



# Fern Hollow Bridge Emergency Replacement

Jason Fuller, HDR



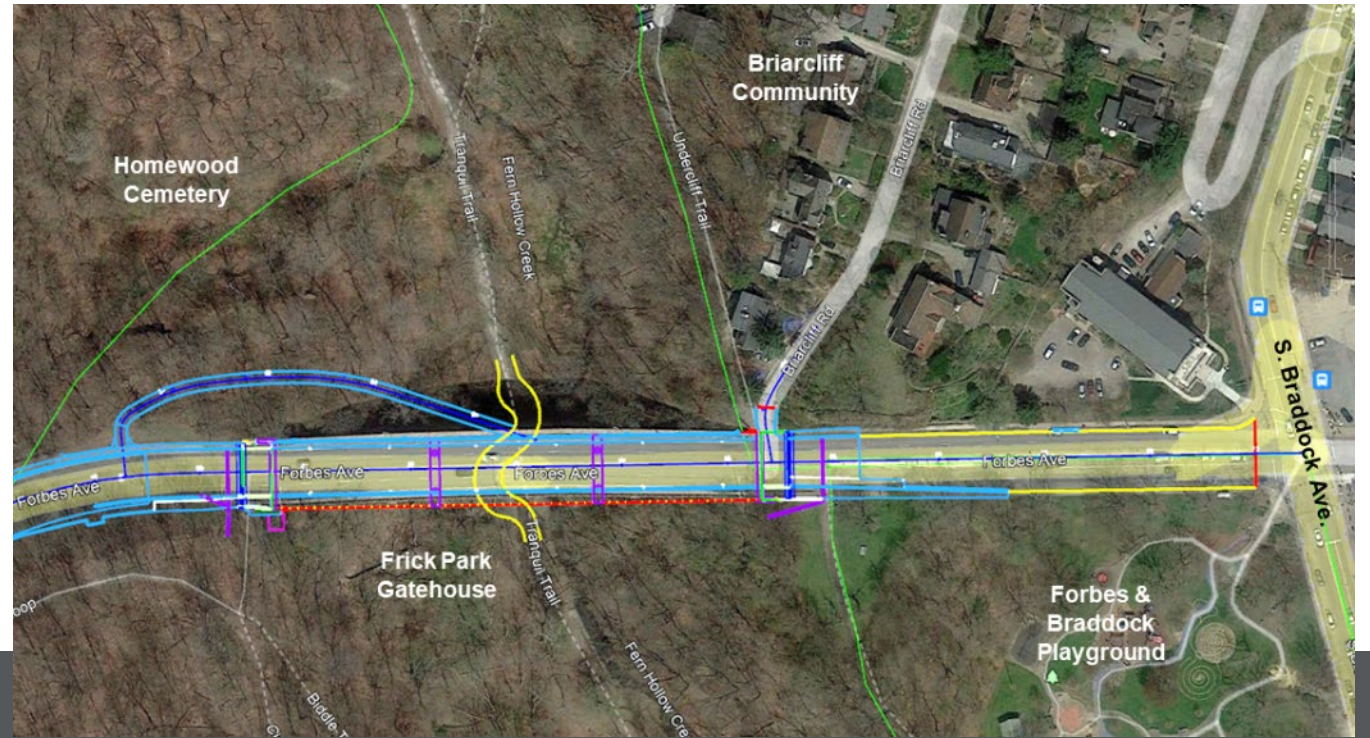
# Project Overview

- **Owner:** City of Pittsburgh
- **Oversight:** PennDOT and FHWA
- **Contractor:** Swank Construction
- **Design Build Designer:** HDR, Inc.
- **Construction Inspection:** SAI Consulting Engineers Inc. with JMT & CCS, Inc.
- **Construction Management:** Michael Baker International with CCS, Inc.
- **Notice to Proceed:** 2/3/2022



# Project Location

- Forbes Avenue is on the National Highway System (NHS) within the City of Pittsburgh, Allegheny County
- Provides travel over Frick Park, Fern Hollow Creek, and Tranquil Trail



# Project Overview: Background

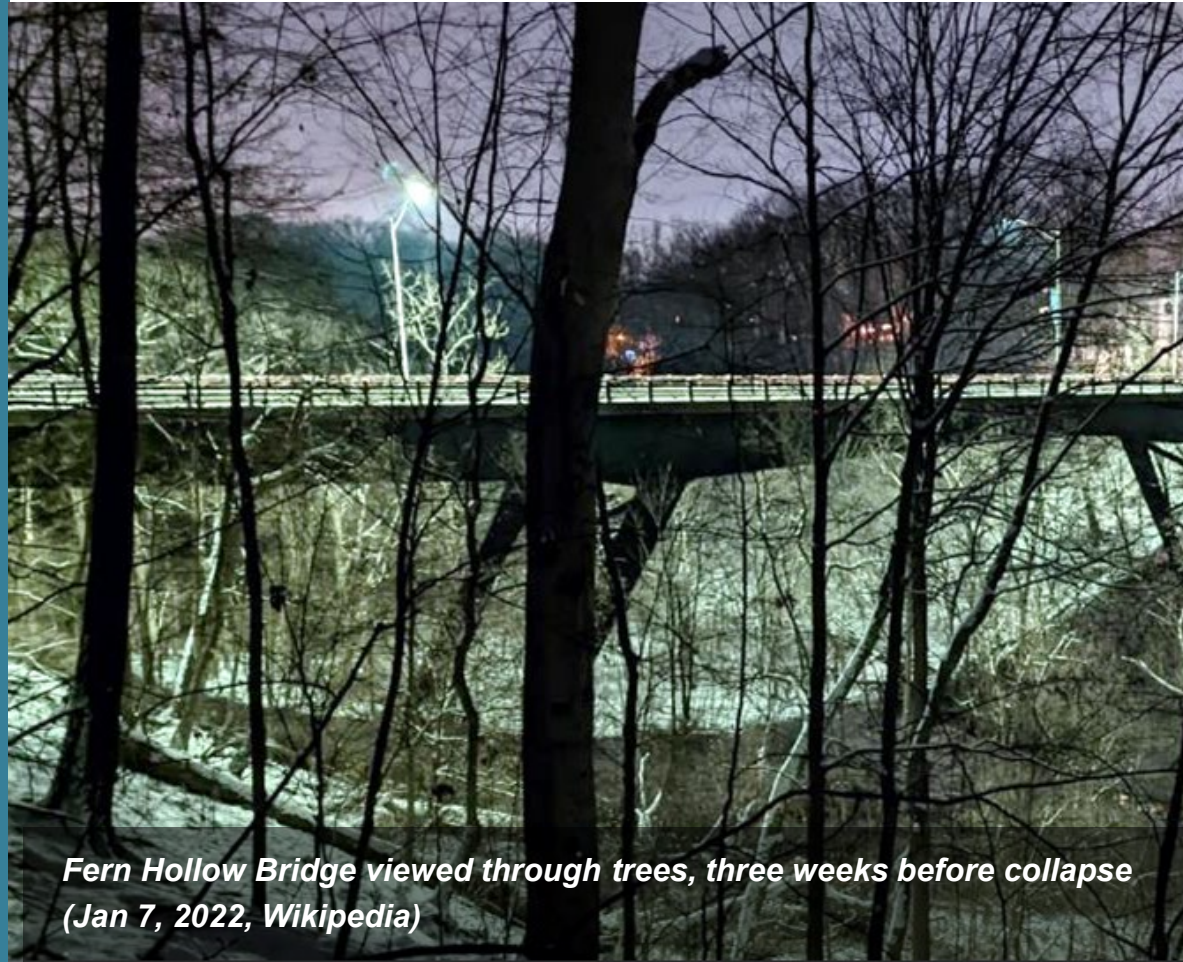
## Existing Structure

Uncoated weathering steel, 3-span, continuous rigid K-frame design (447' long)

Posted speed limit of 35mph and a Posted Weight Limit of 26 tons per vehicle

Prior to posting for 26 Tons, the structure accommodated 7% truck traffic

Average Daily Traffic – 21,000 vpd



*Fern Hollow Bridge viewed through trees, three weeks before collapse  
(Jan 7, 2022, Wikipedia)*

*Heavy pedestrian and bicycle traffic*

*Serves as a mass transit bus route for Pittsburgh*

*Regional Transit Main Arterial for Emergency Service Providers*

*Serves as an Alternate Route for Parkway East Traffic (I-376) during peak hours and closures.*

# Project Overview: Collapse

- January 28, 2022
- Structure over Forbes Ave., Fern Hollow Bridge collapses



Photo Credit: Mike Darnay/KDKA



Photo Credit: Steven Adams / Tribune-Review



Photo Credit: David Sanchez

# Project Overview: Collapse

- National Transportation Safety Board (NTSB) responded immediately to obtain facts surrounding the collapse of the bridge.
- NTSB was onsite 1/31/22 during demo activities advising the construction team which structural members were necessary for their investigation.



*NTSB released preliminary findings on 2/7/22.*

*Updates 5/5/22 & 1/26/23 & 5/18/23  
“Maintenance of weathering steel bridges”*

*NTSB investigation is complete. Board meeting was broadcast 2/21/24. Report posted on website.*



**NTSB investigators at the site of the collapsed bridge.  
(Source: James Anderson, NTSB)**

# Project Overview: Emergency Process

## **A Proclamation of Disaster Emergency signed by Governor Tom Wolf on day of the collapse for the City of Pittsburgh; and subsequently, an Emergency Declaration was issued by Mayor Ed Gainey**

Allowed PennDOT and the City of Pittsburgh to utilize all available powers, resources, and personnel deemed necessary to cope with the magnitude and severity of the bridge collapse.

The City of Pittsburgh delegated the removal, design, and reconstruction of the bridge to PennDOT District 11-0 under a Reimbursement Agreement

The Proclamation of Disaster Emergency permits the use of emergency procedures for both the Right-of-Way, Utility, and Environmental Phases to streamline the design process and expeditiously enter the construction phase

PennDOT was permitted to execute a sole-source design/build construction contract with Swank Construction Company to immediately perform emergency cleanup activities and inform FHWA/PennDOT/City of Pittsburgh of current material lead times and procurement issues

Under the sole-source design/build construction contract Swank Construction Company partnered with HDR, Inc. to quickly establish the existing legal right-of-way limits, implement emergency erosion and sediment pollution controls, obtain project survey, and evaluate appropriate structure types

# Project Overview: Funding for Repair

- USDOT/PennDOT designated \$25.3 million to rebuild the Fern Hollow Bridge
- Emergency Federal Funds are a direct result of additional funds made available in Federal Fiscal Year (FFY) 2022 from the Bi-Partisan Infrastructure Law and will not impact any regionally funded projects



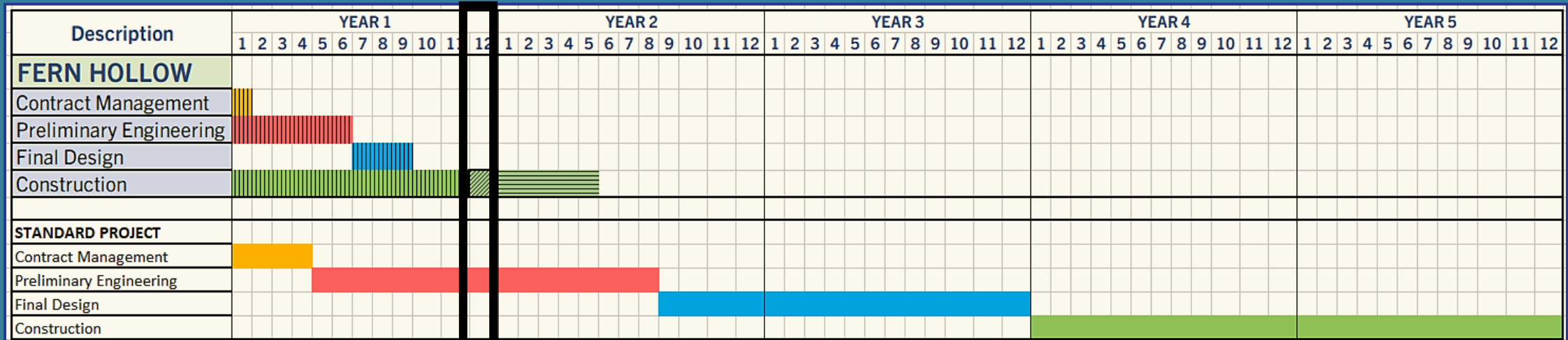
President Joe Biden visits the site - Andrew Harnik/AP Photo



President Joe Biden and Mayor Ed Gainey visit the site  
SAUL LOEB/AFP via Getty Images



# Design / Construction: Collaboration



Overall Project Schedule Comparison		
Description	Standard Project	FERN HOLLOW
Contract Management (Publish, Advertise, Consultant Selection, Issue NTP)	3-4 months	7 days
Preliminary Engineering Phase & Environmental Clearance	18 months	6 months
Final Design Phase	16 months	3 months
Construction Phase	24 months	* 17 months
<b>Total Duration:</b>	5 years	* 17 months
<b>Open to Traffic:</b>		<b>December 2022</b>
* Construction occurring in tandem with Design		

- Constant collaboration between FHWA, PennDOT, Swank, HDR, City of Pittsburgh and all Project Stakeholders.
- Emergency Declarations allowed the design team to utilize all available resources to handle the magnitude of this emergency and streamline the project delivery process.
- An experienced, knowledgeable, and trusted team was selected which allowed swift decisions and calculated risks for the project to proceed forward in an expedited fashion.

# Design / Construction: Jan / Feb 2022

## • Construction

- First two weeks of February:
- Clean-up of Collapse
- Establish viable access
- Develop demolition plan
- Mobilize Equipment (primary equipment 888 Manitowoc, 85,000 lb. class excavators and processors)
- Finalize contract with PENNDOT/  
Finalize subcontract with HDR

## • Design

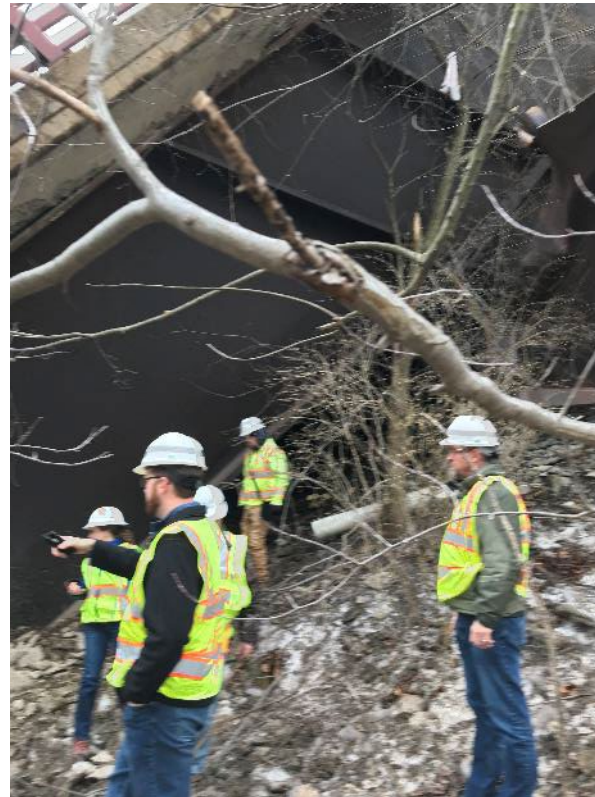
- Kick-off Meeting held with entire team
- Concurrence on Design Deliverables/Design Submissions
- Organized a CPM Baseline Schedule that merged both Design and Construction activities





# Initial Clean Up (Force Account/T&M)

- Team collaborated on approach to clean up:
  - **Access Road** – Contractor identified preferred location
  - **Environmental Document**
    - Environmental Team & Agencies worked to provide the required E&S controls, Agency approvals and R/W easements
  - **NTSB** – Coordinated & Identified key pieces to retain, how to safely remove for forensic evaluation, store and deliver for investigation
  - **Waste Sites** – difficult to find in Urban areas
    - All parties shared local knowledge to finalize the best location
  - **Steel Recycling Facility** – Contractor identified and Department received credit
  - **Concrete** – most of concrete separated from rebar and used for access road and crane pad



# Work Itemization and Cost Justification

- No bid items combined w/ DB = Flexibility
- Multiple Material Quotes –
  - Typical, but cheapest not always used
  - Schedule needs
- Design in progress – when to sign PO for materials
- Standard Construction Items not always used
- Created Job Specific items based upon *on-site crews, equipment availability and what made sense to Owner for this project*
- *EVERYTHING had to be negotiated and agreed to*
  - *Very little T&M other than initial clean up*
  - Spreadsheets to separate material, labor & equipment by item sub tasks
  - Submitted ahead of time for review
  - Many negotiation meetings



# Design / Construction: February 2022

## • Construction

- Provide feedback on the following (from General Contractor perspective as well as information garnered from Industry):
- Superstructure Alternatives
- Span Arrangement
- Column and caisson sizes based on company inventory of forms and drill tooling
- Project Access
- Participate in utility relocation meetings/ feedback on utility schedule and scope
- Identify and begin procuring long lead time/ critical path materials to the extent possible.
- Light Poles,
- Architectural Form Liners
- Integral Piles and Casing

## • Design

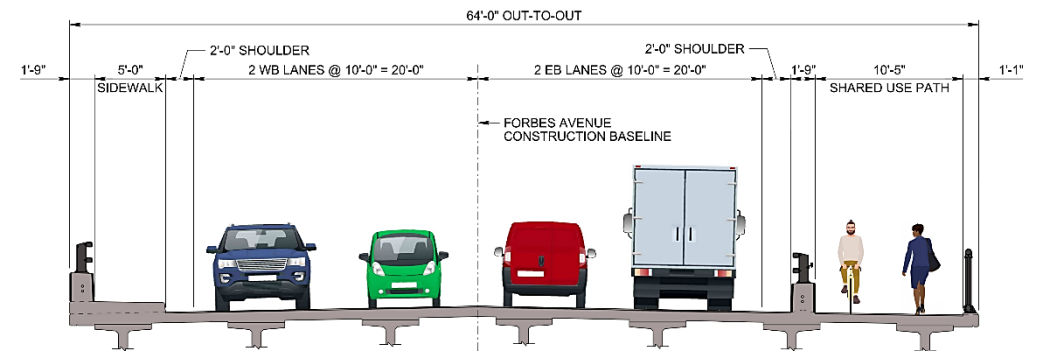
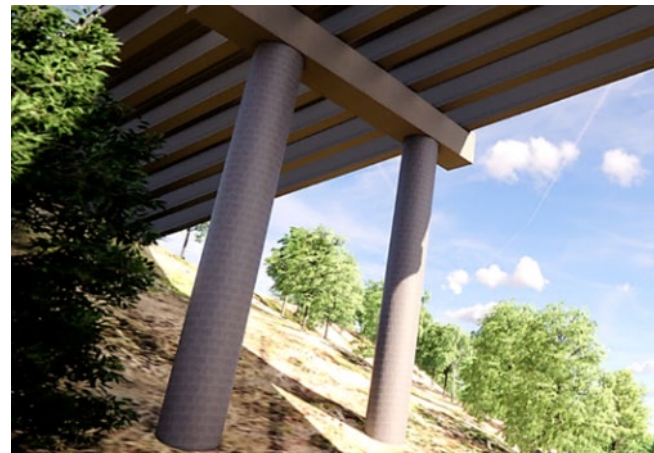
- Major design decisions made in February – Collaborative decision making with the entire team:
- Typical Section selected to minimize disturbance to surrounding features
- Superstructure alternates evaluated and type selected
- Span arrangement set with beam delivery and erection in mind
- Substructure Type chosen based on site constraints as well as equipment and material availability
- Determination of Limits of Disturbance based on design team and contractor feedback





# Design Activities: New Structure

- Proposed Structure – 3 Span Composite Prestressed Concrete PA Bulb-Tee Beams fabricated at PennSTRESS in Roaring Springs, PA.
- Total Structure Length = 460'
- 21 – 4' Width by 8' Depth by 152' long PA Bulb-Tee Beams (each beam weighing +200,000 lbs.)
- Over 15' pedestrian and bicycle access width (50% increase)
- Structure is 100' high over Frick Park
- Typical Cross Section maintains existing out-to-out width of 64'





# Design / Construction: March 2022

## • Construction

- Design and procure column and cap formwork as necessary to supplement in-house inventory.
- Protocol Established for Material Ordering and Physical Construction
- Work began upon the second round of reviews where comments were shown to be addressed on the first submittals.
- If schedule dictated, item-specific pre-approval was requested.
- Establish Protocol for Job Pricing:
- Initial Discussions on Pricing
- Normal Design-Build vs Department & GC/Designer Relationship
- Risk of design changes
- Project specific items / negotiations preceding work.
- Finish Existing Structure Removal

## • Design

- Initial press release, project website goes live, public involvement begins
- Pre-Application meeting with permitting agencies
- Coordination with impacted utility owners
- Begin Highway and Highway Lighting Design
- Review of aesthetics for the proposed structure
- Review of Design Criteria and Design Exceptions
- Core Borings and Survey are obtained
- BCRA Presented their 3 Big Goals (Mid-Block Crossing, Extension of Undercliff Trail, and Park Path Bridge)
- Design Submissions:
- Temporary Traffic Control Plan
- Line and Grade
- Type Size and Location
- Beam and Bearing Design – allowed beam shop drawing preparation to begin

# Construction: March 2022



# Design: March 2022



# Design / Construction: April 2022

## • Construction

- Project Site was quiet waiting for expedited design of Piers, Columns, and Caissons
- Analyzing Core Borings collected in March was an integral part of that process.
- Material Procurement



## • Design

- Acceptance of Beam and Bearing Design
- GP-11 and GP-8 Permits Approved – allowed access across Fern Hollow Creek
- Coordination with OPA for artistic enhancements – artist workshop with nine artists
- Design Submissions:
  - Preliminary Lighting Report
  - Geotechnical Memorandum for Piers 1 and 2 (used conservative presumptive values based on Commercial Street)
  - Partial Submission – Pier Design (allowed drilling to begin for caissons and rebar procurement)
  - Abutment Memorandum for Integral Abutments
  - Safety Review Committee Submission
  - Initial Design Field View Submission

# Construction: April 2022



# Design: April 2022



## TECHNICAL MEMORANDUM

Date: Friday, April 01, 2022

Project: Forbes Avenue (Fern Hollow) Bridge Replacement

To: Cheryl Moon-Sirianni, P.E.  
District Executive  
Engineering District 11-0

Attn: Mike Szurley, P.E.  
Project Manager  
Engineering District 11-0

From: Joshua Pike, P.E.  
HDR Engineering

Subject: Pier 1 and Pier 2 Preliminary Foundation Recommendations

### INTRODUCTION

This memo and attachments present the results of HDR's geotechnical exploration program and provides foundation design recommendations for the proposed piers (Pier 1 and Pier 2) that are to be constructed as part of the Forbes Avenue (Fern Hollow) Bridge replacement project. The project is located within the City of Pittsburgh in Allegheny County, Pennsylvania (see Figure 1 – Project Location Map). In addition to carrying Forbes Avenue over Fern Hollow Creek and Tranquil Trail, the bridge spans the northern portion of Frick Park, a NRHP-listed, city-owned park. The analyses have been performed in accordance with design requirements of the Design Manual Part 4 (DM-4), dated December 30, 2019, AASHTO LRFD, 8<sup>th</sup> Edition (2017), and Geotechnical Engineering Manual (GEM), Publication 293 dated December 18, 2020. This memo has been prepared to accompany and support the Pier Submission prepared by HDR's structural engineers. The following discussions and attachments are included:

- Subsurface Exploration Program and Information
  - Pier 1
  - Pier 2
- Analyses and Results
- Attachment 1 – General Plan and Elevation (From TS&L)
- Attachment 2 – Subsurface Sections and Analyses
  - Pier 1 Axial Resistance
  - Pier 2 Axial Resistance
  - Pier 1 Lateral Load Analysis
  - Pier 2 Lateral Load Analysis
- Attachment 3 – Draft Typed Engineer's Boring Logs
- Attachment 4 – Summary of Rock Strength Tests (Pier 2) and Preliminary Laboratory Test Results.
- Attachment 5 – Preliminary Foundation Notes (Piers)

hdrinc.com One Oxford Centre, 301 Grant Street, Suite 1700, Pittsburgh, PA 15219-1407  
412-497-6000

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## Pittsburgh Creative Corps: Fern Hollow Bridge Artist Workshop

### Meeting Notes

April 28, 2022  
Office for Public Art

### Room Three Session 1

Facilitator & Notetaker: Derek Reese & Sarah Minnaert  
Artists: Oren Cohen, John Peña, and Mariana Vassar  
Additional Attendees: Jason, Mike

What might be some of the potential SITEB (or canvases) for artworks?

- Columns (surface, steel, paint, considering formwork)
- Sculptural elements outside of the structure itself (i.e., sculptures mounted on path, on bridge)
- Route 28 surface treatments/concrete relief
- Sandblasted designs on surface, etching
- Capitol stamping
- Lighting under bridge
- Trail Pathway
- Concrete barrier for pedestrians (late summer formwork decision)

Within these sites, what are THEMES that might be explored through the public art projects?

- Intersections (generational, cultural, physical—memory and historical figures there; people connected to opening of pier/bridge)
- Legacy and history (artwork or material selection, ie stone)
- Water & wildlife resources
- Deep time (we are living in what time? bridge to last 100 yrs)
- Cultural memory, informal history, 1st person narrative
- Frick museum & family history

Are there new AUDIENCES and STAKEHOLDERS who should be added?

- Park website—organizations involved in park plans
- Local churches (Worship) and community gathering spaces.
- Alyssa Velequez

PLAN PREPARATION  
DESIGNER: HDR ENGINEERING, INC.  
PROJECT MANAGER: MICHAEL SZURLEY, P.E.

DISTRICT	COUNTY	CITY	ROADWAY	ROUTE	SECTION	TOTAL SHEETS
11-0	ALLEGHENY	PITTSBURGH				13

FORBES AVENUE  
MPS/EDMS NO. 10039

## COMMONWEALTH OF PENNSYLVANIA

### DEPARTMENT OF TRANSPORTATION

#### CONCEPTUAL DESIGN DRAWINGS FOR CONSTRUCTION OF FORBES AVENUE (FERN HOLLOW BRIDGE)

IN ALLEGHENY COUNTY

FROM STA. 14+85.00 TO STA. 30+44.85 LENGTH 1465.00 FT., 0.277 MI.

SCALE  
HORIZONTAL: 1" = 20' 0" FEET  
VERTICAL: 1" = 10' 0" FEET

DESIGN FIELD VIEW SUBMISSION  
HDR ENGINEERING INC.  
APRIL 2022

ALSO ENCLOSED

TRAFFIC CONTROL PLAN	7 SHEETS
SCOURING AND PAVEMENT MARKING PLAN	7 SHEETS
EROSION AND SEDIMENT POLLUTION CONTROL PLAN	13 SHEETS
HEAVY LIGHTING PLAN	2 SHEETS
STRUCTURE PLAN L+R+SS	10 SHEETS
CROSS SECTIONS	19 SHEETS
EXISTING STRUCTURE PLANS	
RECONSTRUCTION OF FORBES AVENUE BRIDGE OVER FERN HOLLOW & APPROACHES	30 SHEETS

ROADWAY CLASSIFICATION - URBAN PRINCIPAL ARTERIAL

TRAFFIC DATA  
CURRENT A.D.T. - 21,000 (2022)  
DESIGN YEAR A.D.T. - 21,000 (2042)  
DAILY V. - 2,100  
D - 505  
T - 55

DESIGN TYPOLOGY - REGIONAL ARTERIAL  
TOWN/VILLAGE CENTER

DESIGN SPEED - 35 MPH (POSTED)

PAVEMENT WIDTH - 40'-0"

SHOULDER WIDTH - 2'-0"

BUFFER WIDTH - 2'-0"

RIDE LANE WIDTH - 10'-0"

SIDEWALK WIDTH - 8'-0"

MEDIAN WIDTH - MAXIMUM - N/A  
MINIMUM - N/A

PREPARED BY:  
HDR ENGINEERING, INC.  
ONE OXFORD CENTRE  
SUITE 1700 STREET  
PITTSBURGH, PA 15219

RECOMMENDED DATE: \_\_\_\_\_  
DISTRICT EXECUTIVE

RECOMMENDED DATE: \_\_\_\_\_  
DEPUTY SECRETARY

APPROVED DATE: \_\_\_\_\_  
SECRETARY OF TRANSPORTATION  
(ON BEHALF OF THE GOVERNOR  
AS WELL AS THE SECRETARY)

REGISTERED PROFESSIONAL ENGINEER DATE: \_\_\_\_\_

# Design / Construction: May 2022

## • Construction

- Swank broke ground on the new bridge
- 4 - 8' Diameter 30'+ Depth Caissons
- Toward the end of the month rebar and forming began on the pier columns



## • Design

- E&SPC Plan Approved by Allegheny County Conservation District
- Acceptance of Partial Submission – Pier Design Calculations and Drawings
- Acceptance of Partial Submission – Abutment Design Calculations and Drawings
- Coordination with OPA for artistic enhancements continues
- Coordinated with Impacted Property Owners to Obtain ATE's
- Design Submissions:
  - Partial Submission – Abutment Design

# Construction: May 2022







# Design / Construction: June 2022

## • Construction

- Column construction continued with 2 levels of 30' high placements
- Drilling of Integral Abutment Piles



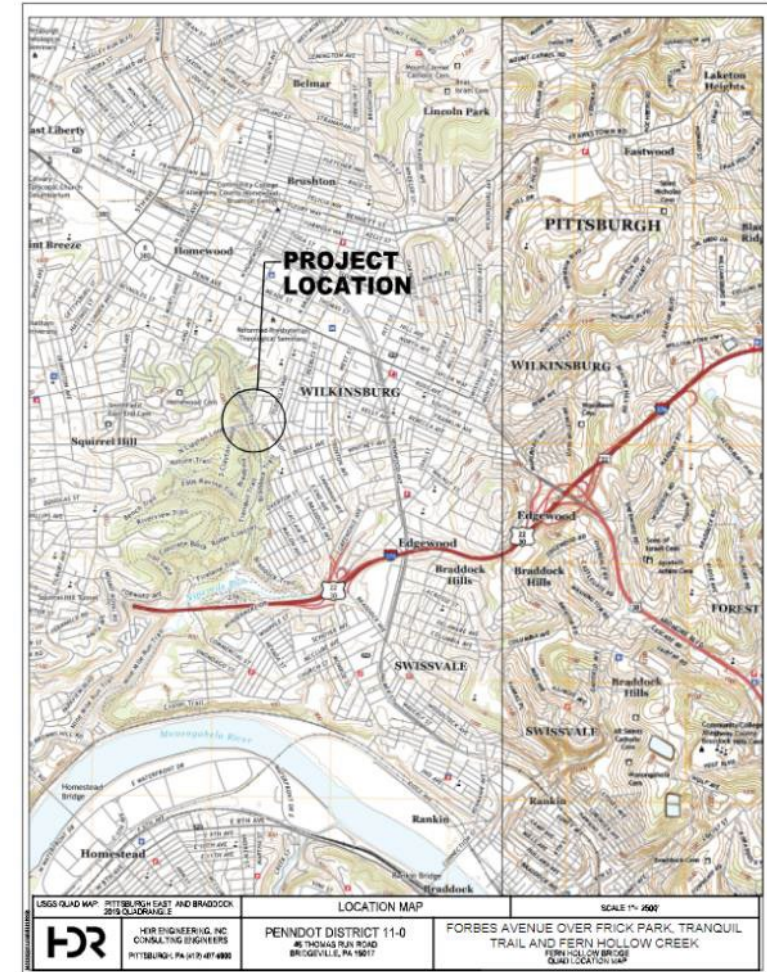
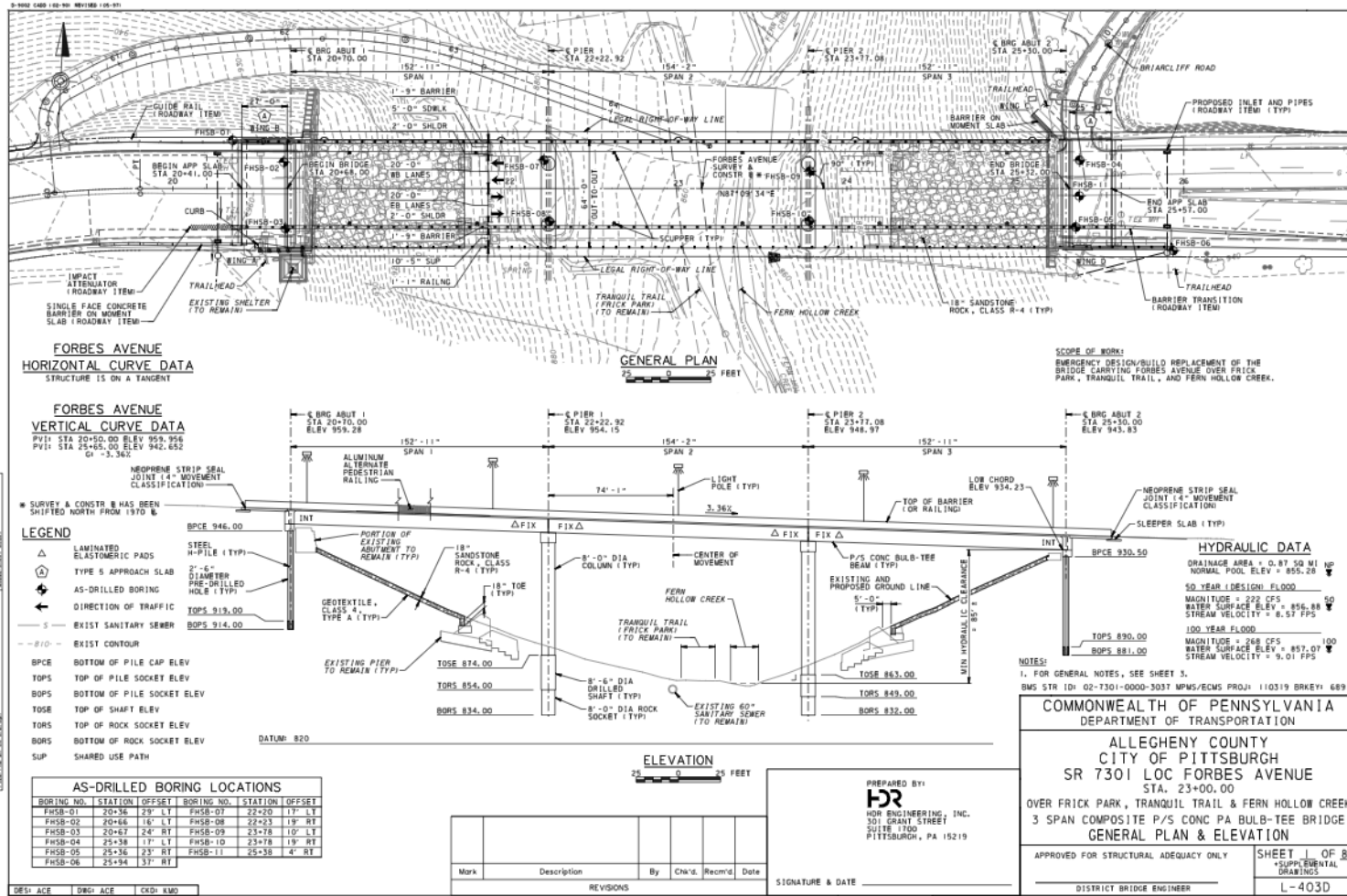
## • Design

- Coordination with FHWA/DOMI/PennDOT to implement a signalized Mid-Block Crossing near the Frick Park Gatehouse
- Recommendation Received by District SRC
- Coordination with OPA for artistic enhancements continues – selection of artists
- Design Submissions:
- Released for Construction – Final Structure Package (remaining details including deck, wingwalls, approach slab, etc.)
- Design Field View – Resubmission (including mid-block crossing)
  - ADA Committee Package

# Construction: June 2022



# Design: June 2022



# Design / Construction: July 2022

## • Construction

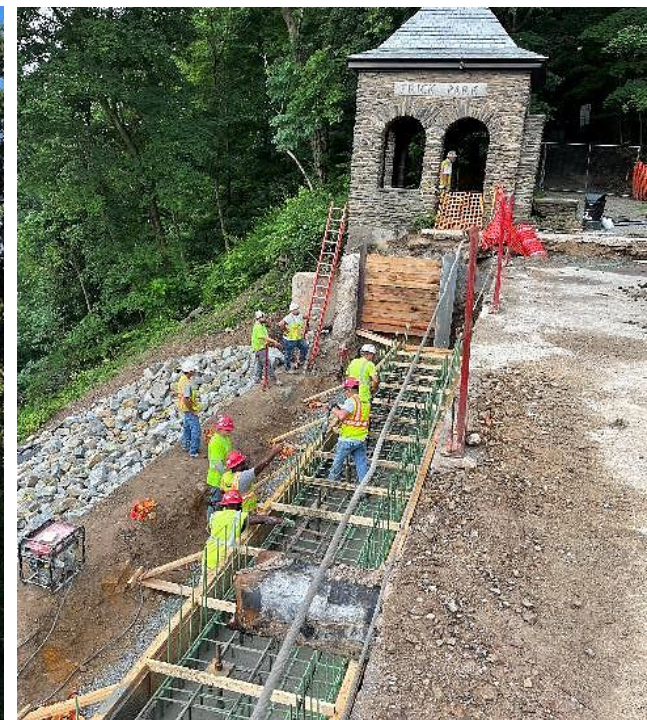
- Final Push Toward Concrete Beam Erection
  - Pier Caps
  - Abutments



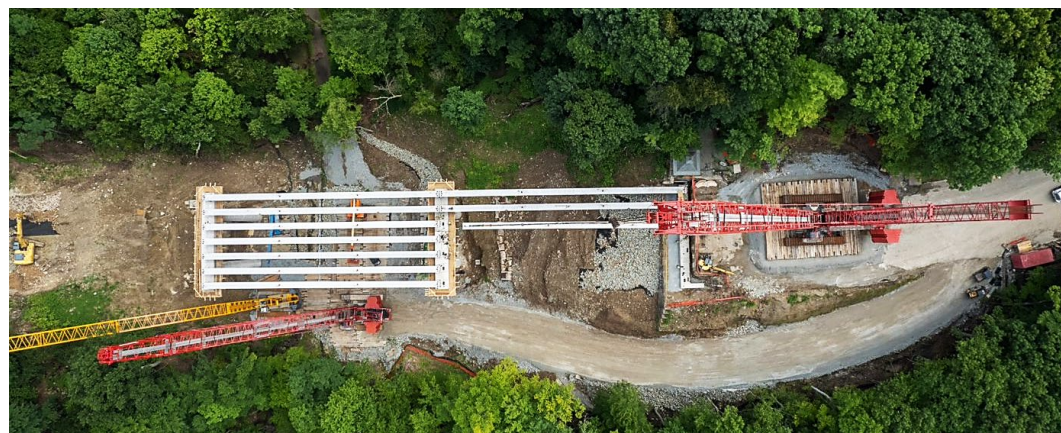
## • Design

- Formal Acceptance of Non-Standard Barrier and Guiderail Form
- Formal Acceptance of Design Criteria and Line and Grade Submission (including Design Exceptions)
- Coordination with PWSA and owners of lateral sewer line impacted by bridge collapse
- Virtual Design Field View Meeting held
- Public Feedback Form for Artistic Enhancements went Live on Project Website
- Design Submissions:
  - 90% Right-of-Way Plan
  - Final Foundation Submission - documenting previously accepted design

# Construction: July 2022



# Construction: July 2022



# Construction: July 2022







# Design / Construction: August 2022

- **Construction**

- Deck Pan and Rebar Installation



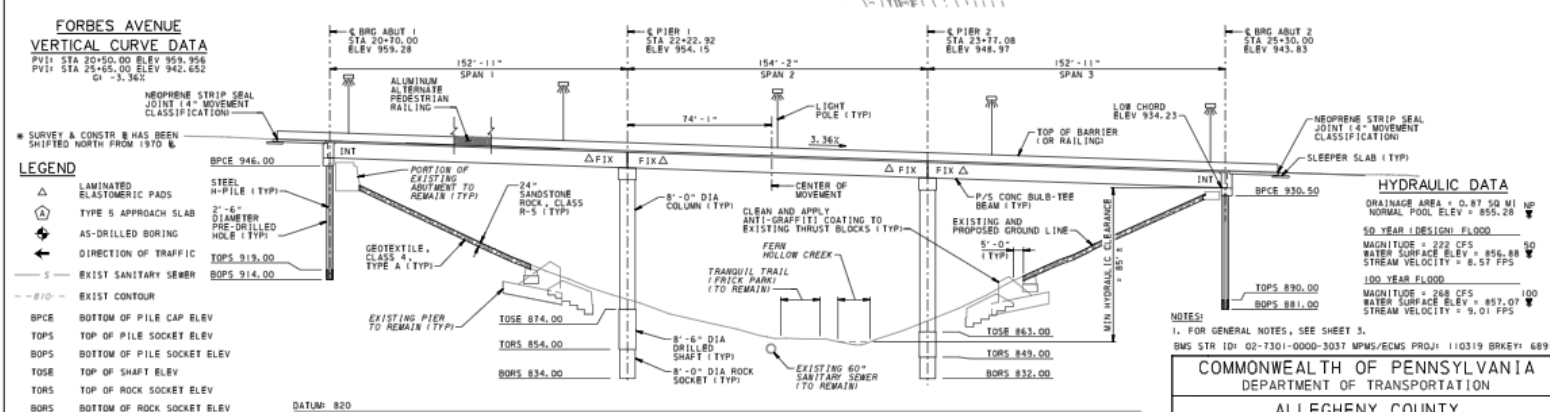
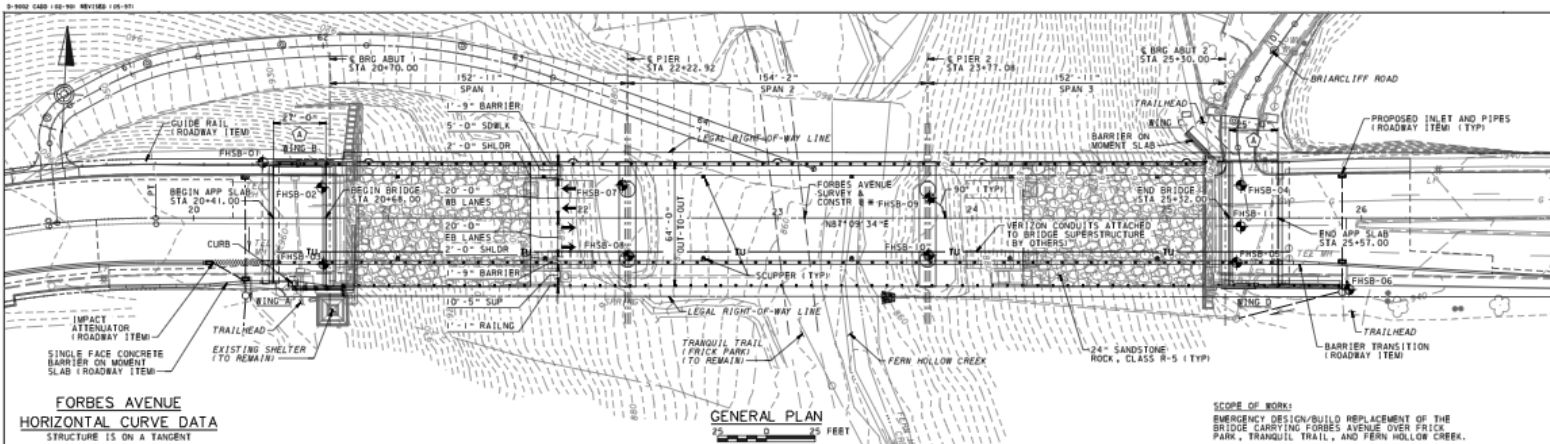
- **Design**

- Coordination with the City of Pittsburgh regarding overall Site Restoration Plan
- Break-Out Session to review Final Right-of-Way Plan
- Formal Acceptance of Design Field View Submission
- Formal Acceptance of Final Foundation Submission
- Art Commission Meeting – Conceptual Review
- Design Submissions:
  - Released for Construction – Final Structure Package Resubmitted (remaining details including deck, wingwalls, approach slab, etc.)

# Construction: August 2022



# Design: August 2022



AS-DRILLED BORING LOCATIONS					
BORING NO.	STATION	OFFSET	BORING NO.	STATION	OFFSET
FHSB-01	20+36	28' LT	FHSB-07	22+20	17' LT
FHSB-02	20+46	16' LT	FHSB-08	22+23	19' RT
FHSB-03	20+47	24' RT	FHSB-09	23+78	10' LT
FHSB-04	25+38	17' LT	FHSB-10	23+78	19' RT
FHSB-05	25+36	23' RT	FHSB-11	25+38	4' RT
FHSB-06	25+94	37' RT			

Mark	Description	By	Chk'd	Rec'd	Date

**REVISIONS**

**DATE**

**CHIEF ENGINEER**

**SIGNATURE & DATE**

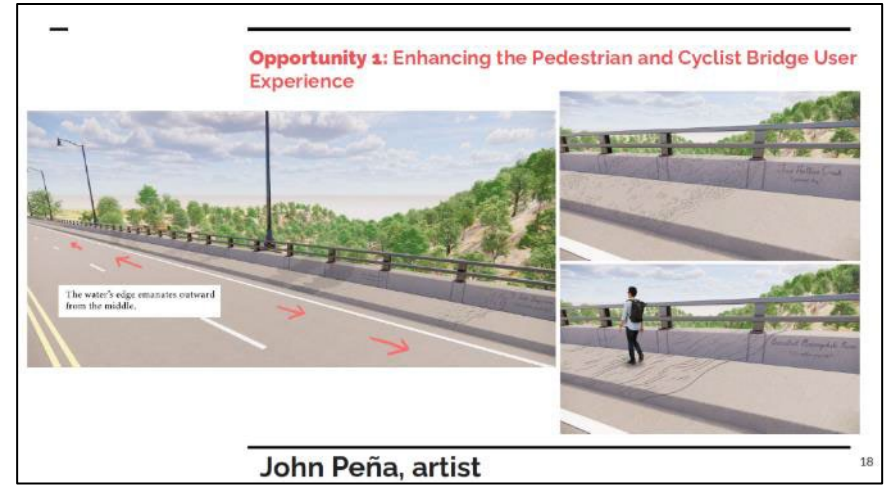
**PREPARED BY:**  
H&R ENGINEERING, INC.  
301 GRANT STREET  
SUITE 1700  
PITTSBURGH, PA 15219

**APPROVED FOR STRUCTURAL ADEQUACY ONLY**

**DISTRICT BRIDGE ENGINEER**

**SHEET 1 OF 83**  
\*SUPPLEMENTAL DRAWINGS

**L-403D**



**pennsylvania**  
DEPARTMENT OF TRANSPORTATION

**H&R**

**FINAL DESIGN CALCULATIONS**  
**FERN HOLLOW BRIDGE REPLACEMENT**  
**SR 7301 LOC FORBES AVENUE**  
**OVER**  
**FRICK PARK, TRANQUIL TRAIL AND**  
**FERN HOLLOW CREEK**  
**ALLEGHENY COUNTY, PA**  
**PENNDOT ENGINEERING DISTRICT 11-0**

**SUPERSTRUCTURE CALCULATIONS**

AUGUST 2022

**COMMONWEALTH OF PENNSYLVANIA**  
**DEPARTMENT OF TRANSPORTATION**

**ALLEGHENY COUNTY**  
**CITY OF PITTSBURGH**  
**SR 7301 LOC FORBES AVENUE**  
**STA. 23+00.00**  
**OVER FRICK PARK, TRANQUIL TRAIL & FERN HOLLOW CREEK**  
**3 SPAN COMPOSITE P/S CONC P/B BULB-TEE BRIDGE**  
**GENERAL PLAN & ELEVATION**

**APPROVED FOR STRUCTURAL ADEQUACY ONLY**

**DISTRICT BRIDGE ENGINEER**

**SHEET 1 OF 83**  
\*SUPPLEMENTAL DRAWINGS

**L-403D**

**Prepared For:**  
PennDOT Engineering District 11-0  
45 Thores Run Road  
Baldwinsville, PA 17017

**Prepared By:**  
H&R Engineering, Inc.  
301 Grant Street, Suite 1700  
Pittsburgh, PA 15219

**H&R**

August 2, 2022

Cheryl Moore Shivers, P.E. (District Executive)  
Pennsylvania Department of Transportation  
PennDOT Engineering District 11-0  
45 Thores Run Road  
Baldwinsville, Pennsylvania 17017

Jonathan Blake Coyle, P.E. (Project Manager)

Re: Forbes Avenue over Frick Park, Tranquil Trail, and Fern Hollow Creek  
City of Pittsburgh, Allegheny County, Pennsylvania  
Emergency Project ECMS - 110319  
Foundation Submission

Dear Mr. Shivers:

H&R Engineering, Inc. is pleased to submit for review and approval the Foundation Submission for the above referenced project. The submission presents the results of H&R's geotechnical exploration and laboratory testing program and geotechnical foundation design recommendations for the proposed bridge replacement structure (L-403D). This submission has been prepared in general accordance with the requirements of PennDOT's Design Manual Part 4 (DM4) 2015, Section 104.3.1 and Geotechnical Engineering Manual (Publication 2015-2020), Section 15.7.2.

Please find the following information included in this submission:

- Foundation Submission Letter
- Foundation Plans
- Geotechnical Report, included as Structure Foundation Report (SFR) and Appendix G of SFR
- QA Checklist for Foundation (BUT) QA Checklist (No. 5) included in the Appendix G of SFR

**Foundation Information**

The abutments will be constructed as cast-in-place integral abutments with attached cantilever wingwalls and will be adequately equipped on vertical fill placed socked into Sandstone and Siltsstone with interbedded Siltsitic bedrock.

The piers will be cast-in-place two-column reinforced concrete piers supported on drilled caissons (shaft) foundations socketed into Siltsitic with interbedded Siltsitic bedrock.

**H&R ENGINEERING, INC.**  
One Cabot Court 37 West Street, Suite 1700  
Pittsburgh, PA 15219

# Design / Construction: September 2022

- **Construction**

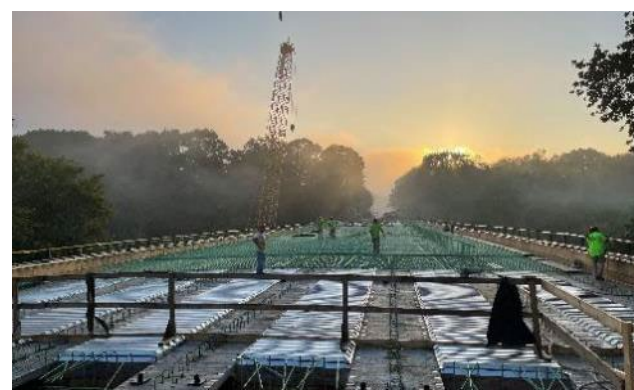
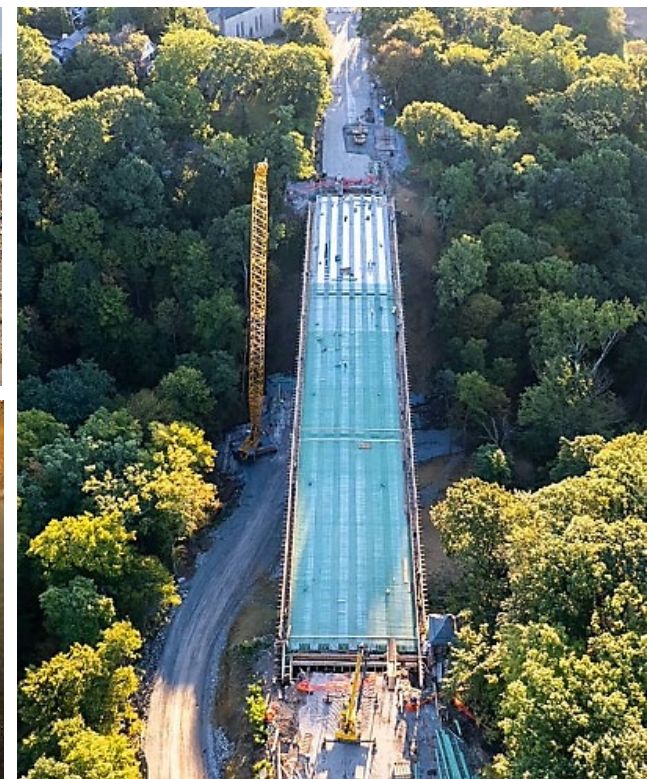
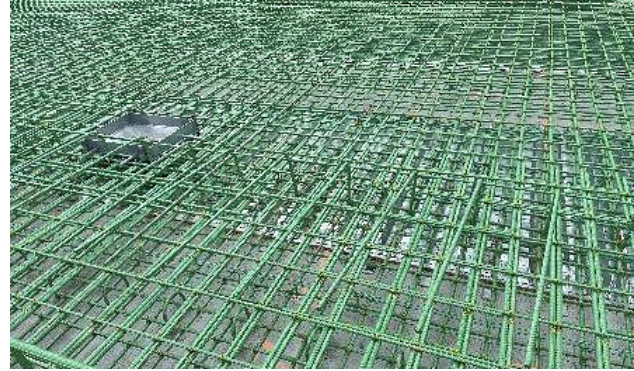
- First Deck Placement September 30th, 2022



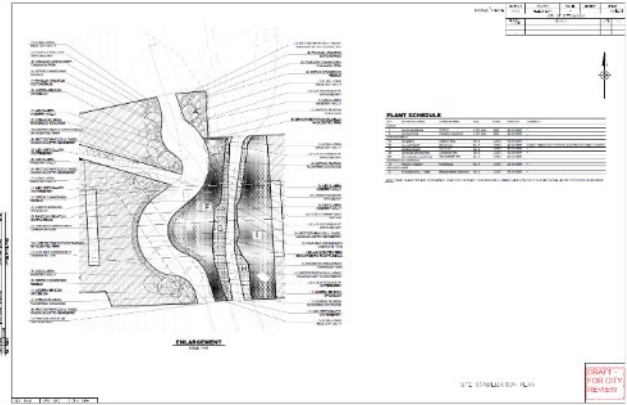
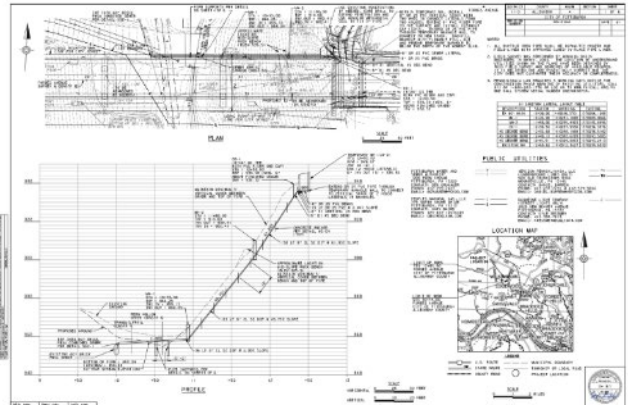
- **Design**

- Formal Acceptance of Released for Construction – Final Structure Package
- Development Activities Meeting (DAM) for conceptual art enhancements
- Section 106 Consulting Parties Meeting to review proposed barrier types and aesthetics
- Design Submissions:
  - Released for Construction – Final Roadway Package Submitted (Construction Drawings, Cross Sections, Signing and Pavement Markings, Traffic Signal Plan, Pavement Design)
  - Private Sanitary Line Re-Establishment Plan and GP-5
  - Draft Overall Site Restoration Plan
  - Final Highway Lighting Plan
  - Final Right-of-Way Plan

# Construction: September 2022



# Design: September 2022



# Design / Construction: October 2022

- **Construction**

- Complete Deck Construction
- Begin Tie-In Work



- **Design**

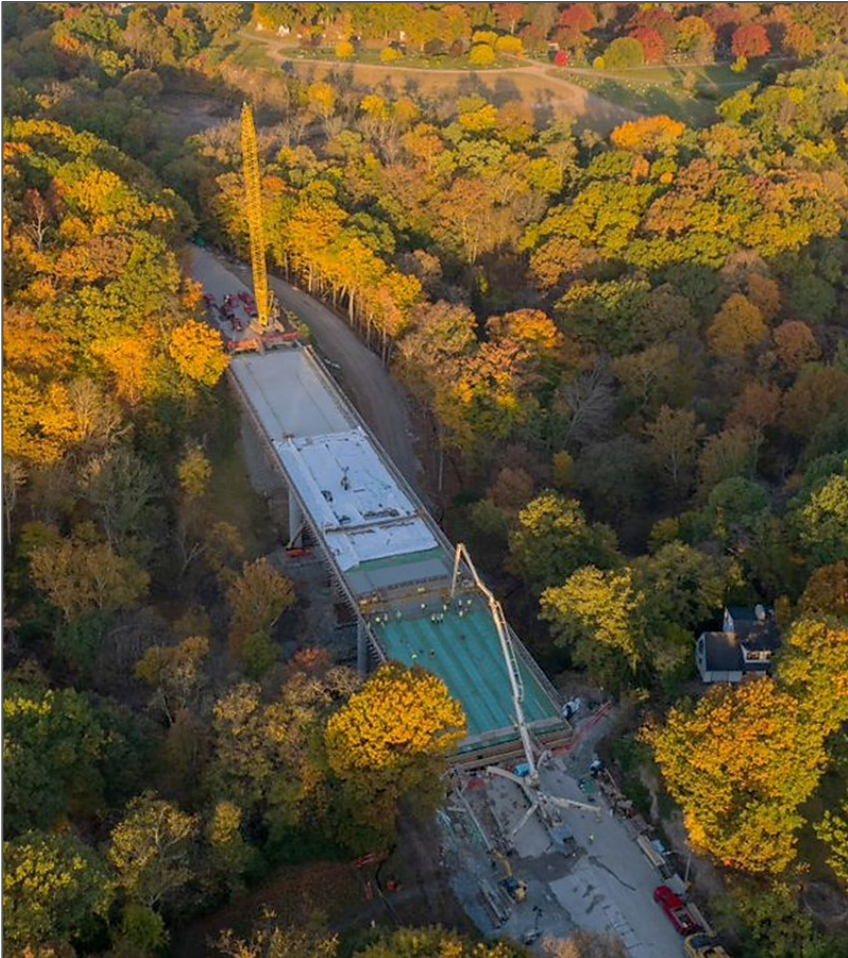
- President Joe Biden Visits the Fern Hollow Project Site
- Art Commission Meeting – Final Review of artistic enhancements for vehicular, pedestrian, and multi-modal users
- Formal Acceptance of Highway Lighting Plan
- Design Submissions:
  - Released for Construction – Final Roadway Package Submitted Resubmitted (Construction Drawings, Cross Sections, Signing and Pavement Markings, Traffic Signal Plan, Pavement Design)
  - Private Sanitary Line Re-Establishment Plan and GP-5 Resubmitted



# Construction: October 2022



# Construction: October 2022



# Design: October 2022

## Opportunity: Enhancing the Pedestrian and Cyclist Bridge User Experience

Sample Rub Rail Text on Shared Use Path

### THE AMES SEA

Approximately 300 million years ago, a warm shallow sea formed beneath you. This is evidenced by the presence of marine Limestone found at 872 feet above sea level (73' under you). During the time of the Ames Sea, the entire North American craton itself was rotated 90 degrees counter-clockwise and Pennsylvania was positioned along the equator. So in truth, what is now here, was never really even here.

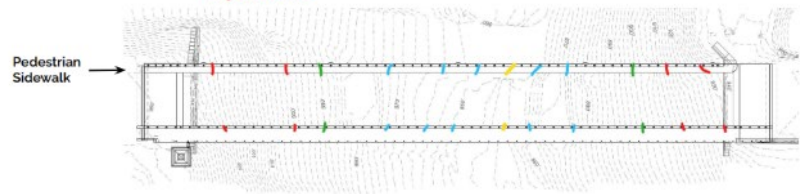


Rub rail text will be on the shared use path, opposite from the corresponding design on the pedestrian sidewalk.

John Peña, artist

16

## Opportunity: Enhancing the Pedestrian and Cyclist Bridge User Experience



### Topo View of Bridge Deck:

Lake Pattern (4) in **RED**  
River Pattern (2) in **GREEN**  
Ocean Pattern (5) in **BLUE**  
Creek Pattern (1) in **YELLOW**

**12 Total Pattern Locations:** Patterns are placed with deep-time events on outer edges of the bridge moving towards present day closer to the middle.

John Peña, artist

13



# Design / Construction: October 2022

- **Construction**

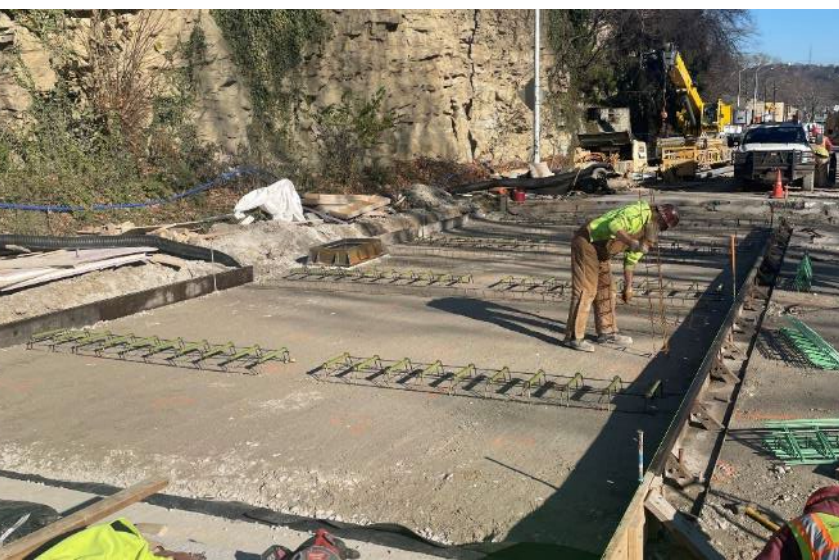
- Construct Deck Sidewalks and Barrier
- Construct Moment Slabs
- Grade for Approach Slabs and Roadway Tie Ins
- Install Drainage



- **Design**

- Formal Acceptance
  - Roadway Plan
  - Traffic Signal
  - Private Sanitary
- Plans In Progress
  - Right of Way
  - Interim Traffic Control
  - Site Restoration

# Construction: November 2022



# Construction: November 2022



# Design / Construction: December 2022

- **Construction**

- Prepare for Opening
- Pave Roadway
- Install Pedestrian Railing and PA Barrier
- Install Private Sanitary Line



- **Design**

- Formal Acceptance
  - Interim Traffic Control
  - Signing and Pavement Marking Plan
- Plans In Progress
  - Right of Way
  - Site Restoration

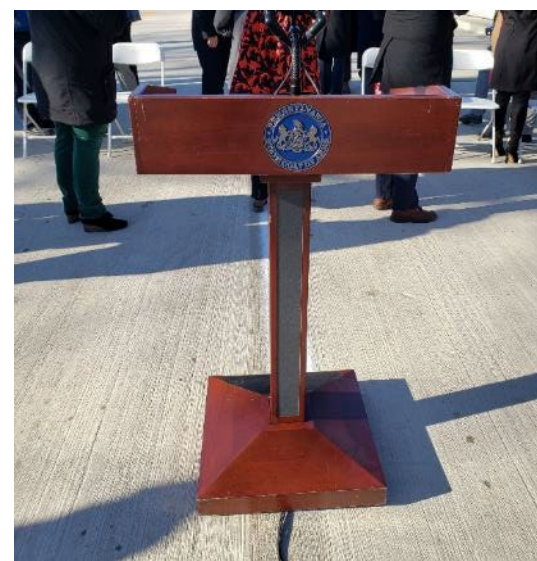
**BRIDGE TO REOPEN  
DECEMBER 2022**

# Construction: December 2022





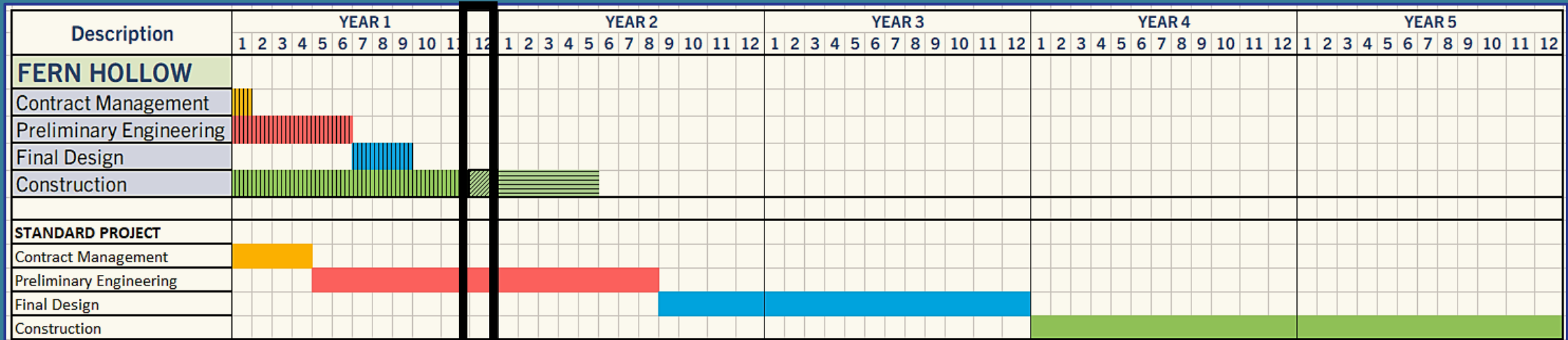
# Opening Event: December 21, 2022



# Open to Traffic: December 22, 2022



# Design / Construction: Collaboration



Overall Project Schedule Comparison		
Description	Standard Project	FERN HOLLOW
Contract Management (Publish, Advertise, Consultant Selection, Issue NTP)	3-4 months	7 days
Preliminary Engineering Phase & Environmental Clearance	18 months	6 months
Final Design Phase	16 months	3 months
Construction Phase	24 months	* 17 months
<b>Total Duration:</b>	5 years	* 17 months
<b>Open to Traffic:</b>		<b>December 2022</b>

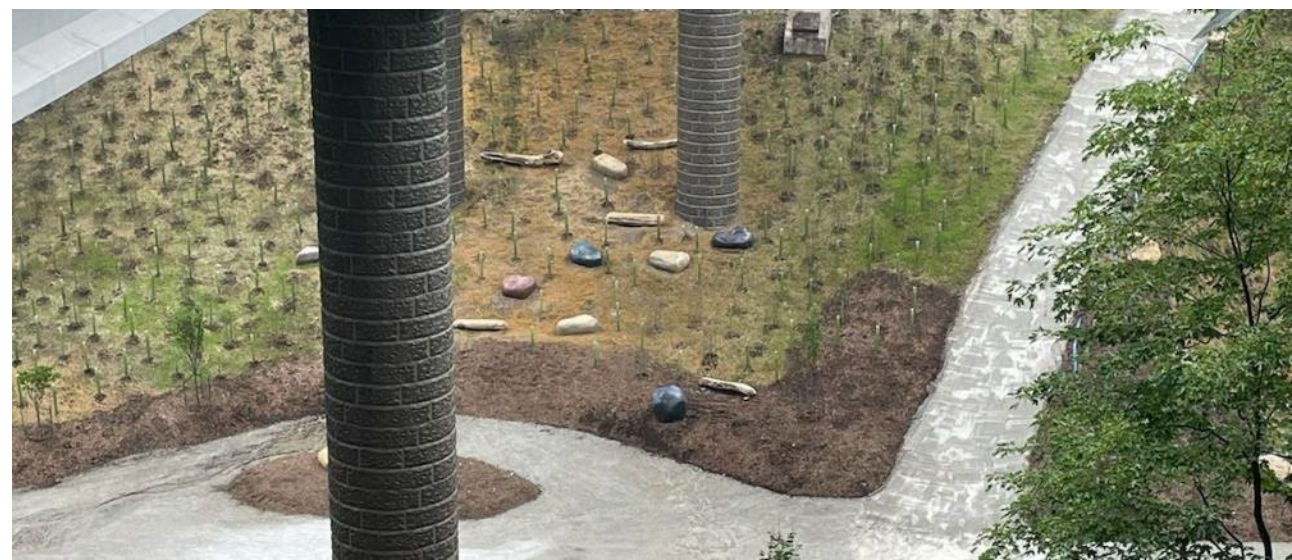
\* Construction occurring in tandem with Design

- Constant collaboration between FHWA, PennDOT, Swank, HDR, City of Pittsburgh and all Project Stakeholders.
- Emergency Declarations allowed the design team to utilize all available resources to handle the magnitude of this emergency and streamline the project delivery process.
- An experienced, knowledgeable, and trusted team was selected which allowed swift decisions and calculated risks for the project to proceed forward in an expedited fashion.

# May 2023 (Finishing Touches)



# Finishing Touches Continued



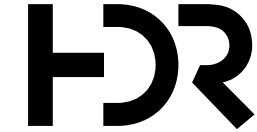
# Post Found from 1901 Bridge



# Finished for Full Traffic and Restoration: July 7, 2023



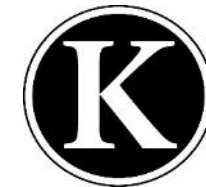
# Project Overview: Team



**OFFICE OF PUBLIC ART**



BRIARCLIFF HOMEOWNERS ASSOCIATION INC.





# Project Overview: Team



The "U" Company LLC



Brila Construction Supply, LLC



Shanefelter Industries



OFFICE OF PUBLIC ART



# Awards Through 12/31/2024

## Civil Engineering Achievement Award, February 2023

Fern Hollow Bridge  
American Society of Civil Engineers (ASCE) – Pittsburgh

## Outstanding Engineering Achievement Award, February 2023

Fern Hollow Bridge  
National Society of Professional Engineers (NSPE) – Pittsburgh

## 2022 Emergency Replacement Project of the Year, March 2023

Fern Hollow Bridge  
Engineers' Society of Western Pennsylvania (ESWP)

## The Top 25 Newsmakers, April 2023

Swank, Chad Basinger, Fern Hollow Bridge  
Engineering News-Record (ENR)

## Bridge Transportation Project of the Year, May 2023

Fern Hollow Bridge  
March of Dimes

## Outstanding Project of the Year, May 2023

Fern Hollow Bridge  
Society of American Military Engineers (SAME)

## Multi-Span Award, May 2023

Fern Hollow Bridge  
Association for Bridge Construction & Design (ABCD)

## Award of Merit, June 2023

Fern Hollow Bridge  
International Bridge Conference (IBC)

## 2023 American's Transportation Awards, NASTO Region, July 2023

**Best Use of Technology & Innovation, Medium Category**  
Fern Hollow Bridge  
Northeast Association of State Transportation Officials (NASTO) – Northeast

## ENR Mid-Atlantic Best Regional Project Award, October 2023

**Highway/Bridge Category**  
Fern Hollow Bridge  
Engineering News-Record Mid-Atlantic Region (ENR)

## Outstanding Project Award, Category B, November 2023

Fern Hollow Bridge  
American Society of Highway Engineers (ASHE) – Pittsburgh

## 2023 American's Transportation Awards, November 2023

### Top 12

Fern Hollow Bridge  
American Association of State Highway and Transportation Officials (AASHTO) – National

## Remarkable Achievement Award, November 2023

Fern Hollow Bridge  
Associated Pennsylvania Constructors (APC) – Harrisburg

## Roads & Bridges Ranked #3 in Top 10, December 2023

Fern Hollow Bridge  
Roads & Bridges

## Pubby Award – Repair Project of the Year, December 2023

Fern Hollow Bridge  
American Infrastructure (Builder Media – B2B Magazine)

## 2024 Diamond Award, Category C: Structural Systems, January 2024

Fern Hollow Bridge  
American Council of Engineering Companies of Pennsylvania (ACEC/PA)

## 2024 Outstanding Civil Engineering Achievement (OCEA) Award, February 2024

Fern Hollow Bridge  
American Society of Civil Engineers (ASCE) - National

## 2024 National Award of Merit, Transportation, November 2024

Fern Hollow Bridge  
Design-Build Institute of America

## 2024 Finalist Best in Process-Progressive Design-Build and Best in Small Projects, November 2024

Fern Hollow Bridge  
Design-Build Institute of America

# Publications & Presentations Through 12/31/2024

**(Besides hundreds of local and national media stories, updates, and random articles in magazines we were not involved in producing):**

- New Civil Engineer (Nov 24, 2022) – “How Pittsburgh is replacing a collapsed road bridge in just 10 months”
- ENR – Mid-Atlantic (Dec 26 / Jan 2, 2022) – “Fern Hollow Phoenix Rises Ahead of Schedule”
- ENR – The Top 25 Newsmakers (Jan 23/30, 2023) – “Chad J. Basinger”
- Roads & Bridges (Feb 2023) editorial – “The Fern Hollow Redemption” – we did not participate but very complimentary editorial
- World Highways (Jan/Feb 2023) – “A Record Bridge Replacement”
- Civil Engineer (April 19, 2023) – “How Pittsburgh’s Fern Hollow Bridge was replaced in less than a year”
- Roads & Bridges – (May/June 2023) – “Fern Hollow Redemption” COVER STORY and article
- PCI Journal (May/June 2023) – “Collapsed Pittsburgh bridge replaced in less than a year” – COVER STORY – we did not participate but based on ASPIRE article I believe
- ASPIRE – The Concrete Bridge Magazine (Summer 2023) – “From Collapse to Commute: Concrete Builds a New Fern Hollow Bridge in 11 Months”
- IBC papers (June 14, 2023) – paper and presentation
- ACEC’s Engineering, Inc. December 2023 magazine feature about "emergency projects"

## **PRESENTATIONS THROUGH 12/31/2024 – by HDR, PennDOT, Swank, City**

- 20+ local/W.PA, state/PA, ACEC, ASHE, WV, NY, IBC, WBES, OTEC, IA, KY, MS, DBIA, MA, MN, ITE, KS, ARTBA, ABA

# Frequent Q&As

- Is the bridge safe since it was built so quickly?
  - **YES** - Meets or exceeds every design code and standard, quality processes were not compromised and verified it, all processes from regular job were still followed, but not necessarily in place “before” construction. Construction followed all specs and standard processes and was inspected to meet quality standard of every other project
- Is the bridge under budget?
  - **YES** – will not exceed budget set day of collapse.
- Did this project cost more by doing it this way?
  - **NO** – TBD but most likely no if you include all costs
- Can you do this on every bridge?
  - **NO** – Can’t put every project to top of list.



# Questions?

