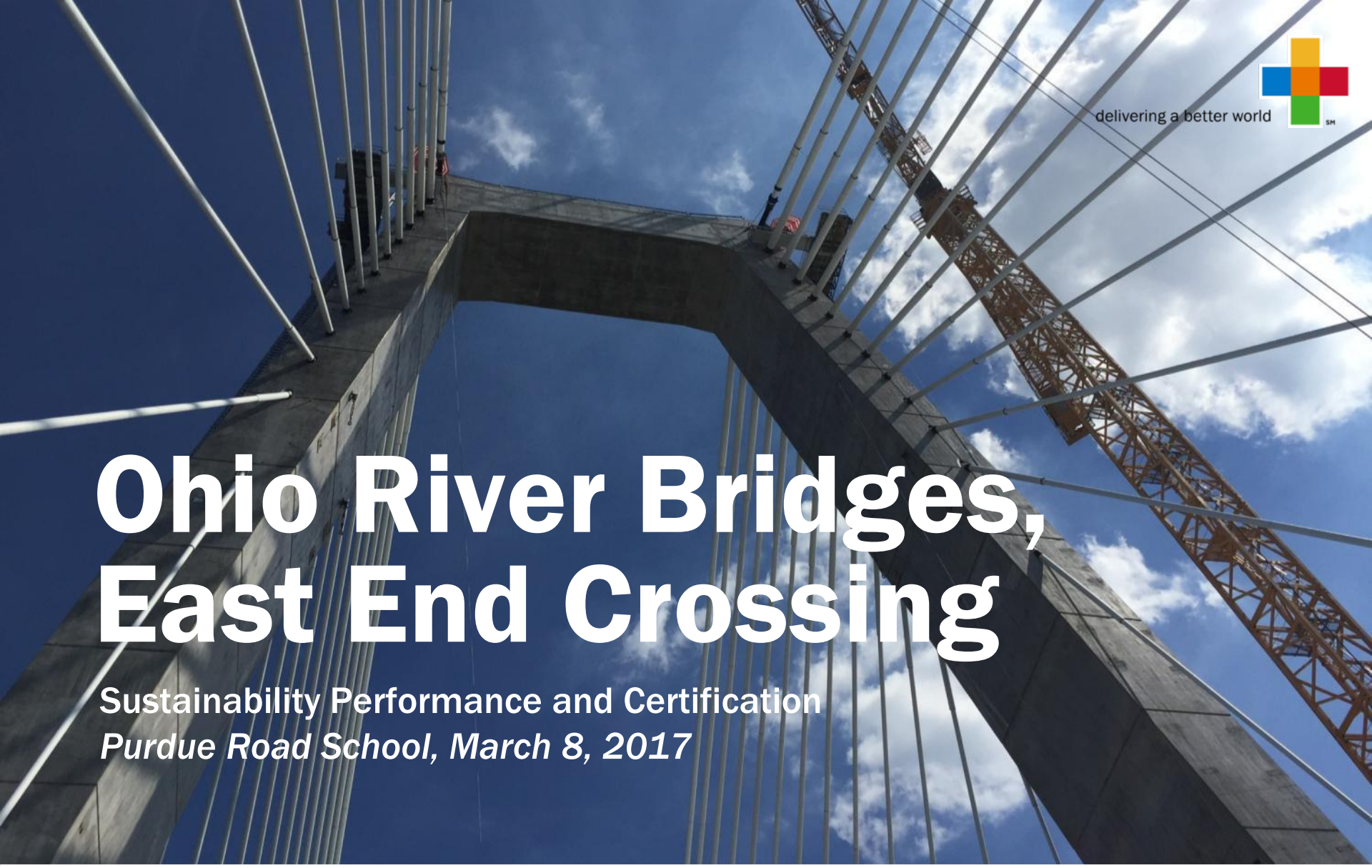


delivering a better world

# Ohio River Bridges, East End Crossing

## Sustainability Performance and Certification

*Purdue Road School, March 8, 2017*

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

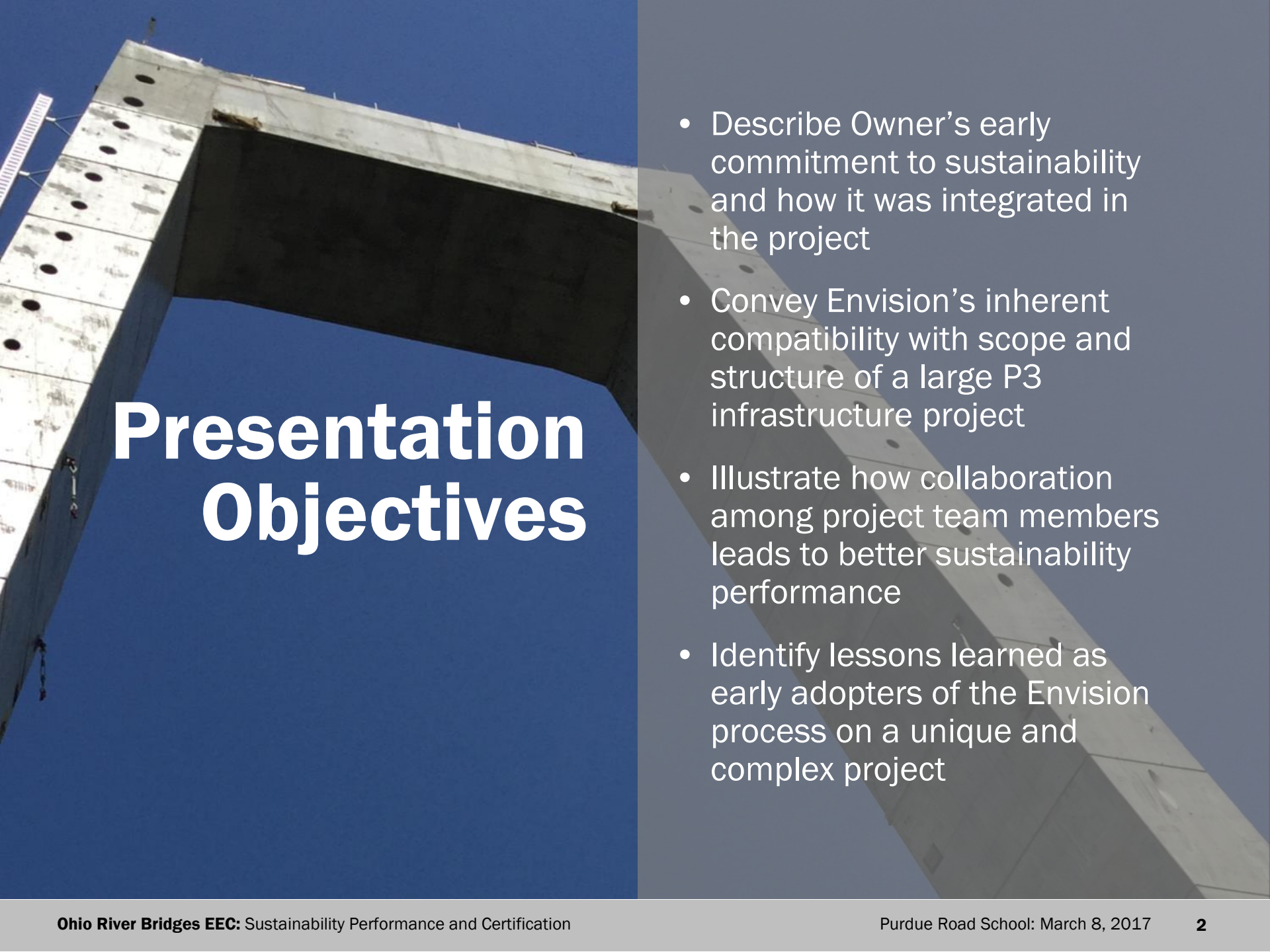
IFA Indiana Finance Authority

PARSONS

WVB East End Partners

WALSH VINCI BILFINGER BERGER JACOBS

BLN BEAM·LONGEST·NEFF



# Presentation Objectives

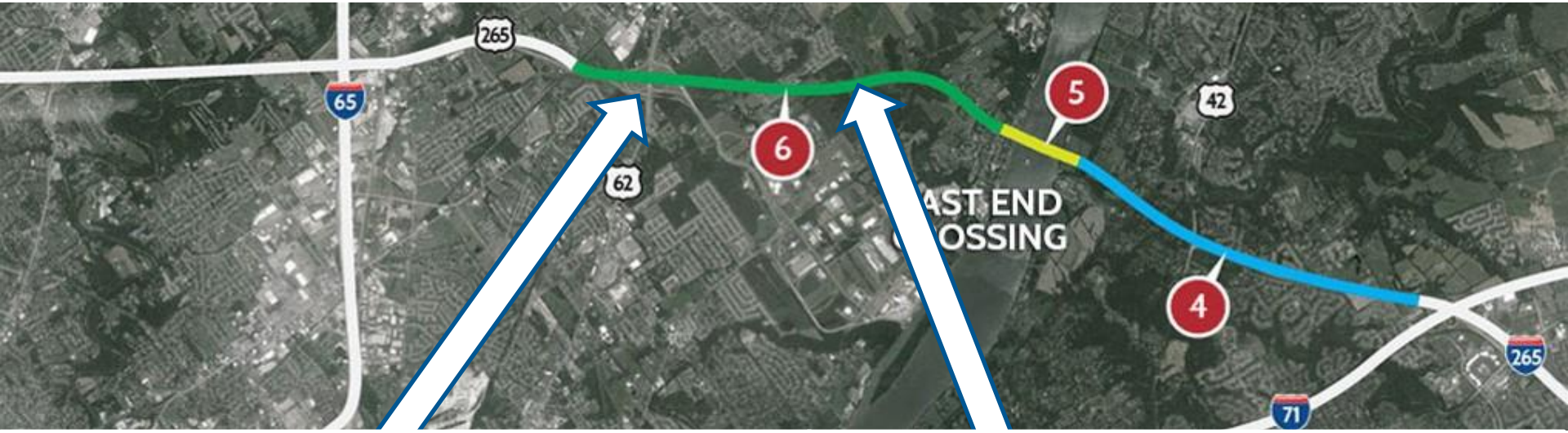
- Describe Owner's early commitment to sustainability and how it was integrated in the project
- Convey Envision's inherent compatibility with scope and structure of a large P3 infrastructure project
- Illustrate how collaboration among project team members leads to better sustainability performance
- Identify lessons learned as early adopters of the Envision process on a unique and complex project

# Project Overview

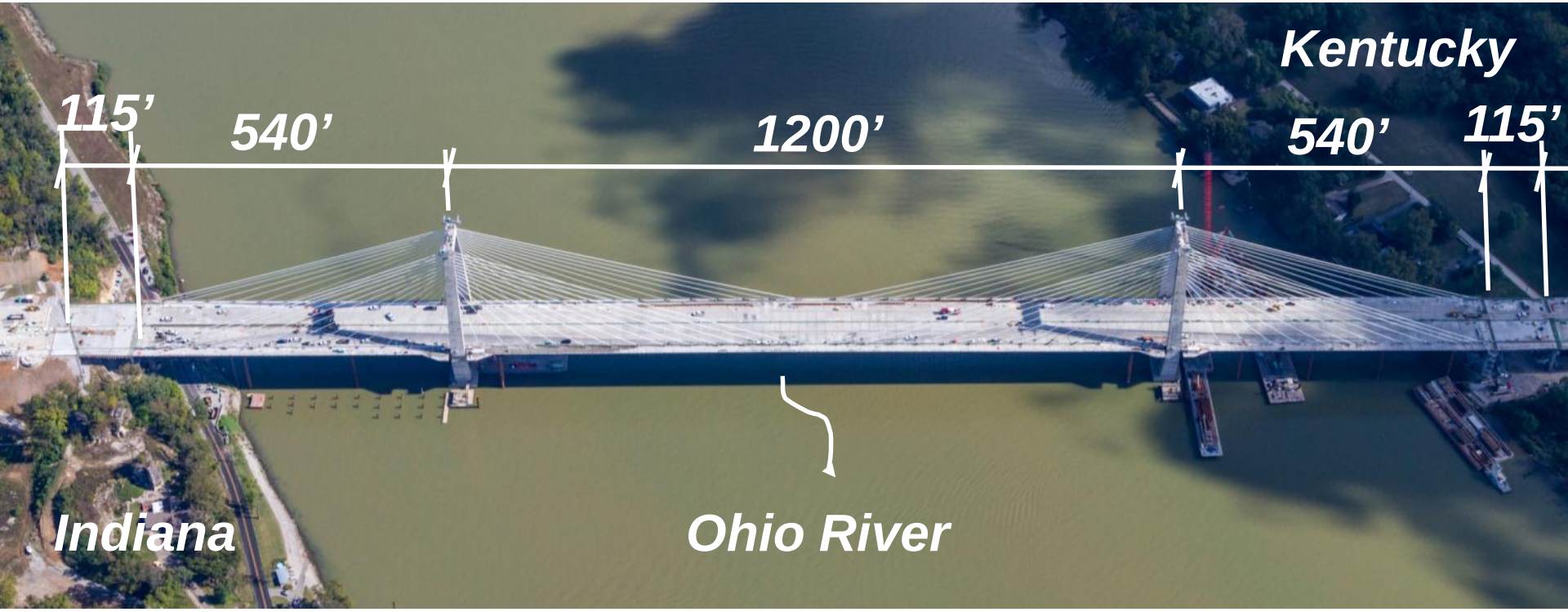
- ORB Scope of Work
- Envision Project Boundary
- P3 Project Structure
- Schedule

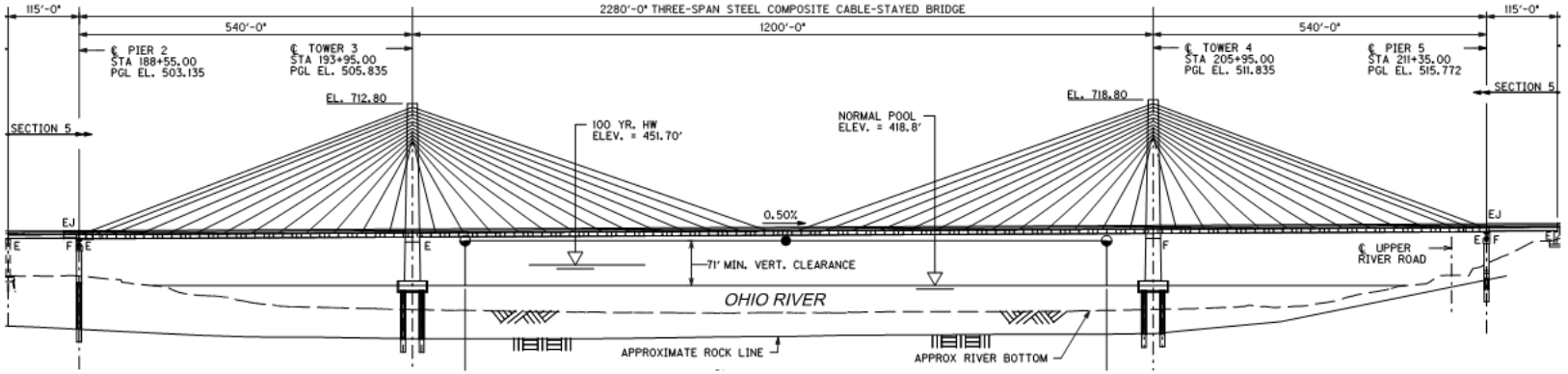
# Ohio River Bridges Project Scope of Work

# Envision Boundary: Indiana Approach




# Envision Boundary: Bridge Overview

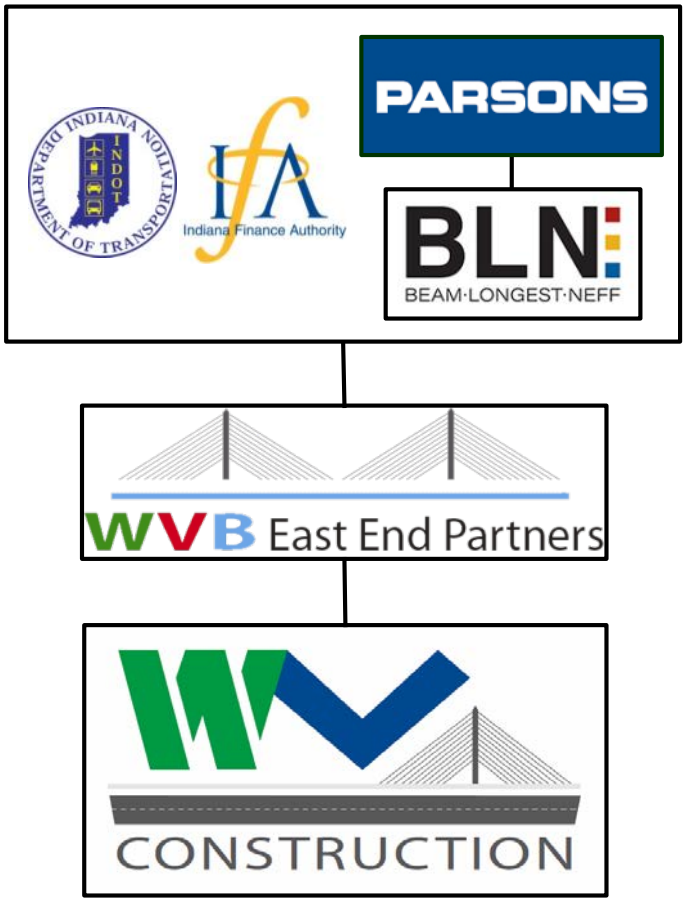


# Envision Boundary: Kentucky Approach

# P3 Project : Team Members

- Owner/CEI
- Developer
- Contractor




# P3 Project: Structure

- *Design/Build/Finance/ Operate/Maintain*
- *35 year O&M period post-construction*

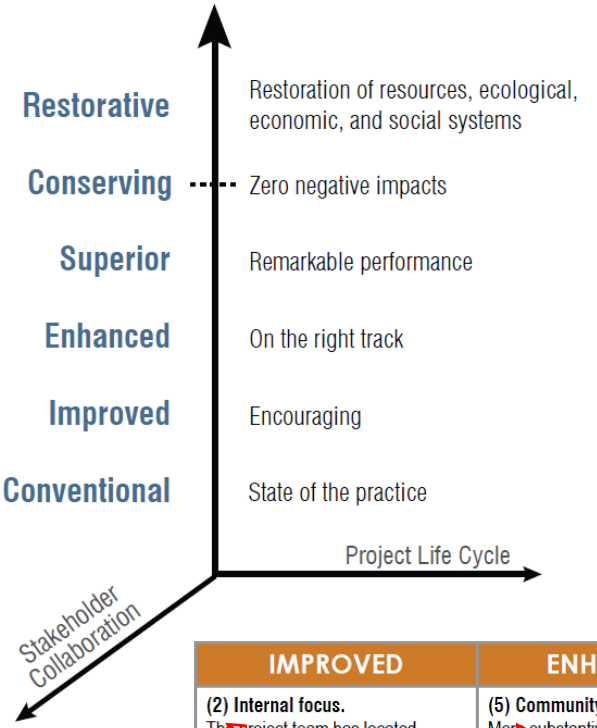
# P3 Project: Contractual Requirements

- Use an "accepted methodology for evaluation of the performance of the Sustainability Management Plan such as INVEST ("Infrastructure Voluntary Evaluation Sustainability Tool"), Greenroads, or GreenLITES."
- Sustainability priorities:
  - Optimize life-cycle costs
  - Provide economic opportunity
  - Protect and conserve environmental resources
  - Improve cross river accessibility and mobility
  - Proactively engage the public
- Prepare a Sustainability Management Plan that demonstrates how Developer will address sustainability goals and objectives project during both performance of the Construction Work and the Operating Period.

# Envision Rating System

- Format and Structure
- Award Levels
- Process Implementation

# Envision: Format and Structure




- Six categories, 55 credits
  - Quality of Life
  - Leadership
  - Natural World
  - Resource Allocation
  - Climate and Risk
- Levels of achievement defined for each credit

| IMPROVED | ENHANCED | SUPERIOR | CONSERVING | RESTORATIVE |
|---|---|---|---|---|
| **(2) Internal focus.** The project team has located and reviewed the most recent and relevant community planning information. Some, but not systematic outreach to stakeholders and decision makers has taken place. Some relatively easy, but not particularly important or meaningful changes made to the project. No significant adverse community effects are caused by the project (A, B, C) | **(5) Community linkages.** More substantive efforts to locate, review, assess and incorporate the needs, goals and plans of the host community into the project. Most potential negative adverse impacts of the project on the host community are reduced or eliminated. Key stakeholders are involved the project decision-making process. (A, B, C) | **(10) Broad community alignment.** All relevant community plans are reviewed and verified through stakeholder input. The project team works to achieve good project alignment with community plans, recognizing that the scope of the project is a limiting factor. Potential negative impacts on nearby affected communities are reduced or eliminated. (A, B, C) | **(20) Holistic assessment and collaboration.** The project makes a net positive contribution to the quality of life of the host and nearby affected communities. The project team makes a holistic assessment of community needs, goals and plans, incorporating meaningful stakeholder input. Project meets or exceeds important identified community needs and long-term requirements for sustainability. Remaining adverse impacts are minimal, mostly accepted as reasonable tradeoffs for benefits achieved. The project has broad community endorsement. (A, B, C) | **(25) Community renaissance.** Through rehabilitation of important community assets, upgraded and extended access, increased safety, improved environmental quality and additional infrastructure capacity, the project substantially reinvigorates the host and nearby communities. Working in genuine collaboration with stakeholders and community decision-makers, the project owner and the project team scope the project in a way that elevates community awareness and pride. Overall quality of life in these communities is markedly elevated. (A, B, C, D) |

AVAILABLE POINTS

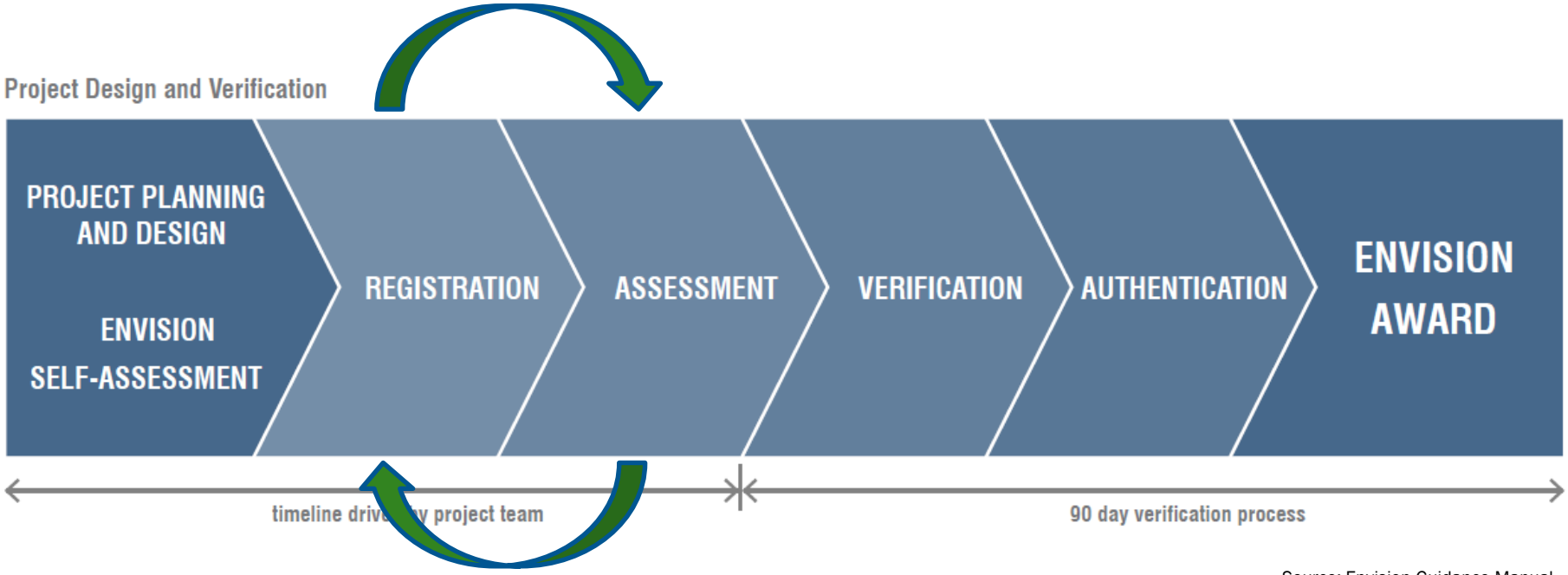
# Envision: Award Levels

809 point maximum, although not every credit is applicable to every project, so the total number available points for a given project may be lower

Award levels are based on a percentage of total applicable points:

- **Bronze** (20% of total)
- **Silver** (30% of total)
- **Gold** (40% of total)
- **Platinum** (50% of total)

# Envision: Process Implementation




Source: Envision Guidance Manual

# Envision: Process Implementation

**Mar 2003**
- Environmental Impact Statement
- Triple Bottom Line evaluation implicitly initiated

**Jul 2012**
- Parsons/INDOT Sustainability Workshop
- Procurement Preparations

**Oct 2012**
- Release of Procurement Documents
- Sustainability Requirements integrated in the RFP Technical Provisions

**Apr 2014**
- Sustainability Management Plan
- WVB/WVC proposes Envision for performance evaluation

**Mar 2015**
- Developer Envision Self-Assessment, validated by Owner/CEI in regular sustainability working meetings

**Apr 2015**
- Third-Party verification discussion
- WVB/WVC/IFA/Parsons agree to partner to pursue third-party ISI review

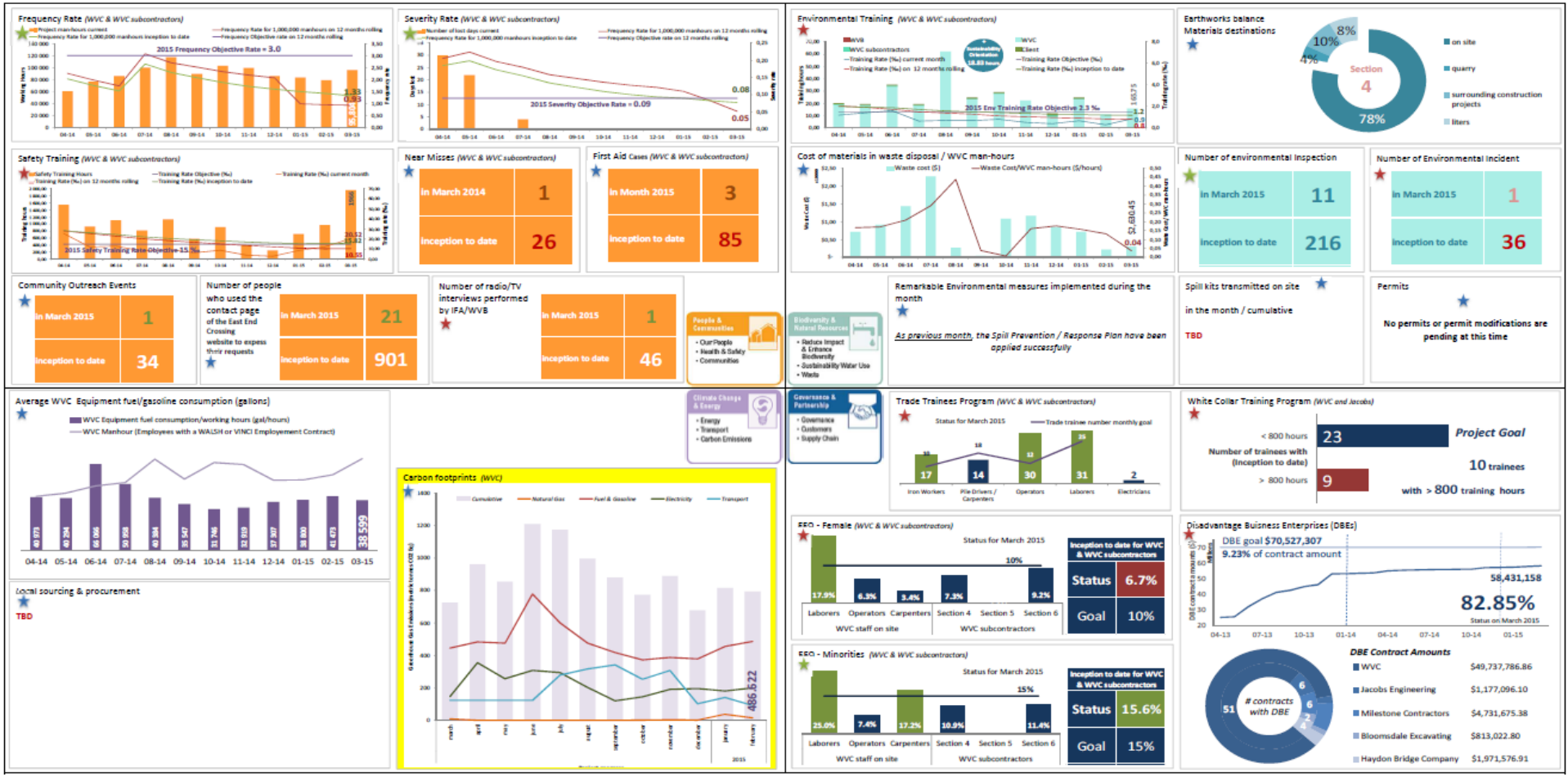
**Feb 2016**
- Pre-registration meeting with ISI
- General feedback received on the Envision Team's Assessment

**Jun 2016**
- Project Registration with ISI
- Documentation submission, Verification/Authentication begins

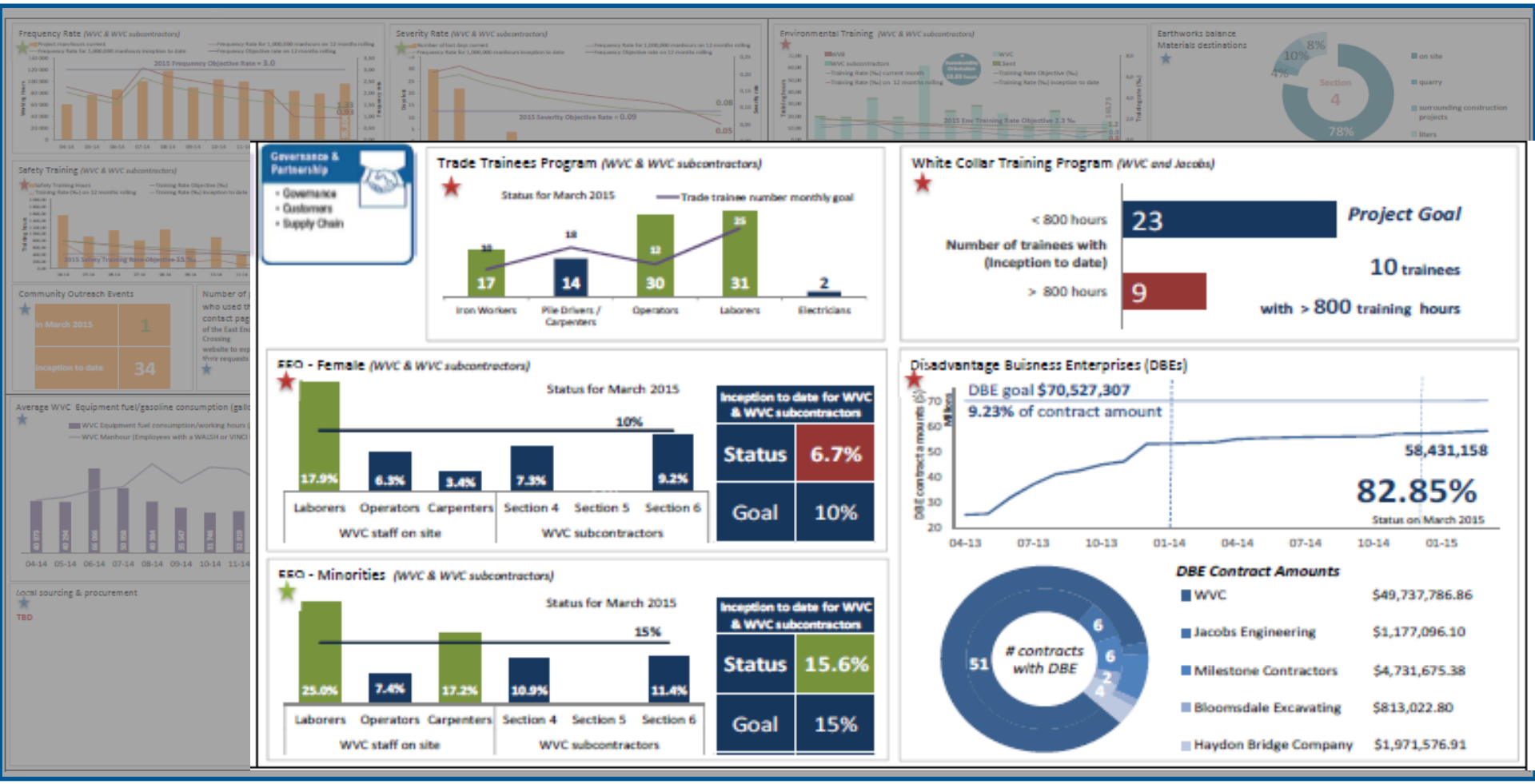
**Aug 2016**
- Verification review comments received from ISI
- Clarifications prepared by Envision Team

**Oct 2016**
- Resubmission of revised credits
- Final verification and award

# Envision: Process Implementation



# Envision: Process Implementation



# Envision: Process Implementation


ORB-EEC PERFORMANCE BY ENVISION CATEGORY

| Category | Team Self-Assessment (June 2015) Low/High | Assessment submitted to ISI (June 2016) | Preliminary Verification / Authentication (August 2016) | Envision Award (October 2016) |
|---|---|---|---|---|
| QL | 93/119 | 165 | 131 | 166 / 181 =92% |
| LD | 58/84 | 121 | 72 | 96/ 121 = 79% |
| RA | 47/47 | 33 | 24 | 24/ 182 =13% |
| NW | 55/88 | 93 | 93 | 93 / 203 = 46% |
| CR | 43/57 | 70 | 45 | 70/ 122 =57% |
| Total | 296/395 | 460 | 365 | 449 / 809 =56% |

# Sustainability Features

- Quality of Life
- Natural World
- Resource Allocation
- Leadership
- Climate and Risk

# Features: Quality of Life (QL)

## QUALITY OF LIFE

13 Credits

### 1 PURPOSE

QL1.1 Improve Community Quality of Life
QL1.2 Stimulate Sustainable Growth & Development
QL1.3 Develop Local Skills and Capabilities

### 2 WELLBEING

QL2.1 Enhance Public Health and Safety
QL2.2 Minimize Noise and Vibration
QL2.3 Minimize Light Pollution
QL2.4 Improve Community Mobility and Access
QL2.5 Encourage Alternative Modes of Transportation
QL2.6 Improve Site Accessibility, Safety & Wayfinding

### 3 COMMUNITY

QL3.1 Preserve Historic and Cultural Resources
QL3.2 Preserve Views and Local Character
QL3.3 Enhance Public Space

QL0.0 Innovate or Exceed Credit Requirements

- Engage community stakeholders
- Exert positive influence on local economy and workforce
- Exceed normal health and safety requirements
- Minimize environmental impacts of construction (vibration, light pollution, etc.)
- Improve access and alternative transportation options
- Preserve local historical, cultural, and public assets

ORB-EEC QL Category Achievement: 166/181 points (91%)

# QL1.1 Improve Community Quality of Life

- Achieved a "Restorative" rating
- Highlights:
  - Extensive community involvement
  - Ease downtown traffic congestion
  - Minimized impact to affected communities


# QL3.1 Preserve Historic and Cultural Resources

- Achieved a "Restorative" rating
- Highlights:
  - Monitoring of historic structures throughout construction
  - Design to reduce light pollution around historic structures
  - Tunnel under the historic Drumanard Estate

# Features: Natural World (NW)

## NATURAL WORLD
15 Credits

### 1 SITING

NW1.1 Preserve Prime Habitat
NW1.2 Protect Wetlands and Surface Water
NW1.3 Preserve Prime Farmland
NW1.4 Avoid Adverse Geology
NW1.5 Preserve Floodplain Functions
NW1.6 Avoid Unsuitable Development on Steep Slopes
NW1.7 Preserve Greenfields

### 2 LAND+WATER

NW2.1 Manage Stormwater
NW2.2 Reduce Pesticides and Fertilizer Impacts
NW2.3 Prevent Surface and Groundwater Contamination

### 3 BIODIVERSITY

NW3.1 Preserve Species Biodiversity
NW3.2 Control Invasive Species
NW3.3 Restore Disturbed Soils
NW3.4 Maintain Wetland and Surface Water Functions

NW0.0 Innovate or Exceed Credit Requirements

- Preserve prime farmland, unique habitats
- Protect wetlands and other natural water bodies
- Avoid developments on adverse geological formations, sensitive aquifers, steep slopes
- Preserve floodplains and greenfields
- Manage quantity and quality of stormwater runoff
- Prevent contamination of surface and groundwater contamination
- Promote biodiversity through invasive species management, maintaining functionality of soils and surface water

ORB-EEC NW Category Achievement: 93/203 points (46%)

# NW1.1 Preserve Prime Habitat

- Achieved a "Conserving" rating
- Highlights:
  - Protection of the American Bald Eagle by establishing buffer zones and noise restrictions
  - Protection of the endangered Gray and Indiana bats' summer habitat

# NW3.4 Maintain Wetland and Surface Water Functions

- Achieved a "Restorative" rating
- Highlights:
  - Well Head Protection Area protection efforts
  - Protecting and restoring streams in the project ROW
  - Wetland mitigation

# Features: Resource Allocation (RA)

## RESOURCE ALLOCATION

14 Credits

### 1 MATERIALS

RA1.1 Reduce Net Embodied Energy
RA1.2 Support Sustainable Procurement Practices
RA1.3 Use Recycled Materials
RA1.4 Use Regional Materials
RA1.5 Divert Waste from Landfills
RA1.6 Reduce Excavated Materials Taken Off Site
RA1.7 Provide for Deconstruction and Recycling

### 2 ENERGY

RA2.1 Reduce Energy Consumption
RA2.2 Use Renewable Energy
RA2.3 Commission and Monitor Energy Systems

### 3 WATER

RA3.1 Protect Fresh Water Availability
RA3.2 Reduce Potable Water Consumption
RA3.3 Monitor Water Systems

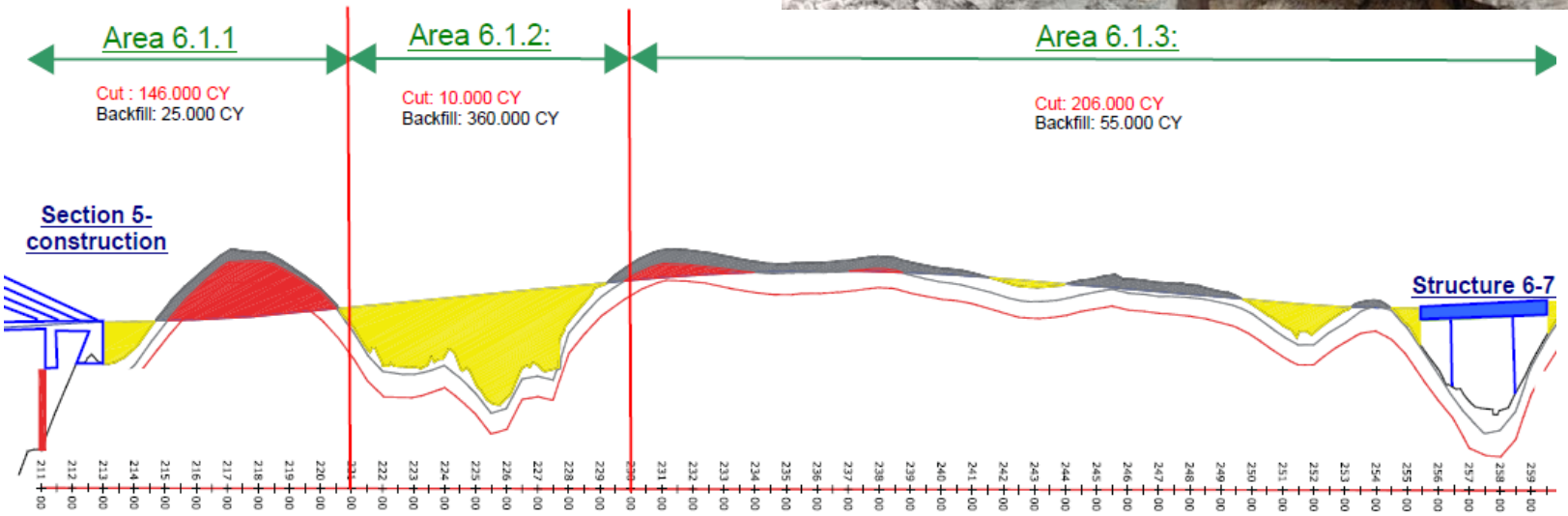
RA0.0 Innovate or Exceed Credit Requirements

- Perform life cycle assessment that demonstrates a reduction in embodied energy of project materials
- Use recycled and regionally manufactured materials
- Divert waste from landfills, encouraging deconstruction and material reuse
- Reduce energy and water consumption, monitoring systems to verify reductions
- Use renewable sources of energy, such as solar, wind, and geothermal
- Verify systems performance through commissioning and monitoring activities

ORB-EEC RA Category Achievement: 33/182 points (18%)

# RA1.6 Reduce Excavated Materials Taken Off Site

- Achieved a "Superior" rating
- Highlights:
  - 82% of materials excavated for the project were reused on site
  - Much of the excavation from the tunnels were used as fill in other sections of the project

# RA2.3 Commission and Monitor Energy Systems

- Achieved a "Conserving" rating
- Highlights:
  - Commissioning of tunnel systems and ITS systems project-wide
  - Training courses provided for tunnel commissioning and operation

# Features: Leadership (LD)

## LEADERSHIP

10 Credits

### 1 COLLABORATION

LD1.1 Provide Effective Leadership & Commitment
LD1.2 Establish a Sustainability Management System
LD1.3 Foster Collaboration and Teamwork
LD1.4 Provide for Stakeholder Involvement

### 2 MANAGEMENT

LD2.1 Pursue By-Product Synergy Opportunities
LD2.2 Improve Infrastructure Integration

### 3 PLANNING

LD3.1 Plan for Long-Term Monitoring & Maintenance
LD3.2 Address Conflicting Regulations and Policies
LD3.3 Extend Useful Life

LD0.0 Innovate or Exceed Credit Requirements

- Establish clear sustainability goals and a means to manage progress toward achieving them
- Use collaborative design and delivery processes
- Involve appropriate stakeholders in decision-making
- Plan for long-term monitoring and maintenance
- Improve project durability, flexible, and resiliency

ORB-EEC LD Category Achievement: 99/121 points (82%)

# LD1.4 Provide for Stakeholder Involvement

- Achieved a "Conserving" rating
- Highlights:
  - Significant involvement of local groups in the Environmental Impact Statement
  - Incorporation of stakeholder feedback into design of project features
  - Ombudsmen for communicating with public and investigating any reported problems









DNR

CITY OF JEFFERSONVILLE

National Trust *for* Historic Preservation®





# LD3.1 Plan for Long-Term Monitoring and Maintenance

- Achieved a "Conserving" rating
- Highlights:
  - Resources planned for/included in project bid
  - Over ten plans developed prior to Project Opening, including Snow and Ice Control Plan
  - Handback requirements and financial implications to availability payments


# LD3.3 Extend Useful Life

- Achieved a "Conserving" rating
- Highlights:
  - Project designed to accommodate an additional lane in each direction in the future
  - Detailed Corrosion Protection Plans for the approach bridge, main cable-stayed bridge, and tunnel
  - Short and long-term payback measures implemented

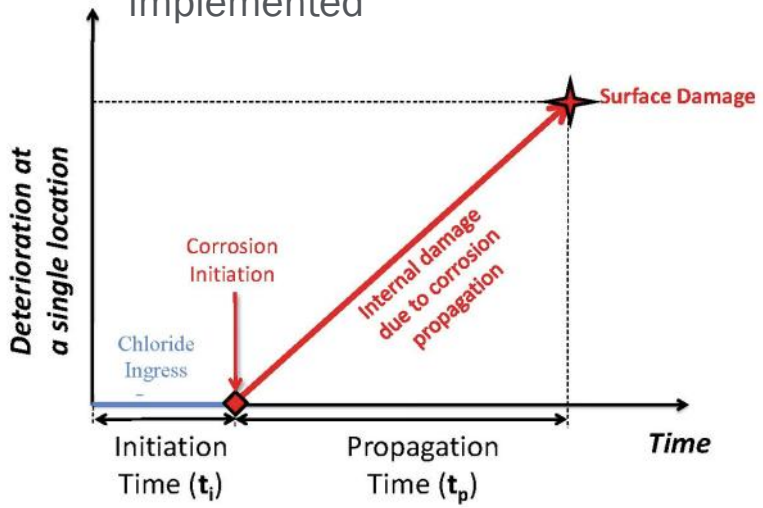



*Figure A.1.Corrosion sequence (adapted from Tuutti 1982).*

# Features: Climate and Risk (CR)

## CLIMATE AND RISK

8 Credits

### 1 EMISSIONS

CR1.1 Reduce Greenhouse Gas Emissions
CR1.2 Reduce Air Pollutant Emissions

### 2 RESILIENCE

CR2.1 Assess Climate Threat
CR2.2 Avoid Traps and Vulnerabilities
CR2.3 Prepare for Long-Term Adaptability
CR2.4 Prepare for Short-Term Hazards
CR2.5 Manage Heat Island Effects

CR0.0 Innovate or Exceed Credit Requirements

- Prevent air pollution
- Perform life-cycle carbon analysis
- Prepare climate assessment and adaptation plan
- Avoid long term project costs and risks
- Prepare for short term hazards, and long term-adaptability.
- Design hardscape to mitigate heat island effect

ORB-EEC CR Category Achievement: 70/122 points (57%)

# CR2.3 Prepare for Long-Term Adaptability

- Achieved a "Conserving" rating
- Highlights:
  - Design resiliency including an adaptive system through structural health monitoring
  - Scour Analysis, Rock Erodibility, Seismic Engineering, Wind, and Fracture Critical Reports

# CR2.5 Manage Heat Island Effects

- Achieved a "Conserving" rating
- Highlights:
  - 91% of hardscape has a solar reflective index (SRI) equal or greater than 29
  - Reflective building roofs and over five million square feet of reflective concrete reduce heat island effect

# Lessons Learned

- Construction Tracking
- Life Cycle Assessments

# Project & Team Attributes

- Willing and Enthusiastic Developer
- Team Synergy
- Leadership Team Involvement

## Why It Matters

- Ethical Obligation
- Educate and Raise Awareness
- Accountability

# Question & Answer

## Presenter Contact Information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# Appendix

# Envision vs. INVEST

| Attribute | ENVISION | INVEST |
|---|---|---|
| Organization | Institute for Sustainable Infrastructure (ISI – APWA, ASCE, ACEC) | FHWA |
| Current Version | June 22, 2015 | v1.2 (Released September 2015) |
| Geographic Reach | In use in both Canada and U.S. | U.S. projects primarily, also applied in Paraguay |
| Project Type(s) | Addresses roads, bridges, pipelines, railways, airports, dams, levees, landfills, water treatment systems, and other civil infrastructure | Focuses on highways & transportation, rather than general civil infrastructure projects or site development |
| Framework & Criteria | One module that focuses primarily on project planning and design, but includes life-cycle considerations, divided into 5 sections, 60 criteria<br>[Note: Other modules may be forthcoming] | ▪ System Planning for Regions (SPR) & System Planning for States (SPS) modules – one scorecard each, 17 criteria<br>▪ Project Development (PD) module – 7 scorecard options, 33 criteria<br>▪ Operations & Maintenance (OM) module – one scorecard, 14 criteria |
| Award Categories | Bronze (20% of total point allocation)<br>Silver (30% of total point allocation)<br>Gold (40% of total point allocation)<br>Platinum (50% of total point allocation) | Bronze (30% of total point allocation)<br>Silver (40% of total point allocation)<br>Gold (50% of total point allocation)<br>Platinum (60% of total point allocation) |
| Certification Process | Third-party review by ISI-assigned Verifier. | No third-party review or certification. Self-registration and scoring on FHWA INVEST website. |
| Fees | Reference materials available at no cost.<br>Registration fee: $1,000; Third-party Verification:<br>▪ $2,400 to $28,000 for members<br>▪ $3,000 to $33,000 for non-members<br>▪ projects over $250M contact ISI for fee details<br>▪ Appeals: $500 per credit | Free self-assessment using online tool, no certification fees payable to FHWA. |

# Historic Preservation Timeline