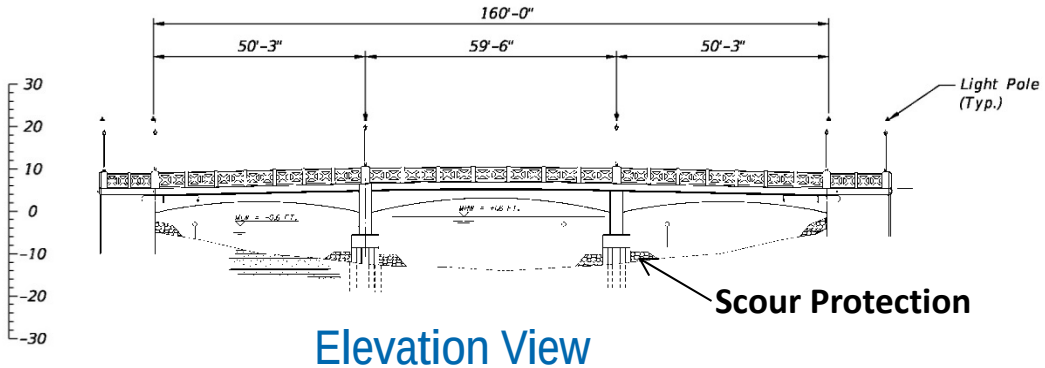
Rehabilitation Alternatives

Alt. 4 - Fixed Bridge Rehab with Beam Strengthening



Plan View

- **Estimated Cost Range:**
  $26 - $30 Million
  (Does not include cathodic protection)

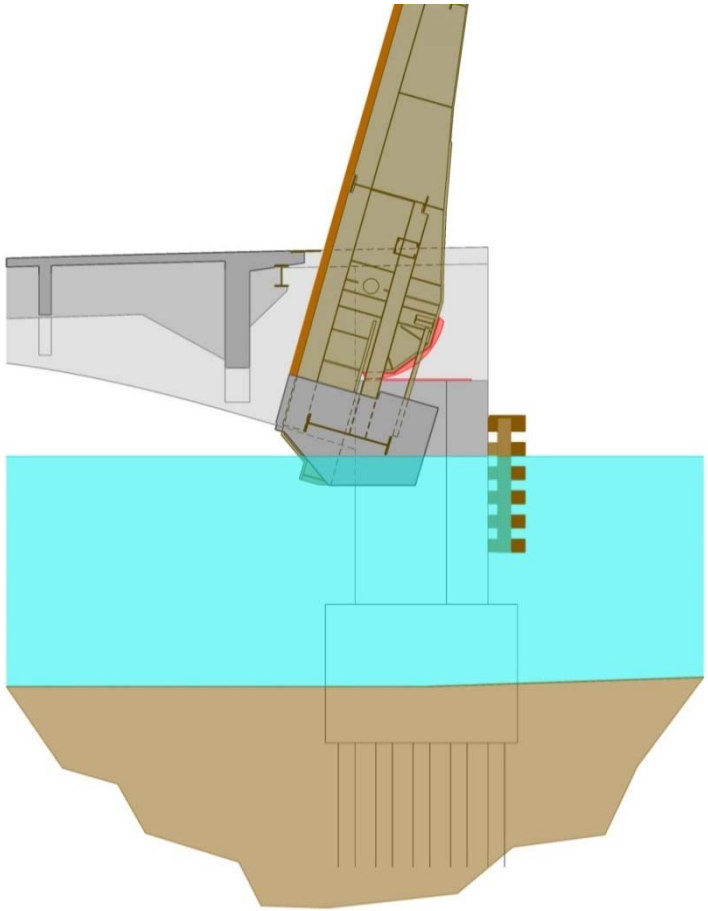


Elevation View

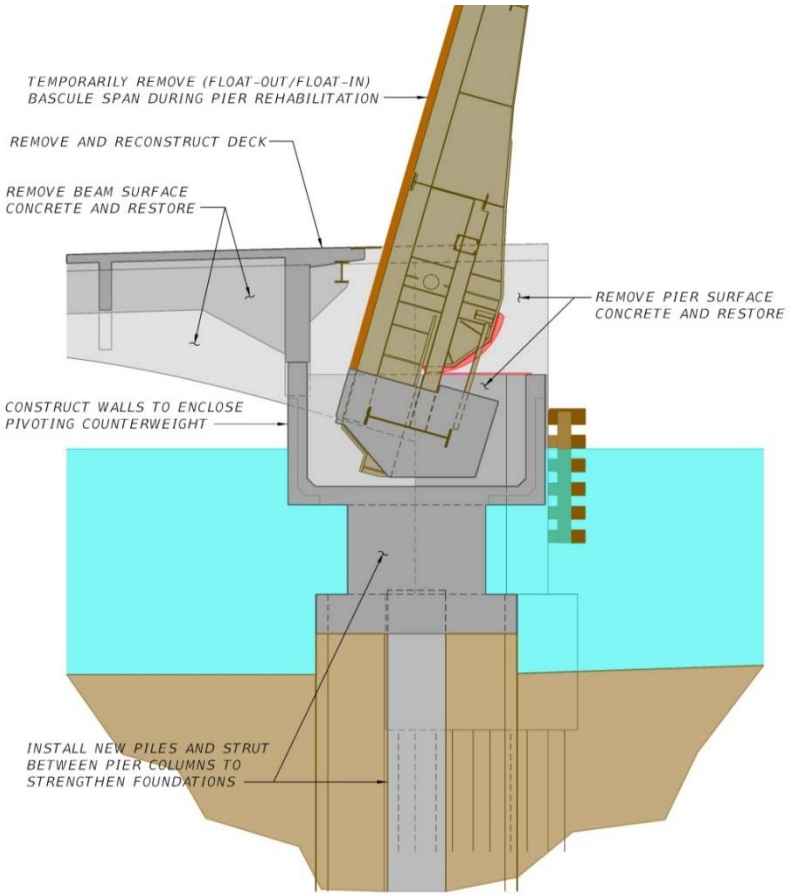
Rehabilitation Alternatives

M1

Alt. M1 - Bascule Bridge Rehabilitation



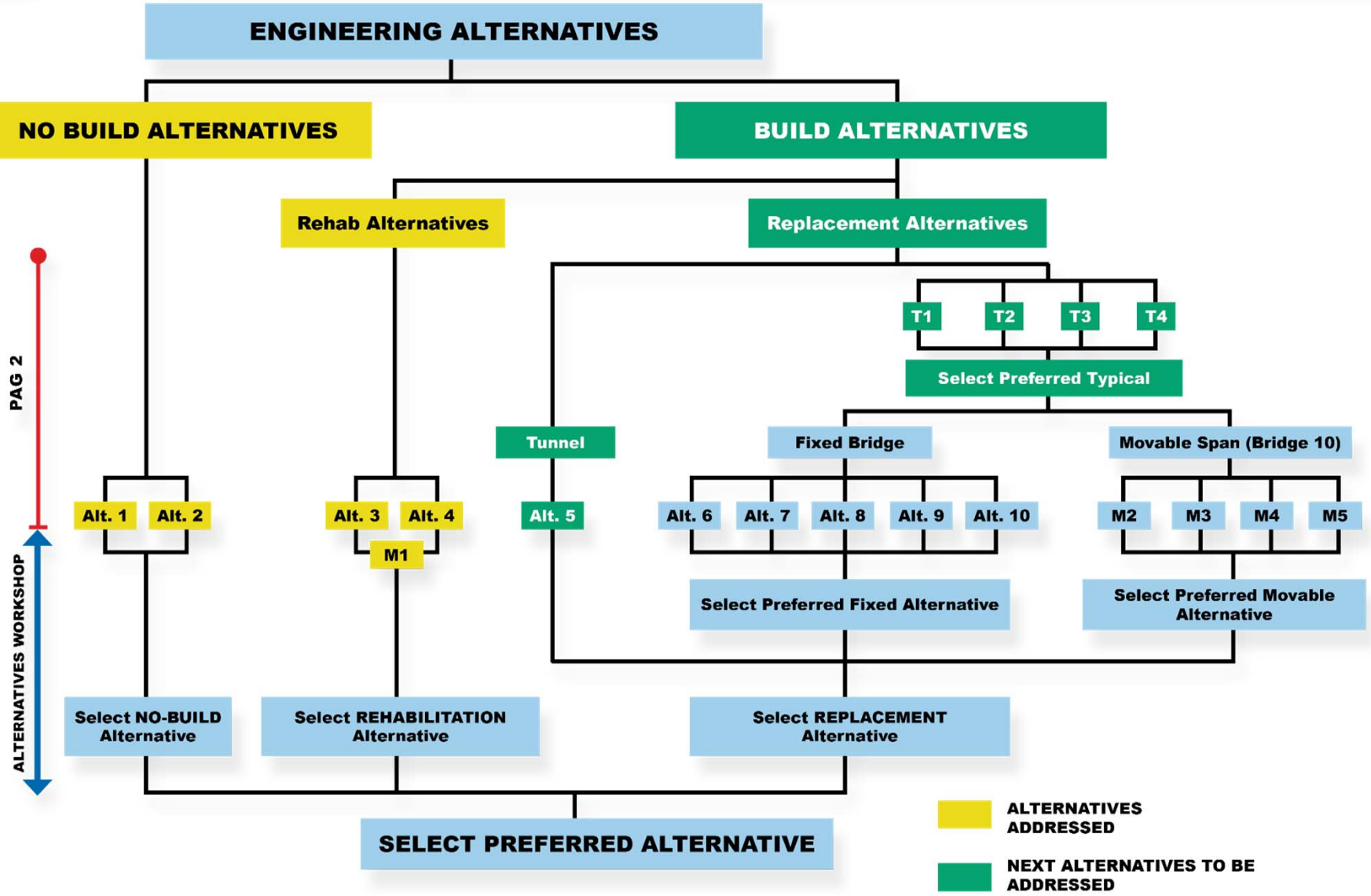
SECTION THRU EXISTING BASCULE SPAN



SECTION THRU REHABILITATED BASCULE SPAN

Estimated Cost Range: $8 - $9 Million

Summary and Next Steps



Replacement Alternatives

Excerpts from FDOT PD&E Manual (Part 2, Chapter 6 - Alternatives)

6.1 Overview

"The alternatives section is the heart of the Environmental Document and should rigorously explore and objectively evaluate alternatives."

6-2.3 Analysis and Documentation

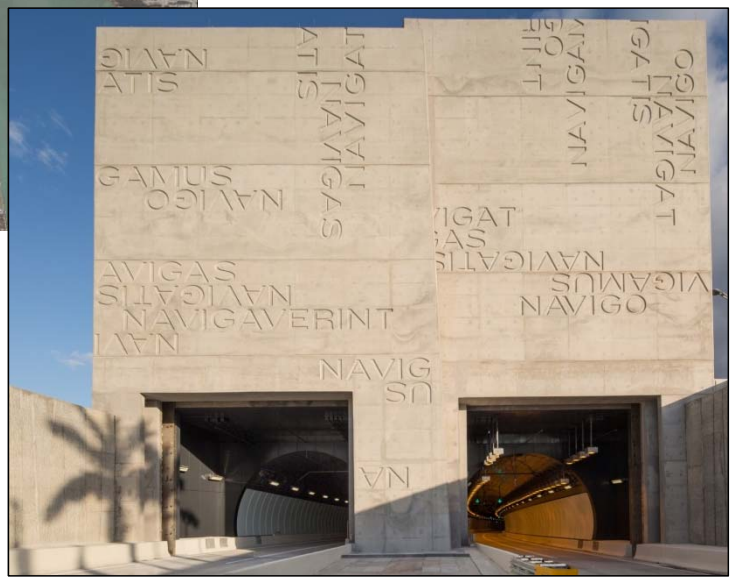
"The alternatives section of the Environmental Document must address the following discussion points in accordance with 40 CFR 1502.14: 1. Rigorously explore and objectively evaluate all reasonable alternatives (for EISs), and, for alternatives which are being eliminated from detailed study, briefly discuss the reasons for their elimination."

Replacement Alternatives

Alt. 5

Alt. 5 - Tunnel

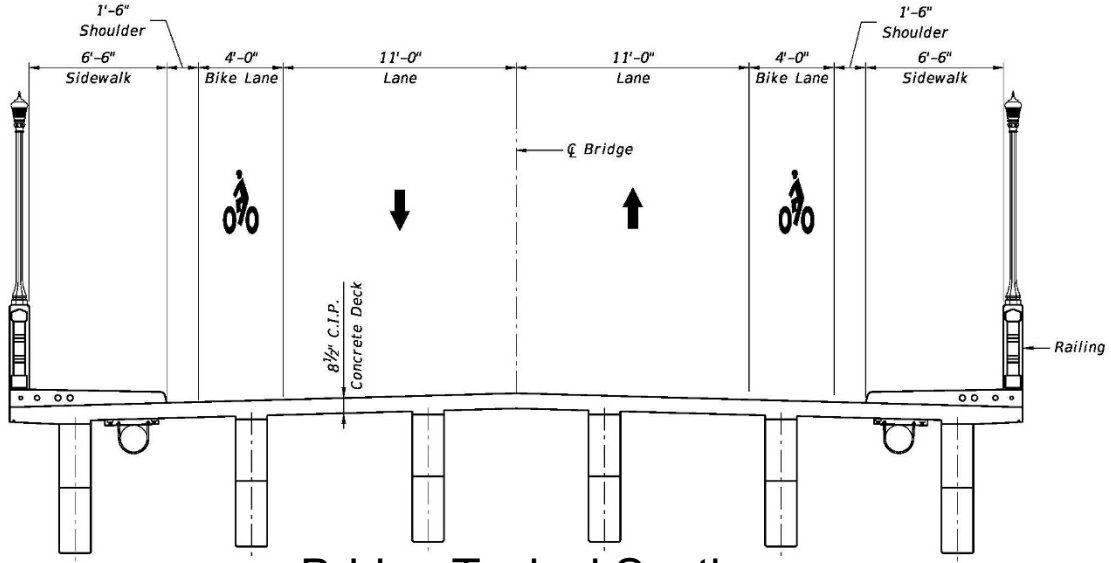
PortMiami Tunnel



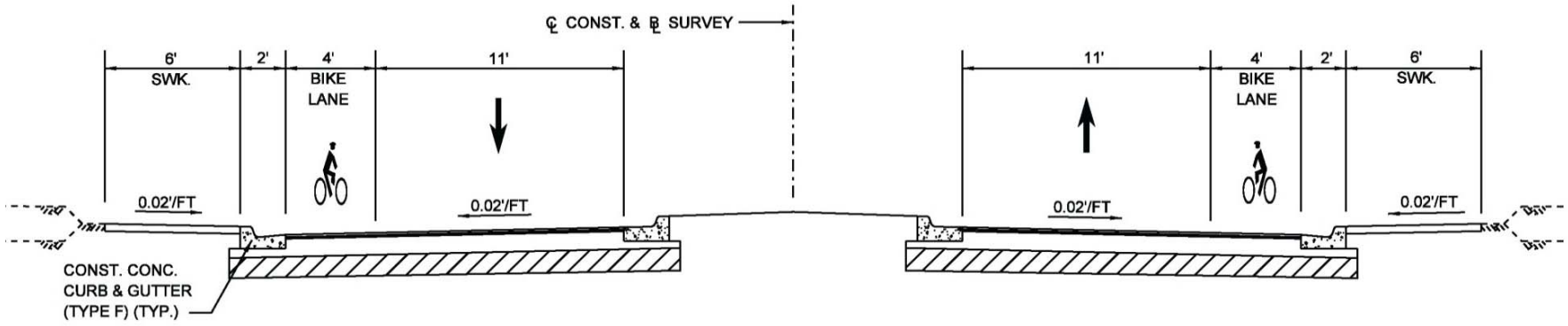
Tunnel Limits
Portal Limits

Estimated Cost Range: $160- $200 Million

Replacement Alternatives – Typical Section



Bridge Typical Section



Roadway Typical Section

Replacement Alternatives – Typical Section/ Railing Selection

T1

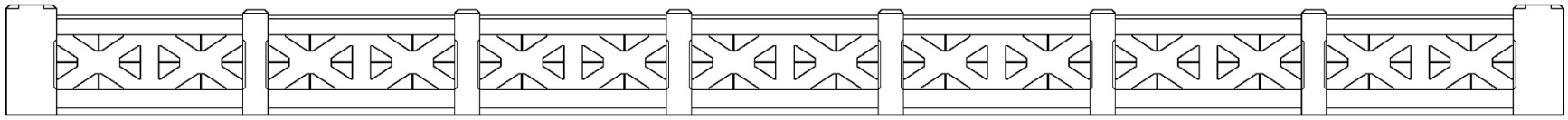
T1 – Venetian Railing

47’-10” Overall width

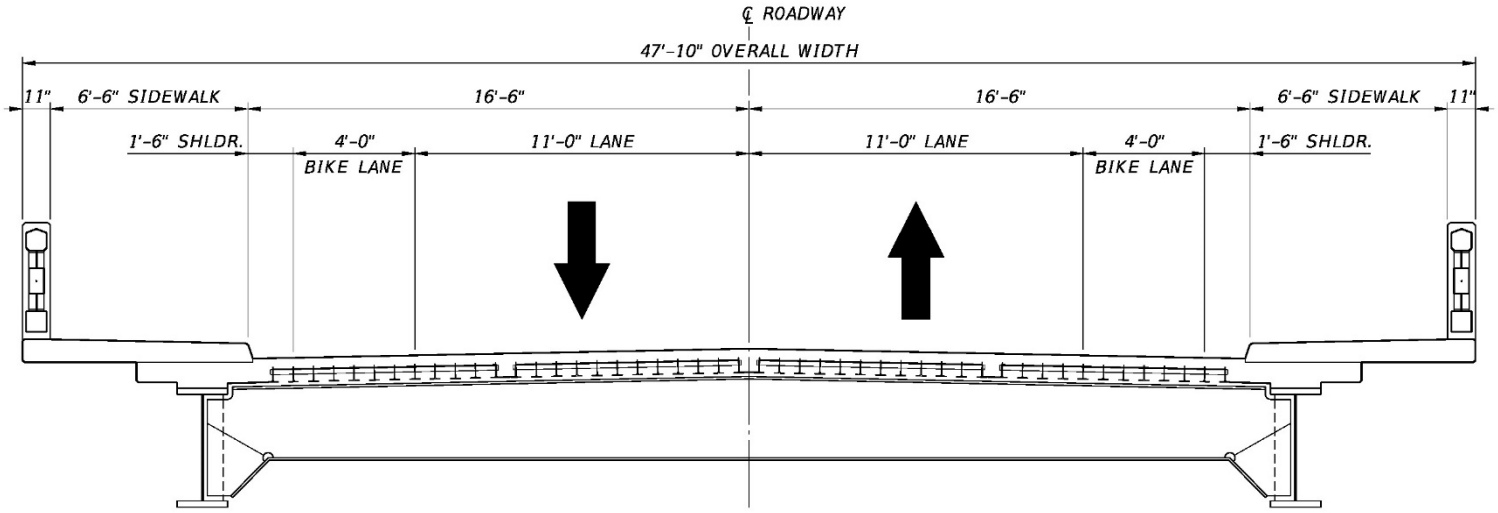
Replacement Alternative – Typical Section/ Railing Selection

T1

T1 – Venetian Railing - Bascule Span Typical Section



COMBINATION TRAFFIC/PEDESTRIAN RAILING ELEVATION - VENETIAN CAUSEWAY RAILING (MODIFIED)

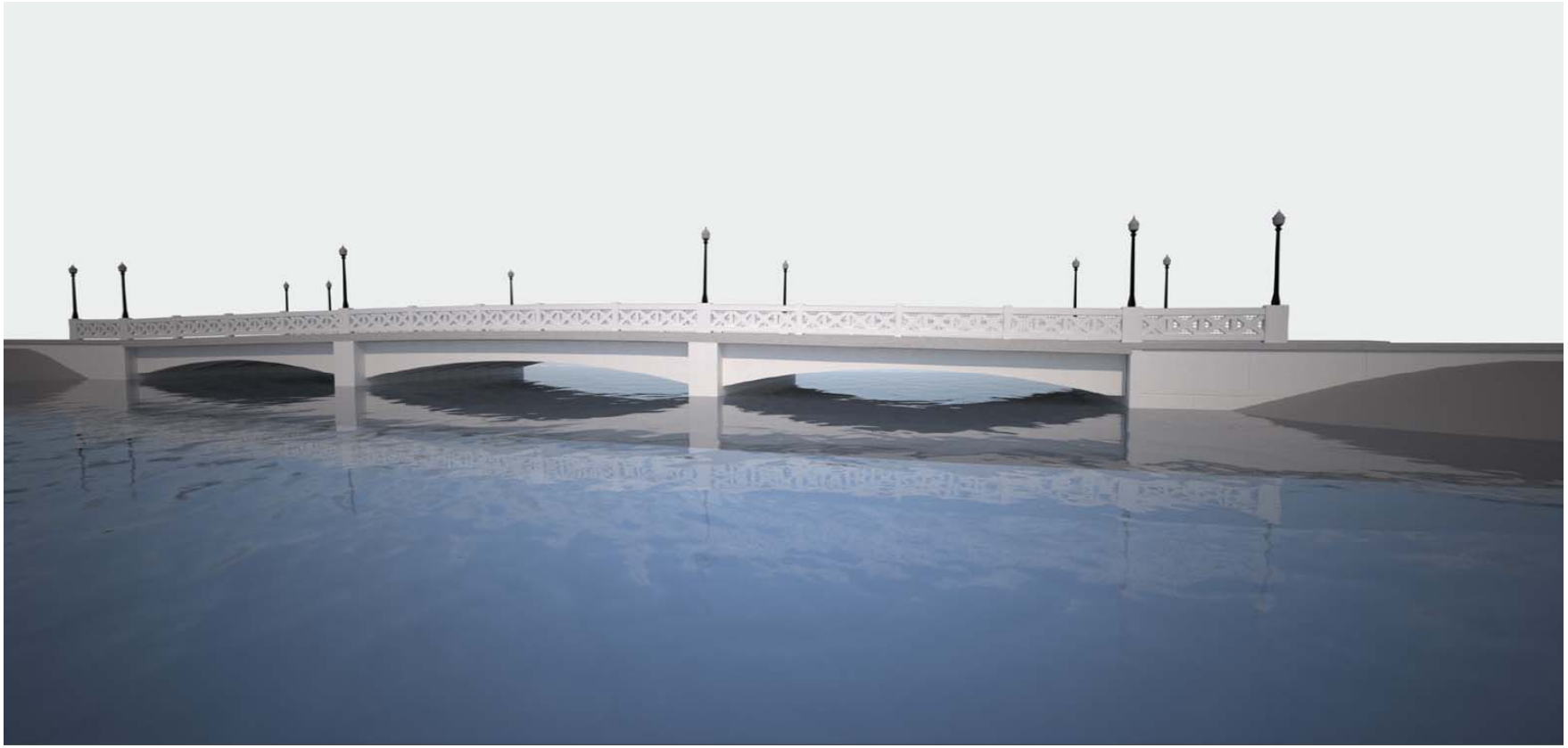


- Functions as Traffic Barrier and Pedestrian Railing
- Matches Current Railings on Causeway but with addition of Inserts in Openings

Replacement Alternatives – Typical Section/ Railing Selection

T1

T1 – Venetian Railing



Replacement Alternatives – Typical Section/ Railing Selection

T2

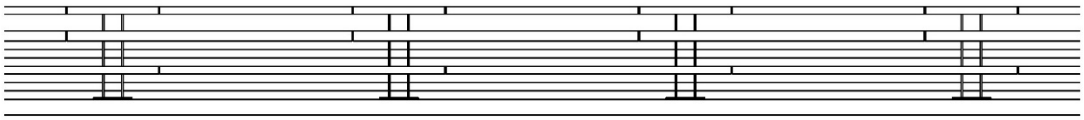
T2 – Wyoming Railing TL-4 at coping

49’- 4” Overall width

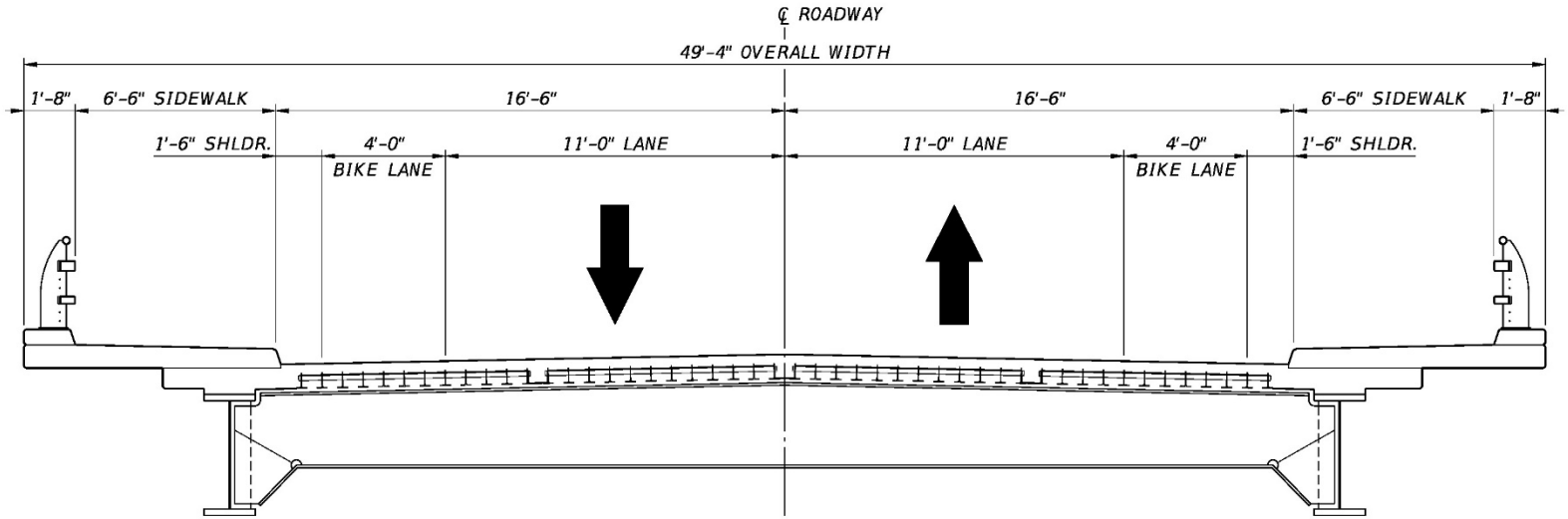
Replacement Alternative – Typical Section/ Railing Selection

T2

T2 – Wyoming Railing TL-4 at coping - Bascule Span Typical Section



COMBINATION TRAFFIC/PEDESTRIAN RAILING ELEVATION - WYOMING TL-4 RAILING (MODIFIED)



- Functions as Traffic Barrier and Pedestrian Railing
- Steel Tube Railing with Intermediate Cables
- Open Design Maximizes Views from Bridge

Replacement Alternatives – Typical Section/ Railing Selection

T2

T2 – Wyoming Railing TL-4 at coping

Replacement Alternatives – Typical Section/ Railing Selection

T3

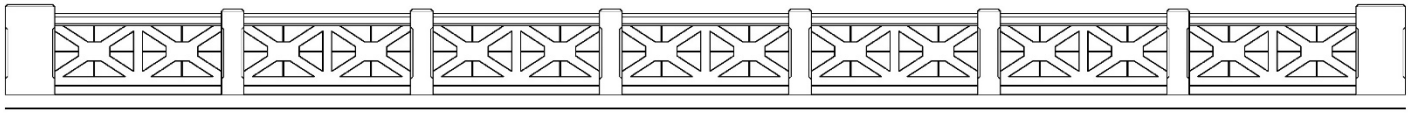
T3 – Wyoming Railing TL-3 at curb and Original Venetian Railing at Coping

48’- 8” Overall width

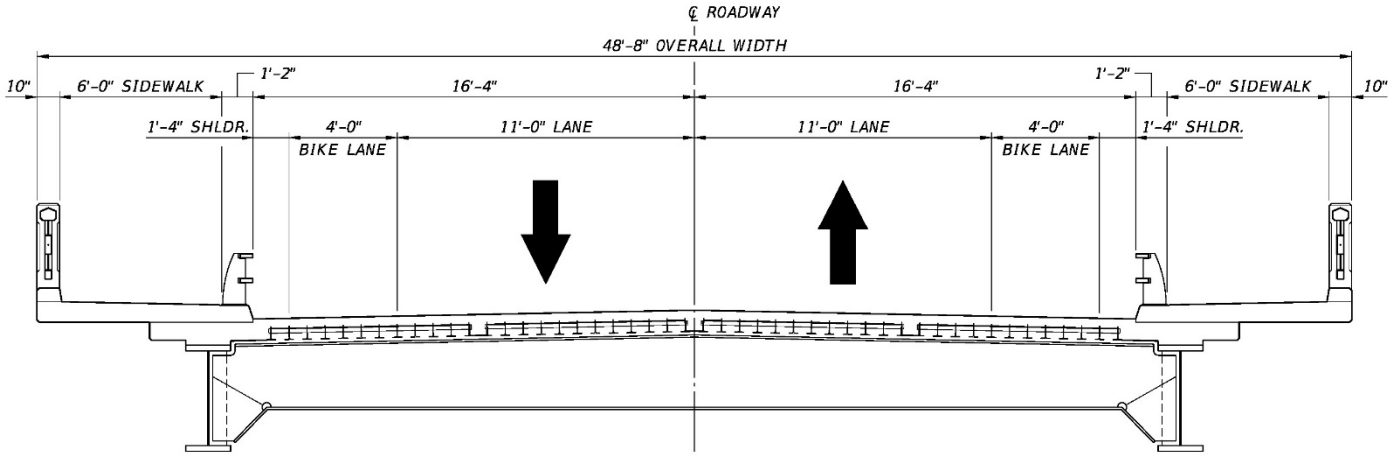
T3

Replacement Alternative – Movable Bridges

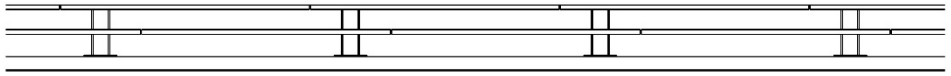
T4 – Bascule Span Typical Section



PEDESTRIAN RAILING ELEVATION - ORIGINAL VENETIAN CAUSEWAY RAILING (MODIFIED)



TYPICAL SECTION THRU BASCULE SPAN - ALTERNATIVE T3



TRAFFIC RAILING ELEVATION - WYOMING TL-3 RAILING

- Traffic Barrier at Curb provides Separation from Traffic; Improves Safety and Functionality at Movable Span; Permits Use of Lighter/More Open Railings
- Matches Original Venetian Causeway Railing but with Inserts in Openings

Replacement Alternatives – Typical Section/ Railing Selection

T4

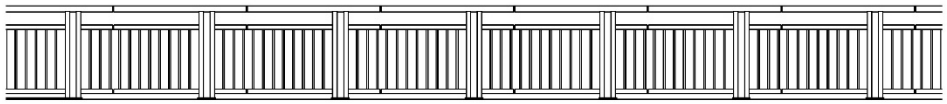
T4 – Wyoming Railing TL-3 at curb and Custom Railing at Coping

48’- 8” Overall width

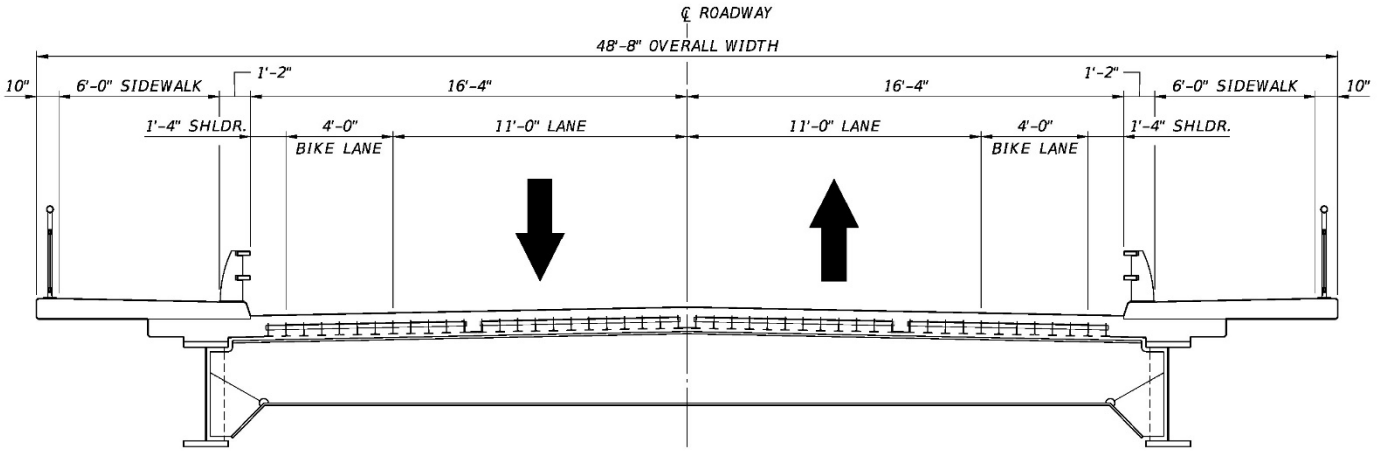
T4

Replacement Alternative – Movable Bridges

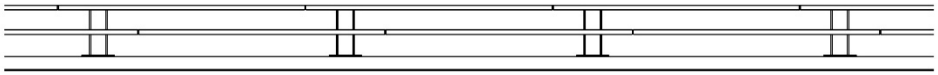
T4 – Bascule Span Typical Section



PEDESTRIAN RAILING ELEVATION - CUSTOM METAL RAILING



TYPICAL SECTION THRU BASCULE SPAN - ALTERNATIVE T4



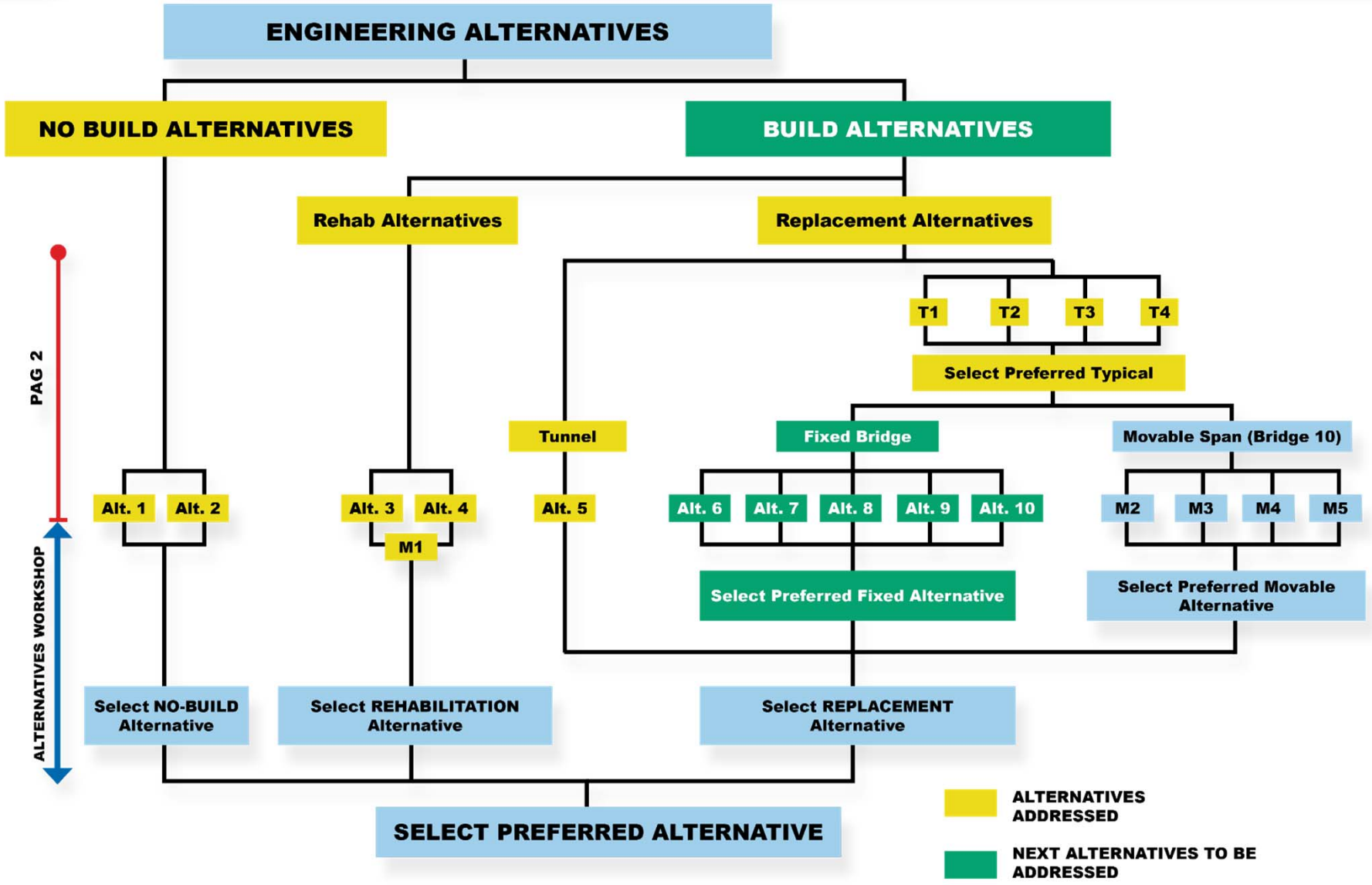
TRAFFIC RAILING ELEVATION - WYOMING TL-3 RAILING

- Traffic Barrier at Curb provides Separation from Traffic; Improves Safety and Functionality at Movable Span; Permits Use of Lighter/More Open Railings
- Custom Metal Pedestrian Railing

Build Alternatives

Replacement Alternatives - Typical Section Selection

Summary and Next Steps



Replacement Alternatives – Fixed Bridges

Alt. 6

Alt. 6 - High Level Fixed Bridge

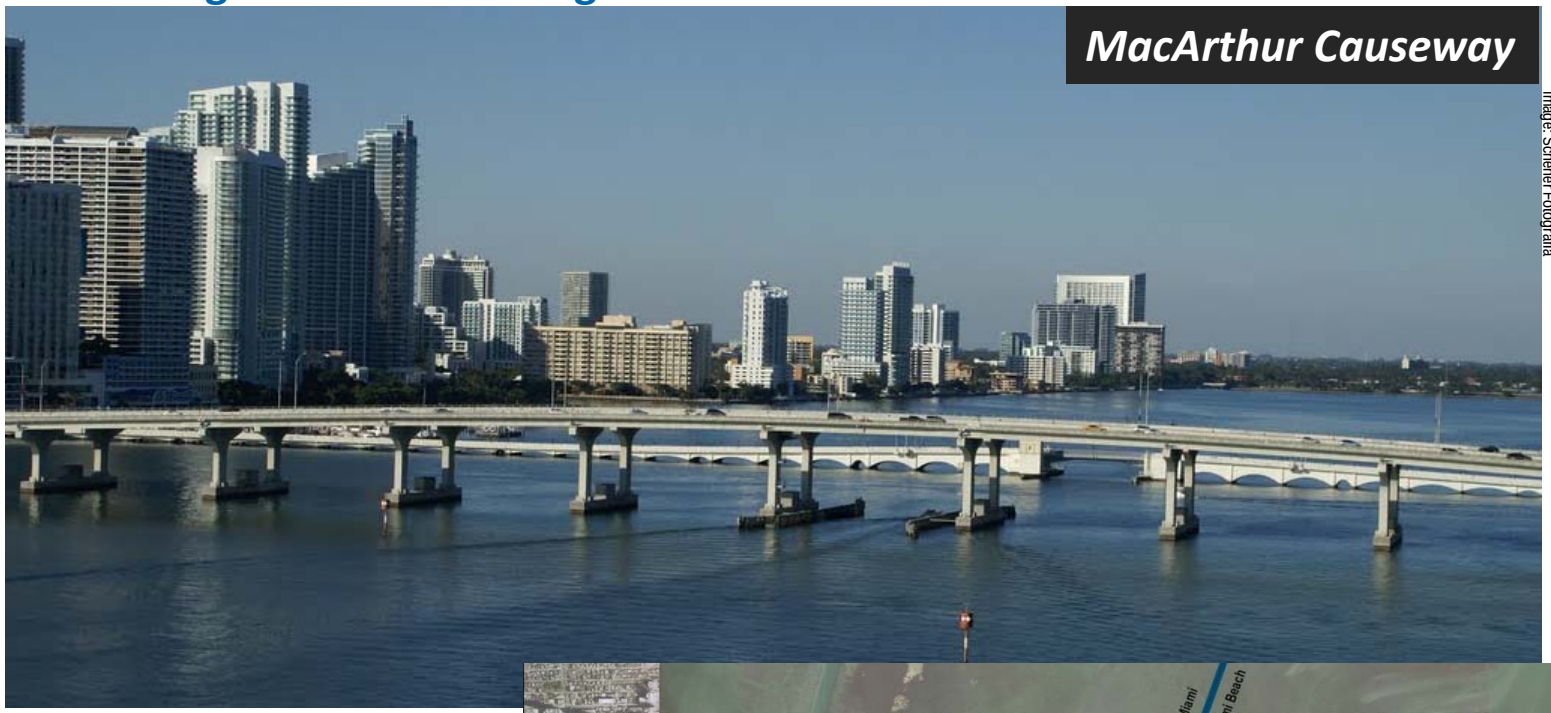
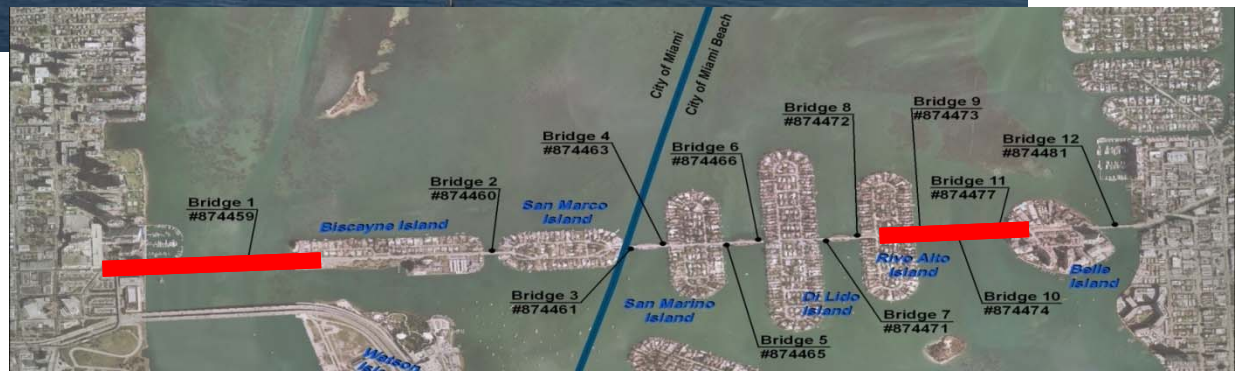


Image: Schener Fotografia



High Level Bridge Limits

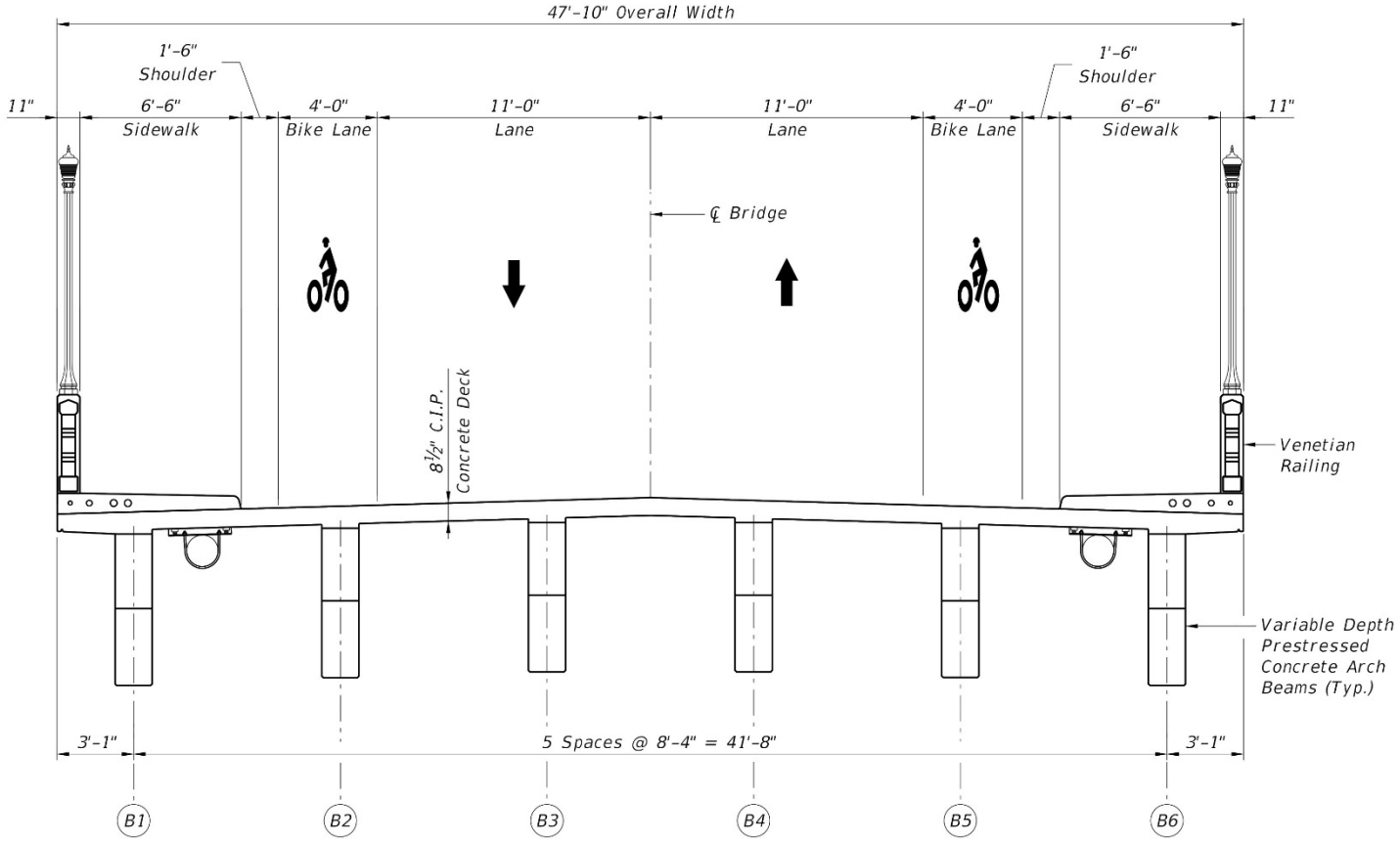
Estimated Cost Range:

$52- $56 Million

Replacement Alternatives – Fixed Bridges

Alt. 7

Alt. 7 –Arch Beam



- 6.5 ft Sidewalk meets ADA requirements.
- 1.5 ft Shoulder and 4 ft Bike lane
- 11” Venetian Railing
- 47’ – 10” Overall width

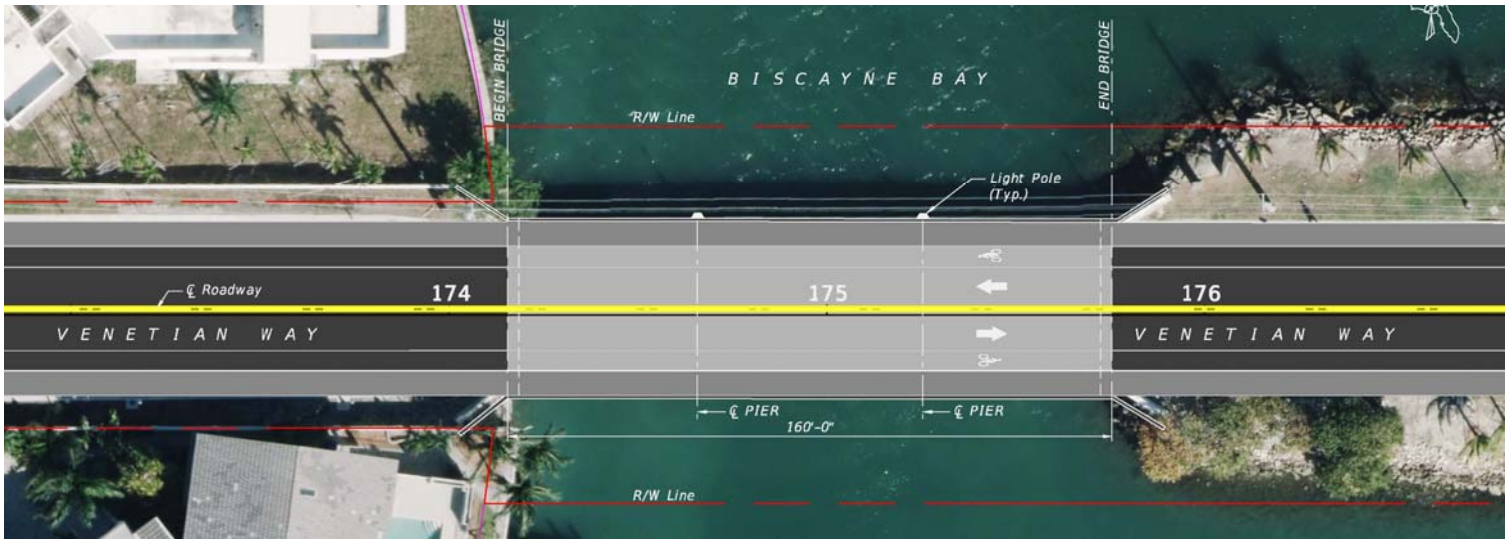
Typical Section

Build Alternatives

Replacement Alternatives – Fixed Bridges

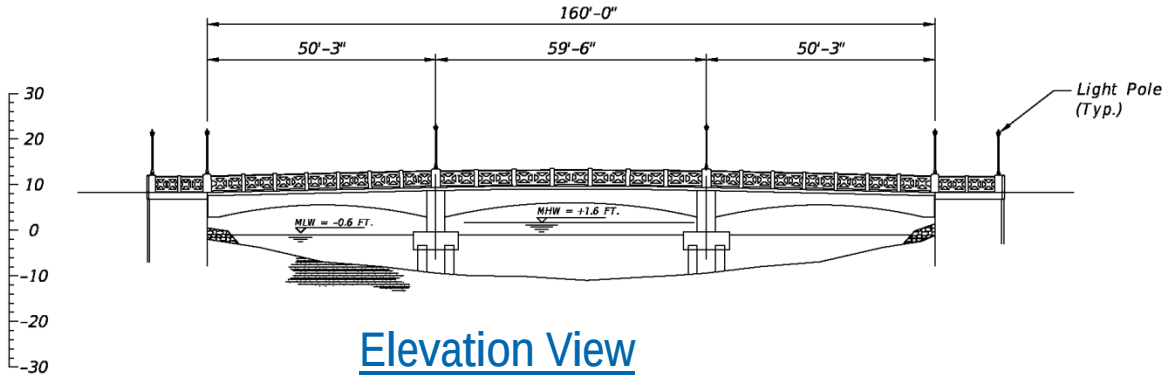
Alt. 7

Alt. 7 –Arch Beam



Plan View

- **Estimated Cost Range:**
  $33 - $37 Million

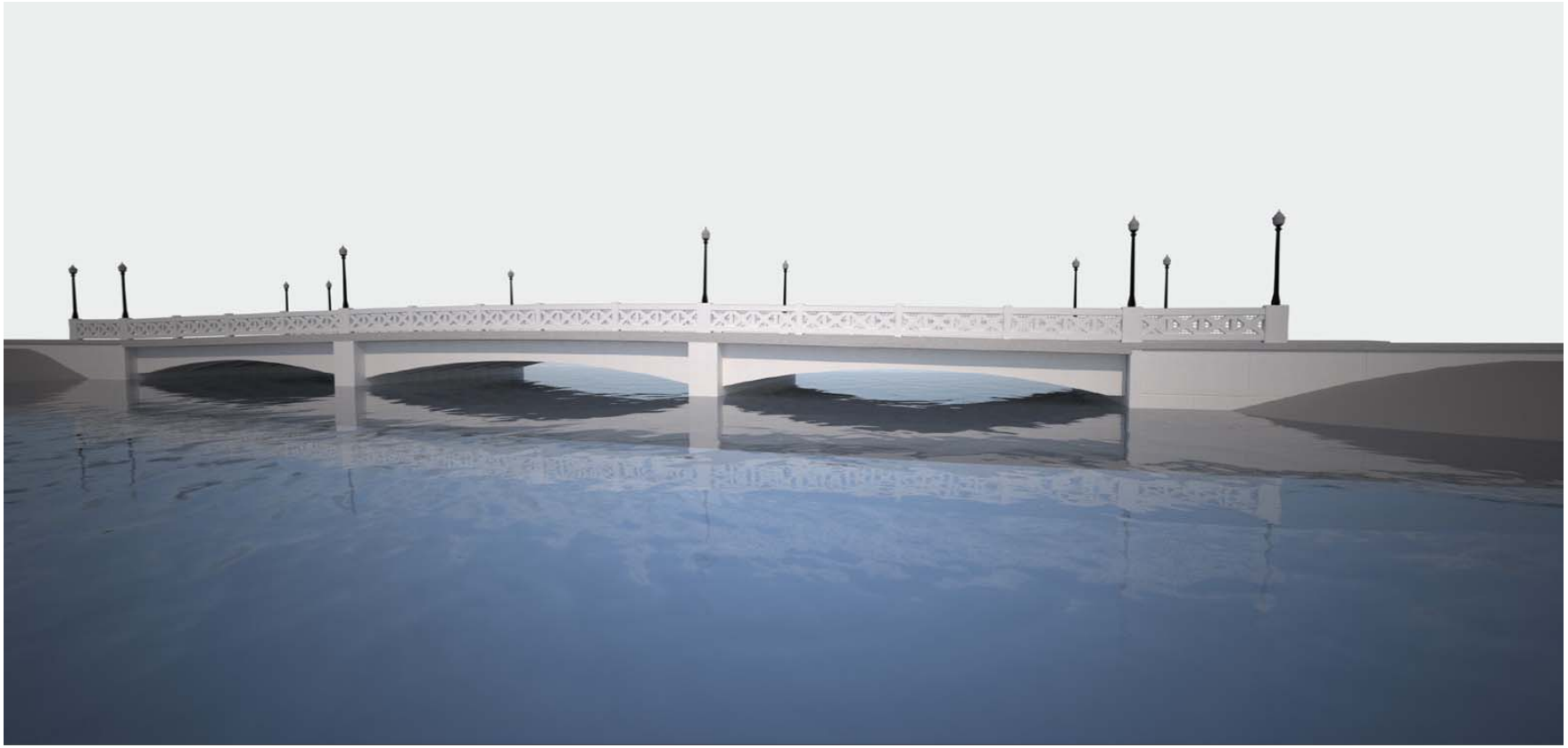


Elevation View

Replacement Alternatives – Fixed Bridges

Alt. 7

Alt. 7 –Arch Beam with Venetian Railing



Replacement Alternatives – Fixed Bridges

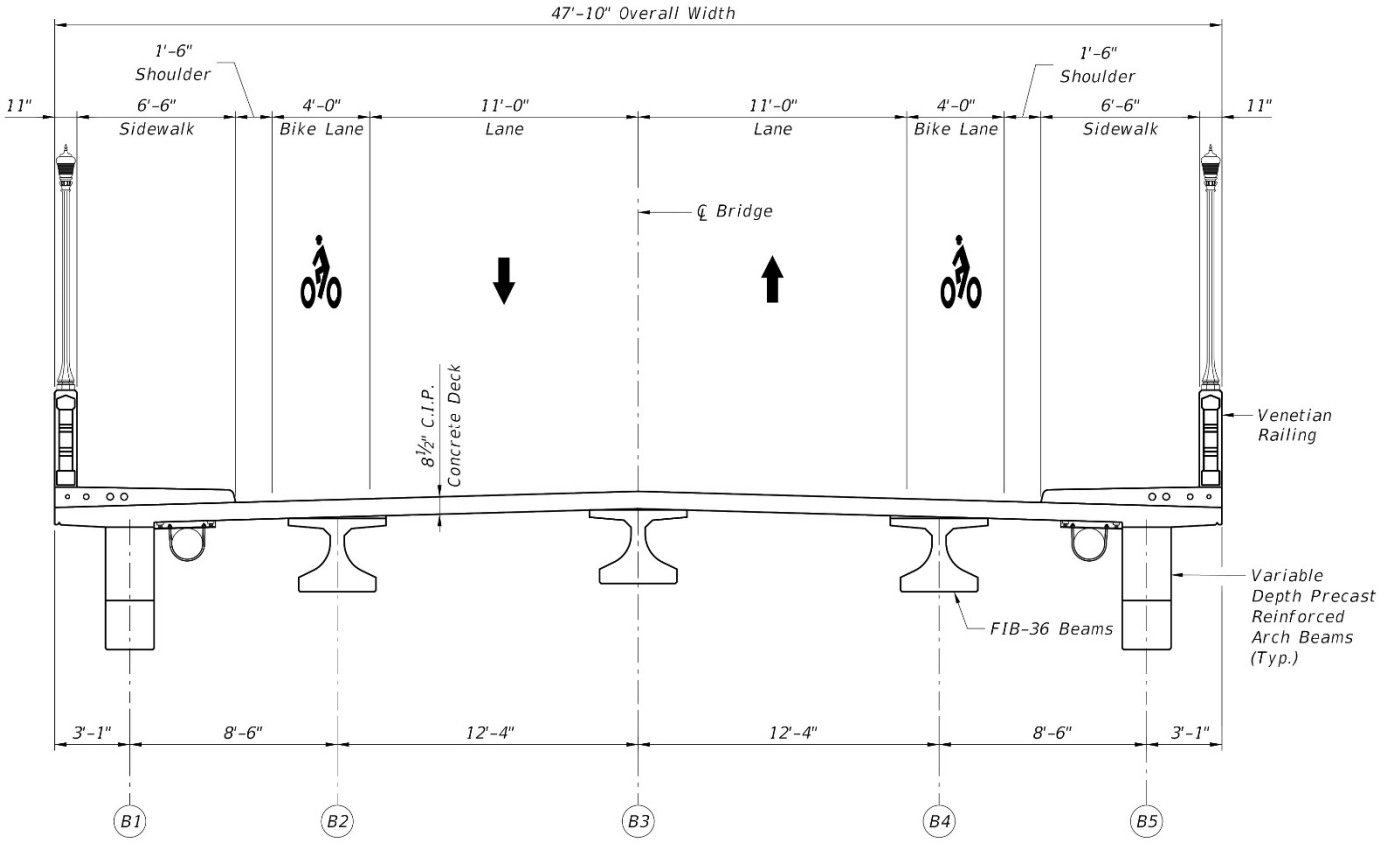
Alt. 7

Alt. 7 –Arch Beam with Wyoming Railing

Replacement Alternatives – Fixed Bridges

Alt. 8

Alt. 8 – FIB with Arched Fascia (FA)



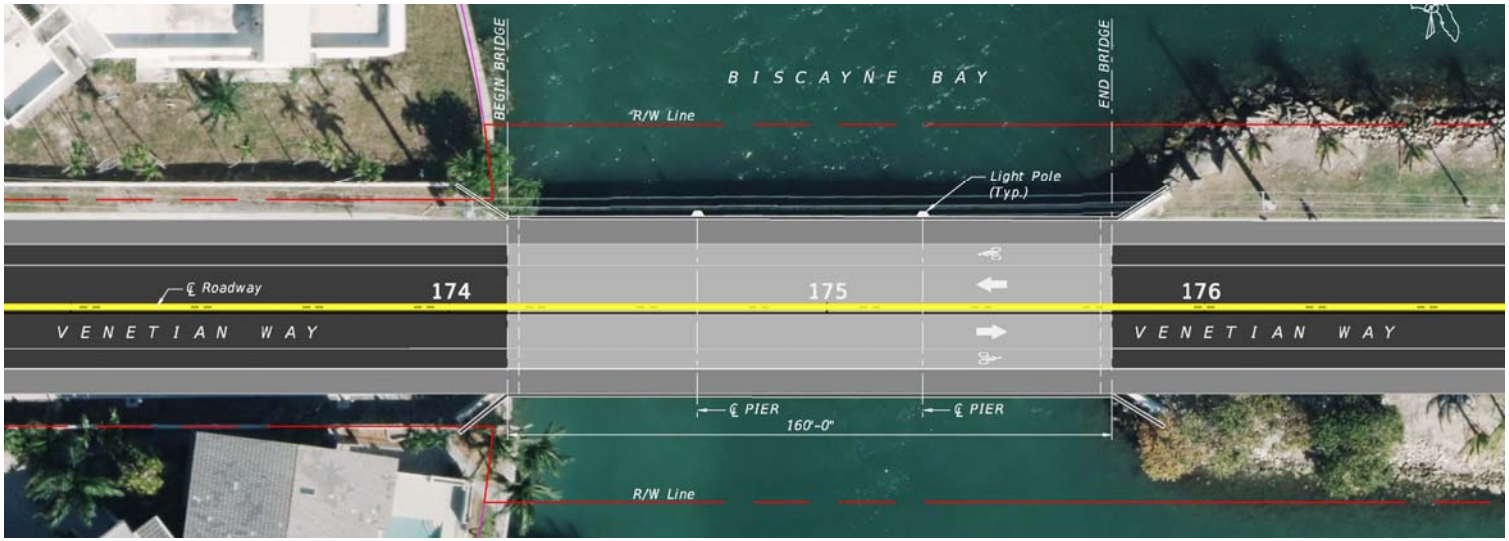
Typical Section

- 6.5 ft Sidewalk meets ADA requirements.
- 1.5 ft Shoulder and 4 ft Bike lane
- 11” Venetian Railing
- 47’ – 10” Overall width

Replacement Alternatives – Fixed Bridges

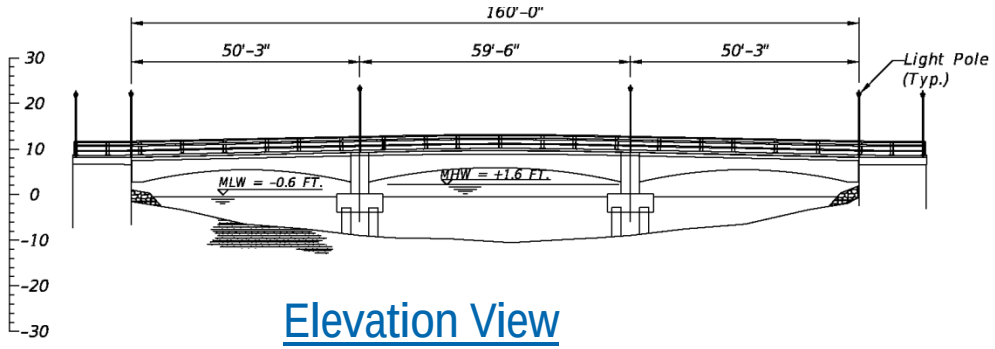
Alt. 8

Alt. 8 – FIB with Arched Fascia (FA)



Plan View

- **Estimated Cost Range:**
  $31 - $36 Million

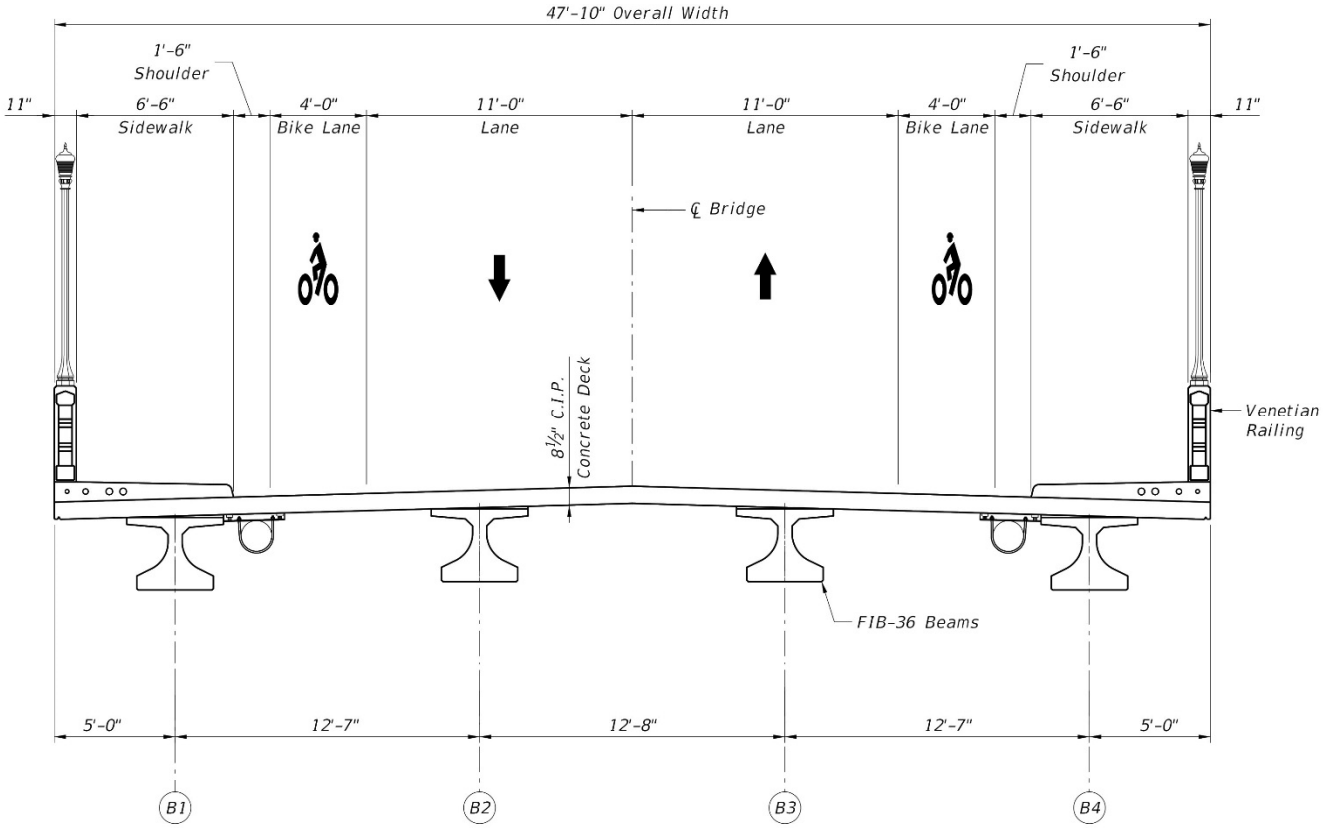


Elevation View

Replacement Alternatives – Fixed Bridges

Alt. 9

Alt. 9 – FIB (F)



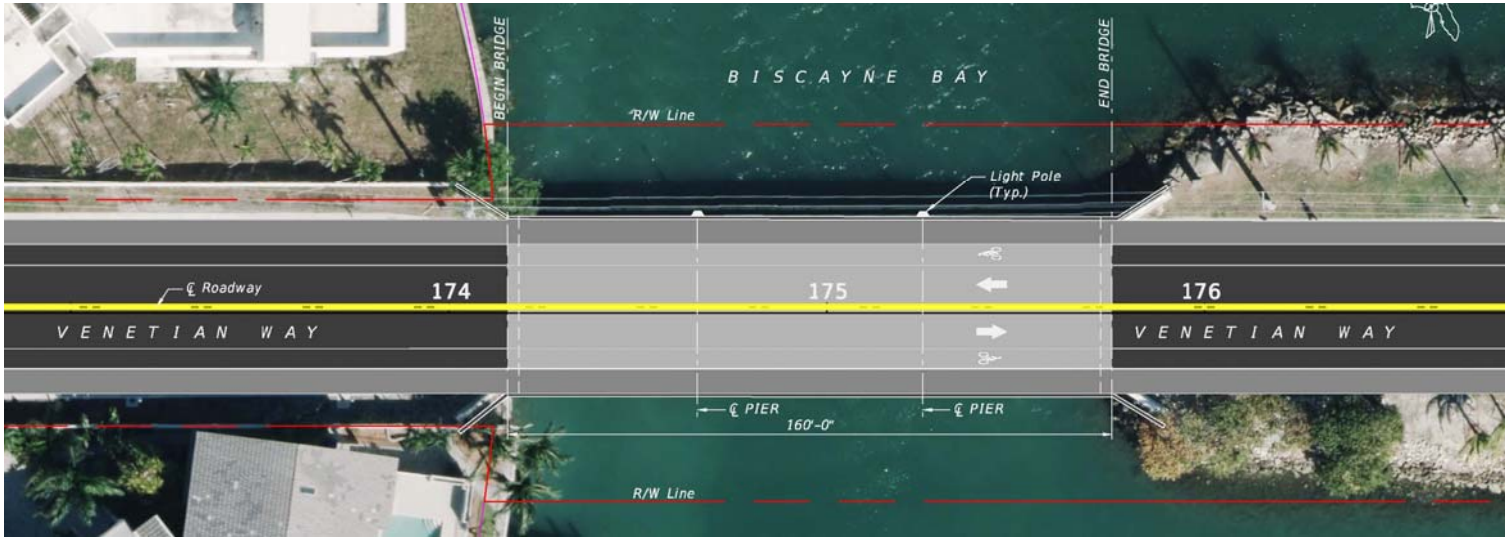
- 6.5 ft Sidewalk meets ADA requirements.
- 1.5 ft Shoulder and 4 ft Bike lane
- 11” Venetian Railing
- 47’ – 10” Overall width

Typical Section

Replacement Alternatives – Fixed Bridges

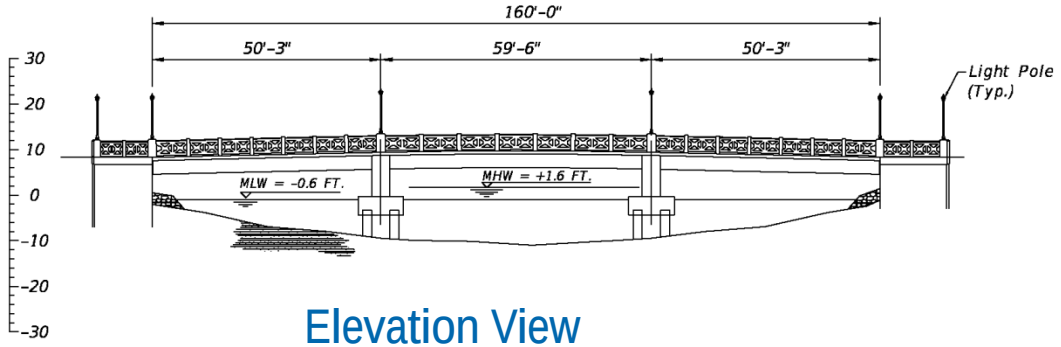
Alt. 9

Alt. 9 – FIB (F)



Plan View

- **Estimated Cost Range:**
  $26 - $32 Million

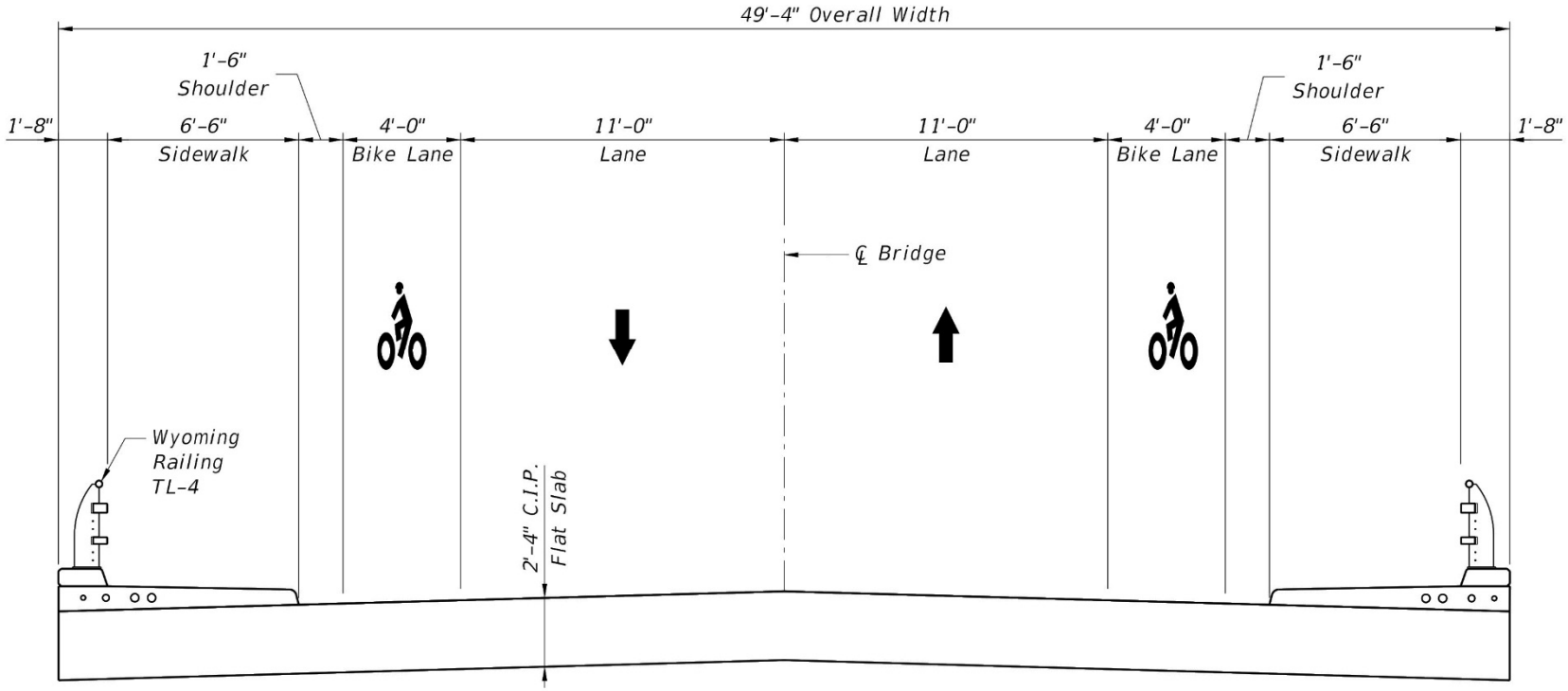


Elevation View

Replacement Alternatives – Fixed Bridges

Alt. 10

Alt. 10 – Flat Slab (FS)



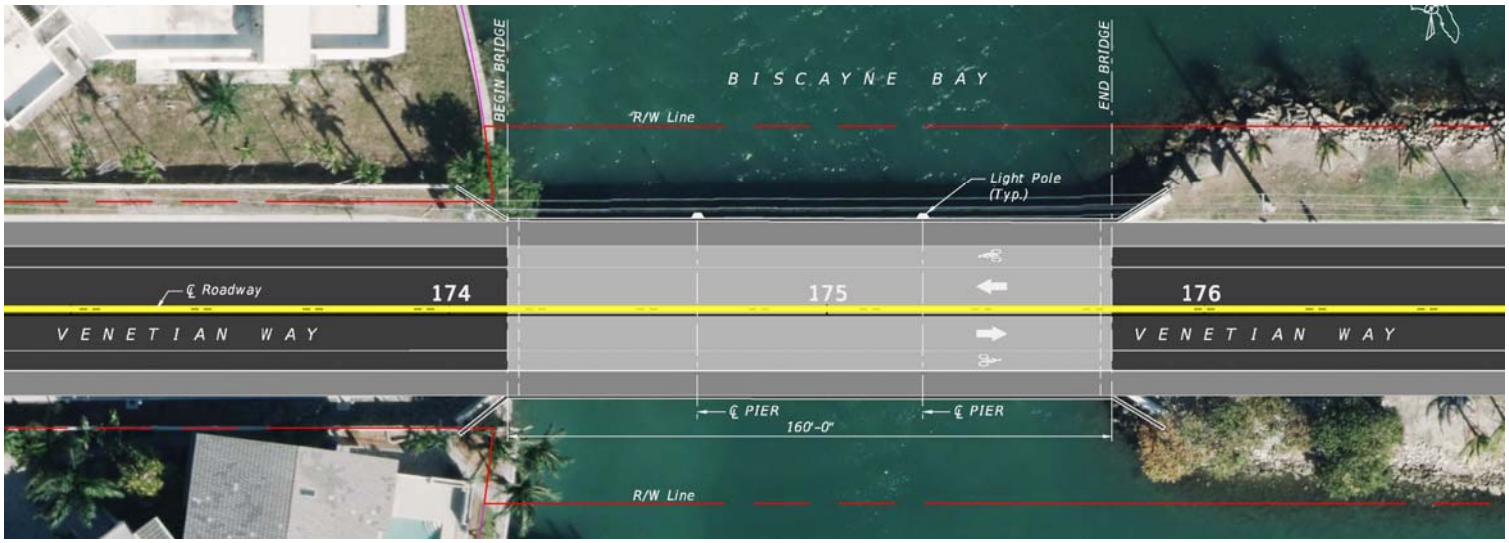
- 6.5 ft Sidewalk meets ADA requirements.
- 1.5 ft Shoulder and 4 ft Bike lane
- 1’ - 8” Wyoming TL-4 Railing
- 49’ – 4” Overall Width

Typical Section

Replacement Alternatives – Fixed Bridges

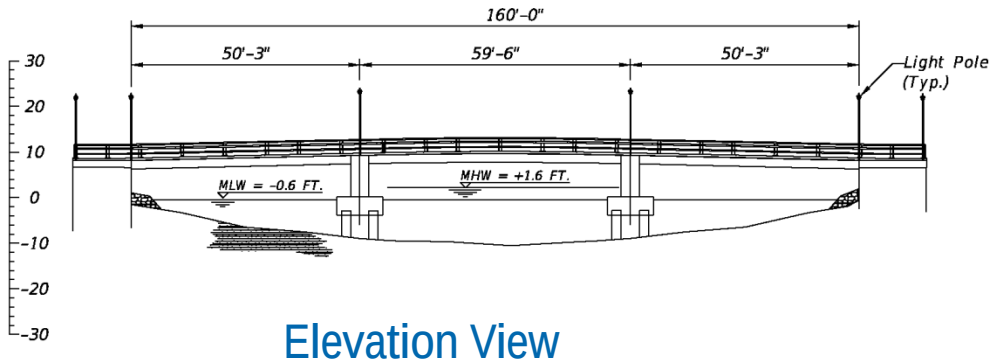
Alt. 10

Alt. 10 – Flat Slab (FS)



Plan View

- **Estimated Cost Range:**
  $31 - $34 Million

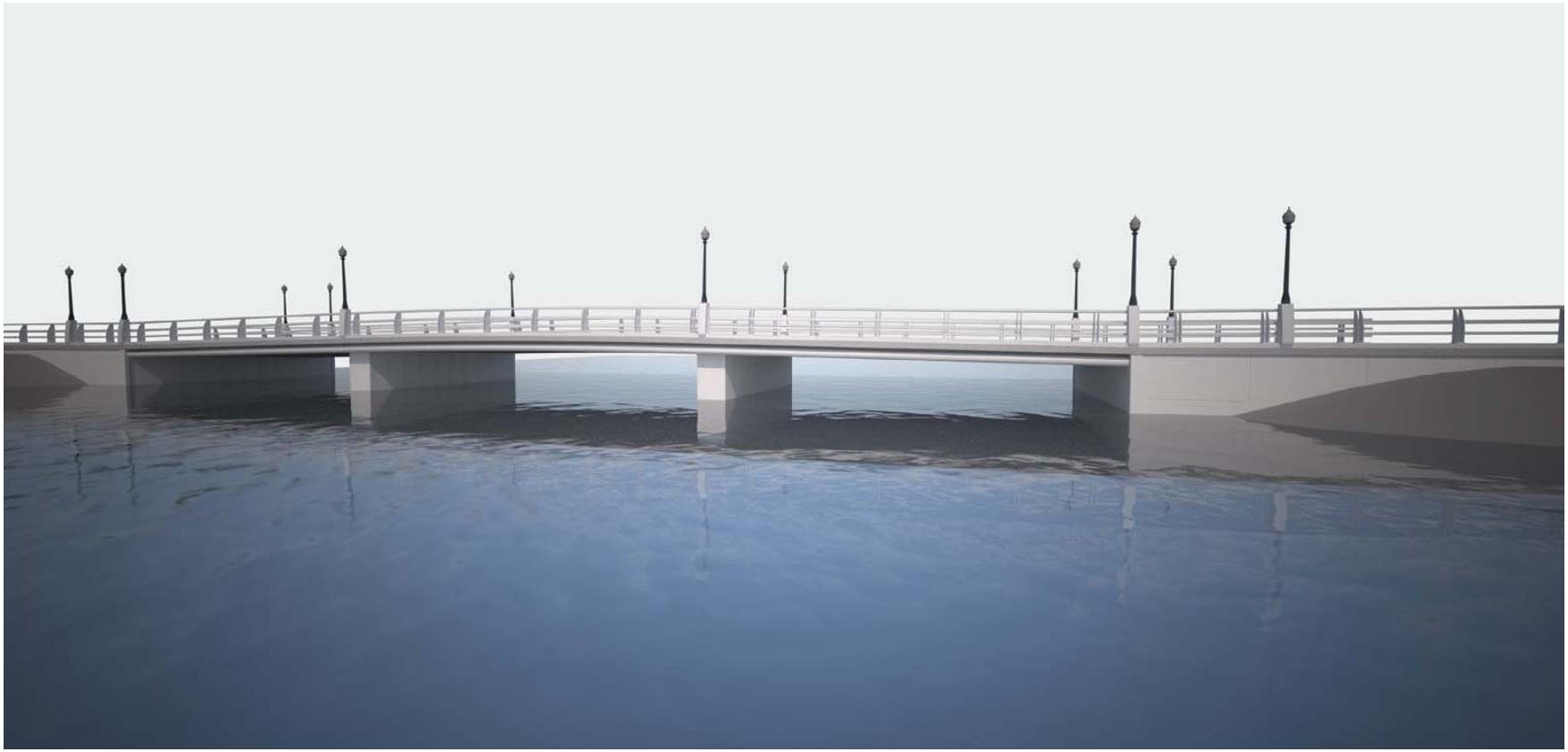


Elevation View

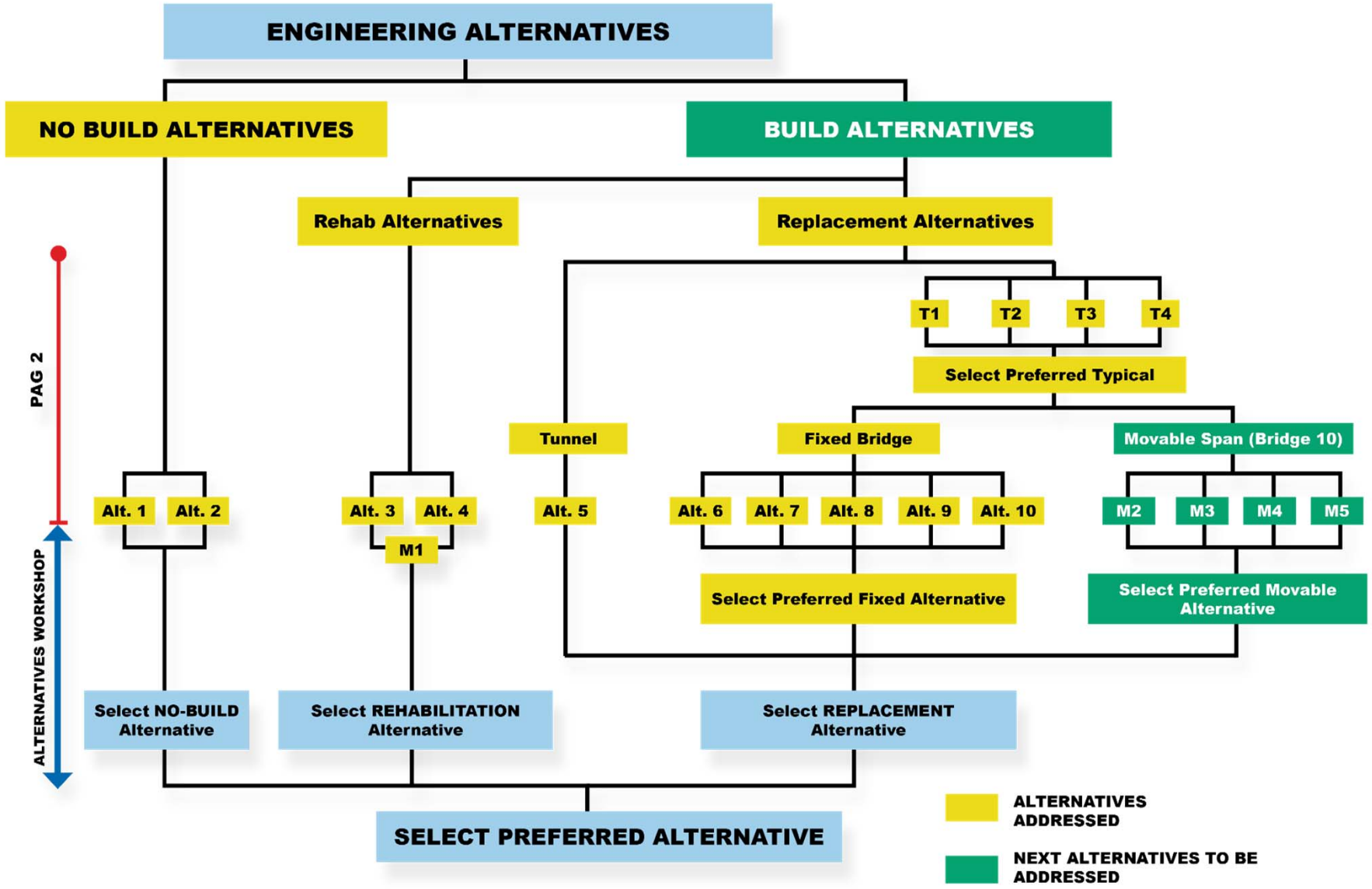
Replacement Alternatives – Fixed Bridges

Alt. 10

Alt. 10 – Flat Slab (FS)



Summary and Next Steps



Replacement Alternatives – Movable Bridges

M2

Alt. M2 – Swing Bridge/ Movable Span alternative

Advantages:

- Low Construction Cost
- Unlimited Vertical Clearance in Open Position
- Provides two Channels

Disadvantages:

- Hazard to Navigation
  - Pivots toward Approaching Vessels
  - Swing Span More Exposed to Vessel Collision
- No Direct Access to Swing Span in Open Position
- Non-Redundant for Maintenance

Estimated Cost Range: $23- $25 Million

Replacement Alternatives – Movable Bridges

M3

Alt. M3 – Vertical Lift Bridge

Advantages:

- **Shallower Girders/More Vertical Clearance - Span Lowered**
- **Typically Spans Longer Distance**
  - Span Waterway with no Piers in Water
  - Greater Horizontal Clearance
  - Improved Navigation Safety

Disadvantages:

- **High Construction Cost**
- **Tall Towers (85 to 90 ft)**
- **Restricted Vertical Clearance with Span Raised (65 ft)**
- **Longer Operating Time**
- **Non-Redundant for Maintenance**

Estimated Cost Range: $26 - $29 Million

M4

Replacement Alternative – Movable Bridges

Alt. M4 – Movable Span Alternatives M4 – Double Leaf & M5 – Single Leaf Bascules

Advantages:

- Economical/Low Construction Cost
- Unlimited Vertical Clearance in Raised Position
- Shortest Operating Time
- Most Similar to Existing Bridge
- Good Maintenance Access

Disadvantages:

- Larger Pier(s) in Waterway

M4 - Double Leaf Bascule:

- Redundant for Maintenance
- Shallower Girders/More Clearance
- Two Smaller Piers
- Symmetric Arrangement

M5 -Single Leaf Bascule:

- Non-Redundant for Maintenance
- Deeper Girders/Less Clearance
- One Larger Pier/One Smaller Pier
- Asymmetric Arrangement

Estimated Cost Range: $25- $28 Million

M4

Replacement Alternative – Movable Bridges

Alt. M4 – Movable Span Alternatives M4 – Double Leaf

M4

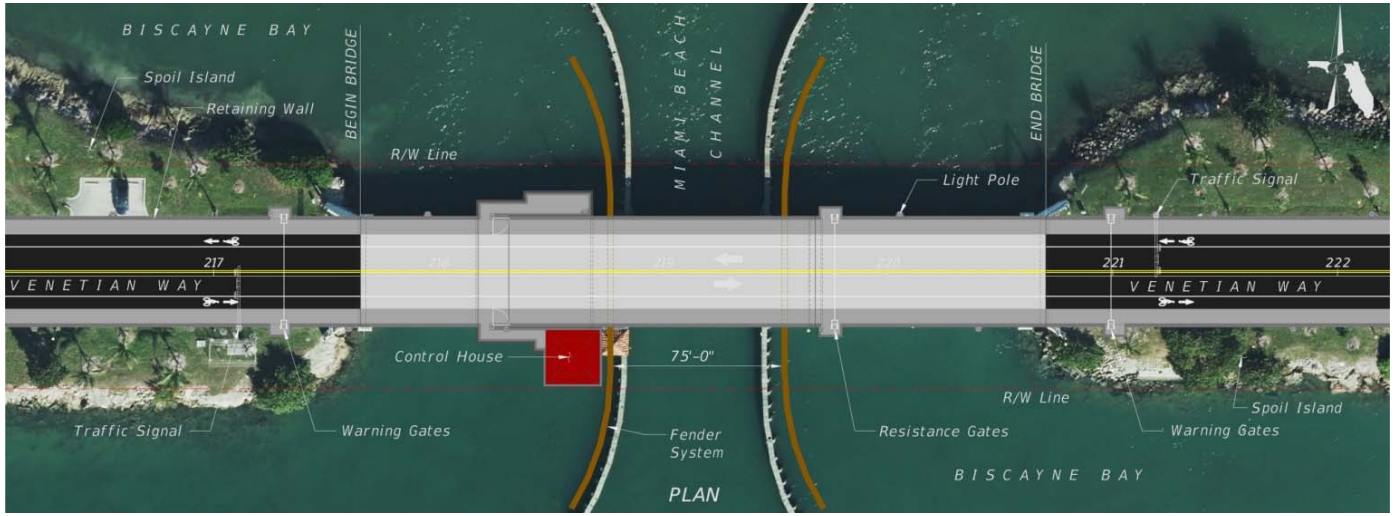
Replacement Alternative – Movable Bridges

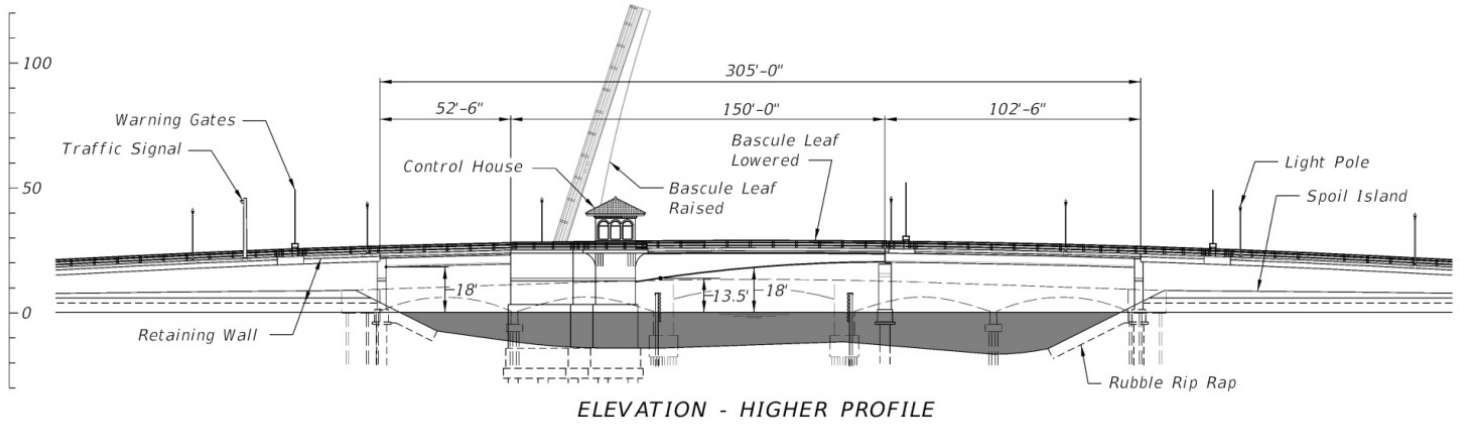
Alt. M4 – Movable Span Alternatives M4 – Double Leaf

M5

Replacement Alternative – Movable Bridges

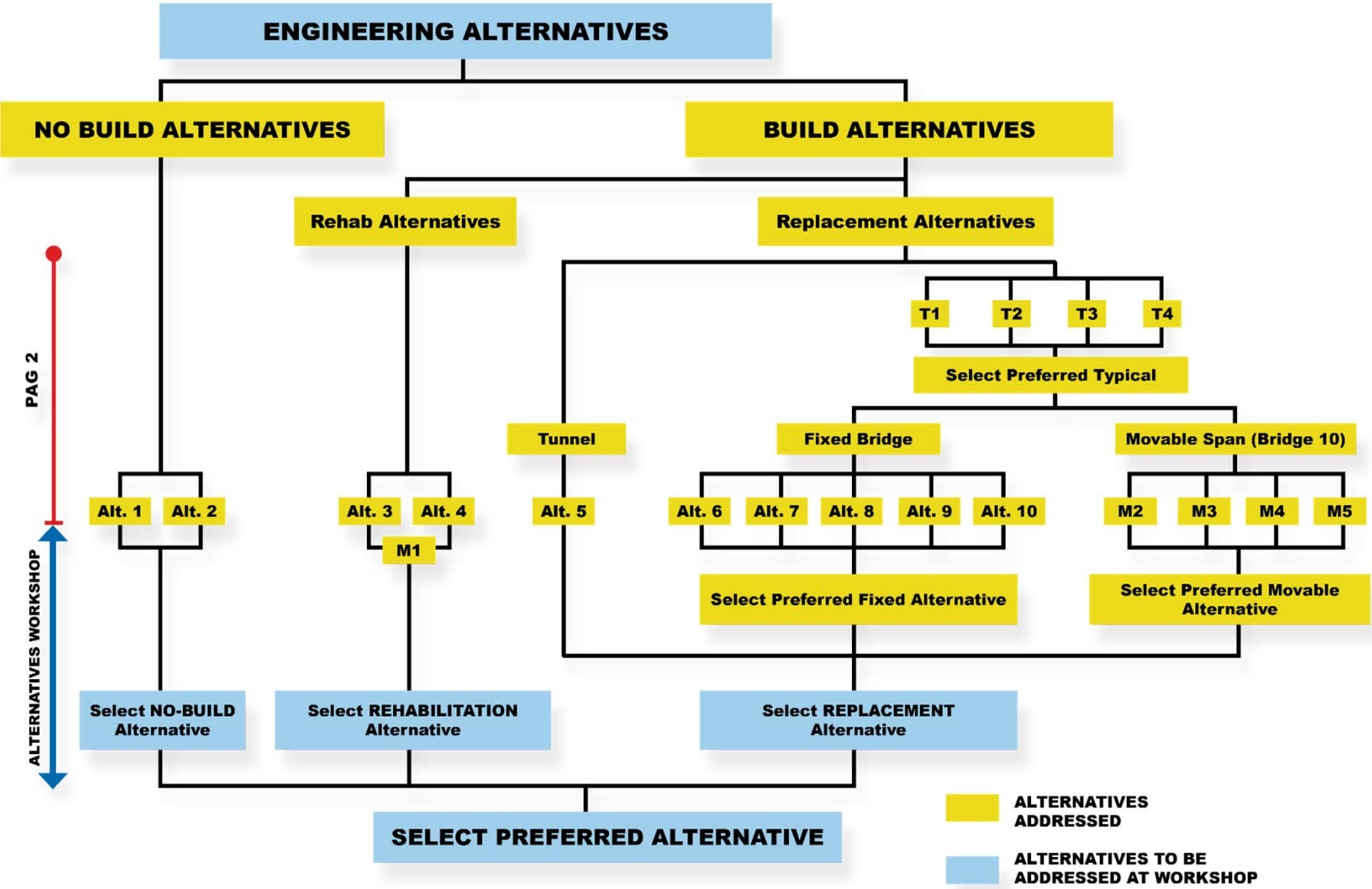
Alt. M5 – Movable Span, Single Leaf Bascule





Estimated Cost Range: $23- $26 Million

Summary and Next Steps



Hybrid Alternatives

Other Combinations of Alternatives are Possible

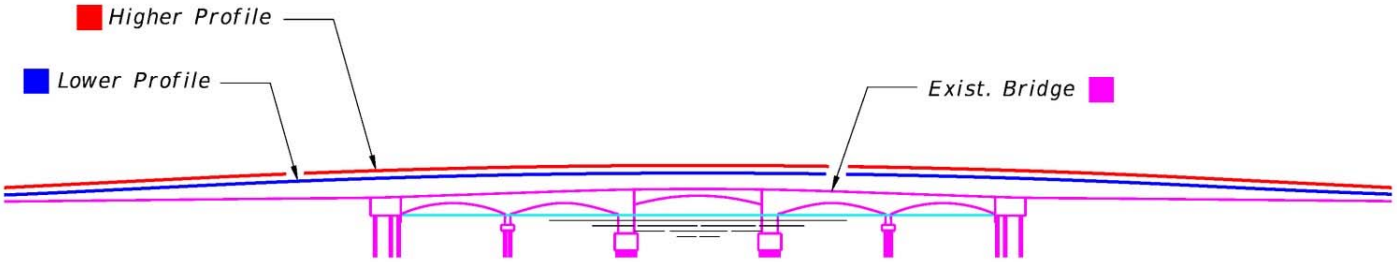
- **Different Structural System on the Fixed Bridges than on the Fixed Approach to the Movable Bridge**

Bridge Clearances (Replacement – East Bascule Bridge 10)

i. Navigational
   - Horizontal – increase for safety
   - Vertical – higher profile (Vessel study Diagram – Impacts of different heights)

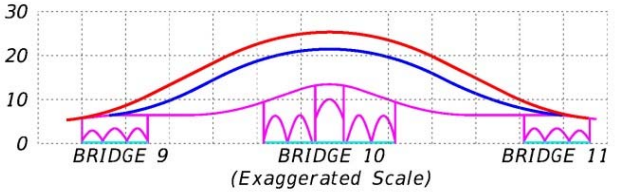
ii. Benefits of higher vertical profile

- **Higher Profile**:
  - Raises Peak Approx. 12 ft
  - Reduces Bridge Openings Approx. 50%
  - Exceeds Recommended Height for Corrosion Protection and Flooding during Coastal Storms
  - Requires Bridge 9 and 11 Replacement
- **Lower Profile**:
  - Raises Peak Approx. 8 ft
  - Reduces Bridge Openings Approx. 30%
  - Lowest Recommended Height for Corrosion Protection and Flooding during Coastal Storms
  - Requires Bridge 9 and 11 Modifications



BRIDGE 10 (True Scale)

NAVIGATION CLEARANCE POINT	VERT. CLEAR. (ABOVE MEAN HIGH WATER)		
	EXISTING	HIGHER	LOWER
at Fender	6.0'	17.0'	13.0'
at Center	10.0'	20.0'	16.0'
DECK ELEVATION AT PEAK	13.45'	25.32'	21.45'



BRIDGE 10 - VERTICAL PROFILE ALTERNATIVES

Impacts of No-Build vs Build

- **No build results in no environmental impacts**
- **Build Alternatives (Rehab. or Replacement)**
  - Similar natural resource impacts for both rehabilitation and replacement.
  - Potential impact to corals on substructure & scour protection areas
  - Temporary impacts due to construction methods
    - Barge Use, water quality, noise, air quality
  - Minimal threatened & endangered species involvement
    - Informal Section 7 (of the Endangered Species Act) Consultation with USFWS & NMFS
  - Retain and improve bicycle and pedestrian access

Other Considerations

Maintenance of Traffic – Individual Bridge Detours

- Same considerations for Rehabilitation or Replacement as both remove the deck
- Detours affect one bridge location at a time
- Construction Duration
- Public Safety
- Emergency Services
- Maintain Utility Services

Maintenance of Traffic – Temporary Fixed Bridge (at Bridge 10)

- **Used during 1998 rehabilitation**

Other Considerations

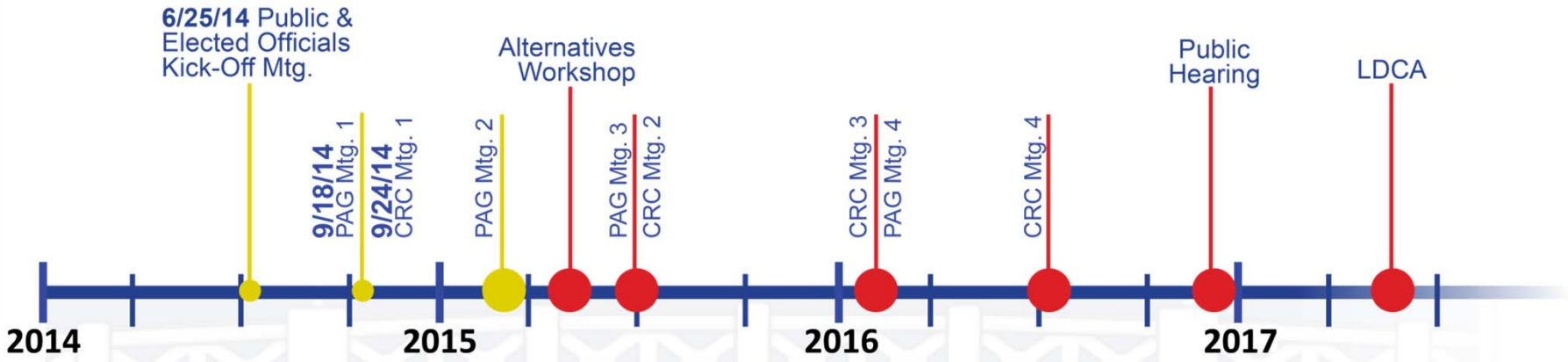
Utility Services

- **Maintain services throughout Construction**
  - Approach is dependent on selected MOT concept
- **Different Approach for Rehabilitation and Replacement**
  - Rehabilitation leaves portion of bridge from which utilities are supported
- **Subaqueous Crossings**
  - Phased construction

Anticipated Project Schedule

Next Steps

- Alternative's Workshop



LEGEND

CRC: Cultural Resource Committee
MTG: Meeting
PAG: Project Advisory Group
LDCA: Location Design Concept Acceptance

Stay Informed

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Miami-Dade County Contact

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Email: loveg@miamidade.gov

Phone: 305-514-6607

ONLINE

- Project webpage - Updates posted weekly

  http://www.fdotmiamidade.com/venetianbridgestudy

- Efficient Transportation Decision Making (ETDM)

  https://etdmpub.fla-etat.org/est/

  - **Click on Project Number on left hand menu**
  - **Type in 12756**
  - **Click "Go" or press Enter**