Summit County Engineer Alan Brubaker, PE, PS.

TOWNSHIP ASSOCIATION OF SUMMIT COUNTY MAY 7, 2024



The Summit County Engineer Office



Summit County Engineer Alan Brubaker, P.E.,P.S, County, Park, and Township officials at the Cuyahoga Valley National Park Pedestrian Bridge Ribbon Cutting. Opened July 27, 2023

• Our Office:

- Was created in 1928
- Maintains nearly 200 miles of county roads
- Maintains 280 county bridges
- Has 99 total employees

Our mission is to serve the Summit County Community by maintaining and improving our region's infrastructure, encouraging economic development, and ensuring a safe and efficient transportation system while protecting the environment.

Bridges in Summit County

- The Summit County Engineer is responsible for 280 total bridges county-wide.
 - 118 are located in Townships.
 - 162 are located in Cities and Villages.
 - 153 are 50 years or older (55%).
 - Only 33 of these bridges have had major work by contract completed within the last 50 years.



Shadybrook Rd. over Springfield Lake Outlet. Inspectors noted debris at end of pipe. SCE Crews removed.

Services: Bridges



Old Pressler Rd. Bridge. Originally built in 1939. Replacement started 8/24/23 and reopened 12/08/2023

The Bridge Section is responsible for:

- Bridge condition inspections
- Bridge inventory
- Determine safe weight limits
- Developing recommendations for maintenance, repair, rehabilitation and replacement
 - The bridge engineers review and approve all bridge design plans prepared by engineering consultants.
- Assisting the Summit Metro Parks with the inventory and condition inspection of 40 of their bridges.

Bridge Inspection Ratings

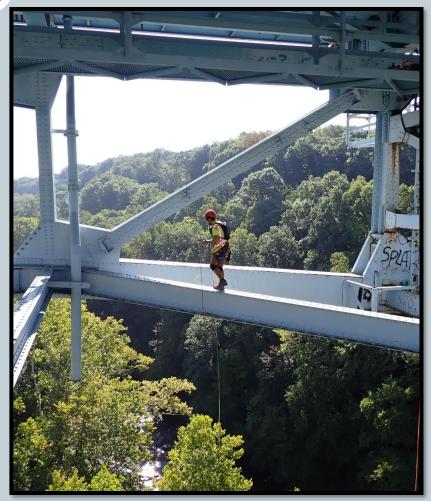
- 9 Excellent New (17 Bridges)
- 8 **Very Good** No problems noted (42 Bridges)
- 7 **Good** Some minor problems (82 Bridges)
- 6 **Satisfactory** Structural elements show some minor deterioration (82 Bridges)
- 5 **Fair** Structural elements show deterioration but are sound (38 bridges)
- 4 **Poor** Advanced deterioration or scour (14 Bridges)
- 3 **Serious** Poor *and* local failures are possible (3 Bridges)
- 2 **Critical** Serious *and* unless closely monitored it will be necessary to close bridge
- 1 **Imminent Failure** Critical *and* deterioration affecting stability, bridge closed
- o Failed Imminent failure and bridge is out of service, beyond corrective action



Glenwood Drive Bridge is rated 4-Poor. Programmed for replacement in 2027.

Bridge Inspection

- All bridges with General Appraisal with:
 - o 6 or less, are inspected every 12 months in the even years.
 - o 7, 8 or 9 are inspected every 24 months or in the odd numbered years.
 - o New or rebuilt bridges ranked 7, 8 or 9 are inspected every 12 months for 3 years, then switch to a 24-month inspection cycle.
- We have three bridge inspection teams.
 - They consist of two people; The team leader with a minimum of 5 years experience and ODOT certifications and another inspector.
- We also hire an engineering consultant to inspect about 25% of our bridge inventory



B&N's Inspection of the High Level Bridge

Our Summit County Engineer Bridge Crew

- The Summit County Bridge Crew complete maintenance across the County avoiding costly contractors.
 - They sandblast, form, and pour concrete to replace crumbling parapet walls, wing walls, and other important components of our Summit County bridges
- Bridge maintenance completed in 2023.
 - Seven Bridges over the Tuscarawas River
 - Forest Run Dr over Branch Furnace Run
 - AKR 59-0275: Front St over Cuyahoga River
 - Glenmount over Holy Cross Cemetery inlet
 - AKR 8-0908: N. Main Street High Level Bridge over Cuyahoga River
 - Shaw Rd over Branch of Yellow Creek
 - Townsend Rd over Furnace Run (Two bridges)
 - Various other bridges throughout the County



SCE Employee Jerimiah Stonestreet working on the Front Street Bridge over the Cuyahoga River (AKR 59-0275)

Our Summit County Engineer Bridge Crew



The Summit County Bridge Crew

<u>From left to right:</u> **Kurt Koerber** - Bridge/Ditch Foreman - 40 years, **Zach Schrock** - Bridge Worker II - 2 years, **Jeremiah Stonestreet** - Bridge Crew Leader - 24 years, **Jamie Lee** - Bridge Worker II - 20 years, **Aaron Zehr** - Bridge Worker II - 5 years





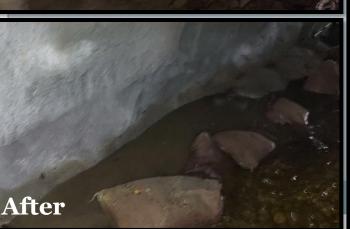




Above: Maintenance on The Akron Peninsula Rd Bridge (BST 10-1010) shows photos Before, During, and After repairs made to the wing walls.

Left: Maintenance on the Shaw Rd Bridge (Bat 199-0068) showing before and after photos of the abutment wall tuck pointed and repaired with Gunite.

Below: Maintenance on the Shaw Rd Bridge (Bat 199-0068) showing before and after photos orf bridge deck deterioration repaired with Gunite and drainage weep installation







Bridge Load Ratings

- Reasons why we load rate bridges:
 - Additional deterioration such as exposed or broken prestressing strands, spalled concrete, exposed reinforcing steel with section loss, perforations or section loss in steel beams or metal culverts.
 - Additional asphalt/concrete wearing surface added/removed from the bridge.
 - Major rehabilitation and/or widening of the bridge.



South Main Street Bridge. Was load rated for 3 Tons. Road closure started on 07/06/2023 and was reopened on 10/20/2023

Bridge Load Ratings (Continued)

The number of vehicles we load rate bridges for is constantly changing, currently we load rate for 12 different vehicles plus the design vehicles.

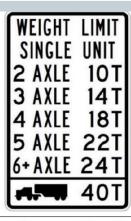
| Ohio Vehicles | AASHTO Vehicles | Special Hauling Vehicles | Emergency Vehicles |
|----------------------------------|---------------------------------------|----------------------------|---------------------------|
| 2F1 – 2 Axle (15 Tons)* | Type 3 – 3 Axle (25 Tons)* | SU4 – 4 Axle (27 Tons)* | EV2 – 2 Axle (28.75 Tons) |
| 3F1 – 3 Axle (23 Tons)* | Type 3S2 – 5 Axle (36 Tons)* | SU5 – 5 Axle (31 Tons)* | EV3 – 3 Axle (43 Tons)** |
| 5C1 – 5 Axle (<u>40 Tons</u>)* | Type 3-3 – 6 Axle (<u>40 Tons</u>)* | SU6 – 6 Axle (34.5 Tons)* | |
| | | SU7 – 7 Axle (38.75 Tons)* | |
| * Not included (7.5% allow | rance; Electric/Gas allowance) | | ** On Interstate system |

EMERGENCY
VEHICLE
WEIGHT LIMIT
2 AXLE 25T
3 AXLE 40T

Figure 919-3: Emergency Vehicle Sign (R12-H7 30"x30" or 48"x48") **AHEAD**

R3-17a Sec. 9B.04

Figure 919-2: AHEAD SIGN

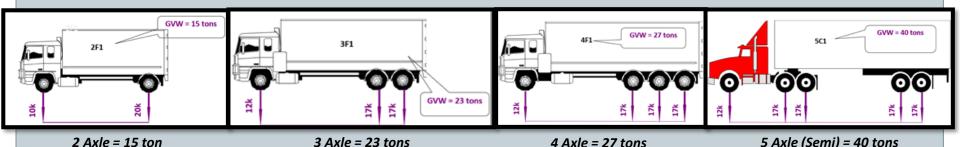


WEIGHT LIMIT Sign R12-H5

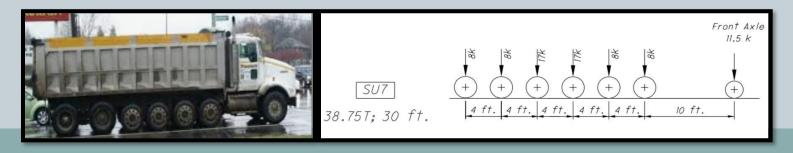
Figure 919-1: NEW LOAD POSTING SIGN

Vehicles and Weight Limits

- The state, county, and cities of Ohio must determine the safe capacity of every bridge in their jurisdiction. Trucks have always included trucks ranging from 2 axle to semi's
 - Trucks have always been limited to a maximum 17,000 lb. axle weight for multiple rear axles, and 20,000lb. for singe rear axles.



- 2 Axle = 15 ton 3 Axle = 23 tons 4 Axle = 27 tons 5 Axle (Semi) = 40 ton
- Contractor's trucks and other heavy trucks have grown in size to 6 or 7 axles or more.
 - Because we can't handle an infinite number of sizes of trucks, we have added the 6 and 7 axle truck to our standard calculations.



Emergency Vehicles and Weight Limits

- Even though our normal weight limit is 15 tons for 2 axles, and 23 tons for 3 axles, the
 Federal Transportation bill that authorizes all the funding for large projects, passed in
 2016, known as the FAST Act (Fixing America's Surface Transportation Act) granted an
 exemption for heavy fire trucks, weighing up to 43 tons for 3 axles and 28.75 tons for 2
 axles.
 - This is almost double the standard weight, and normally this exemption in the federal law applies to the interstate system.
 - FHWA mandates that we have to load rate every bridge over 20' span for these heavy fire trucks, and if found lacking, post an Emergency Vehicle weight limit sign at the bridge.
- Over the next 4 years, every bridge in Ohio over 20' span will have to be checked for load limits for this new EV and a sign posted if it is not able to carry a full load. We expect every county will be putting up dozens of new load limit signs for the EV's. It is expected to be thousands of new signs statewide.
 - Remember though, that Ohio law exempts the fire trucks from penalties for exceeding the weight limit. So, we are
 not stopping the fire department from crossing a bridge. However, there is a limit to what our bridges can carry and
 we can't change the laws of physics.

Emergency Vehicles and Weight Limits

Vehicles from Shawnee Twp. In Allen County







Ladder 5 Engine 1 Tanker 8

| Truck Siz | e & Weight | Std. | Weight Comparison |
|-----------|-------------------|---------|----------------------------|
| Rescue | 2 axle, 15 tons | 15 tons | OK |
| Engine 1 | 2 axle, 24.5 tons | 15 tons | Overweight 9.5 tons (163%) |
| Tanker 8 | 3 axle, 26 tons | 23 tons | Overweight 3 tons (113%) |
| Ladder 5 | 3 axle, 38 tons | 23 ton | Overweight 15 tons (165%) |

Note:

3 out of 4 are overweight, 2 are 160% overweight

Load Restricted Bridges

• There are currently 17 Load Restricted Bridges in the SCE Bridge Inventory.

o 10 are located in Townships.

- o 7 are located in Cities.
- o 12 are to be replaced in the next 5 yrs.

• The bridges are:

o AKR-001-0044 South St. over Ohio Canal

O BAR-003-0160 Snyder Ave. over Tuscarawas River

O BAR-009-0045 Brady Ave. over Wolf Creek

o BAT-046-0066 Ira Rd. over North Fork of Yellow Creek

o BAT-079-0203 Granger Rd. over Yellow Creek

BAT-079-0221 Granger Rd. over Yellow Creek

OBAT-079-0283 Granger Rd. over North Fork

o BAT-114-0320 N. Revere Rd. over Revere Run

o BST-009-1430 Riverview Rd. over Columbia Run

O BST-010-1127 Akron Peninsula Rd. over Salt Run

O COP-207-0161 Minor Rd. over Wolf Creek

o GRT-007-0150 Mt. Pleasant Rd. over Nimisila Creek

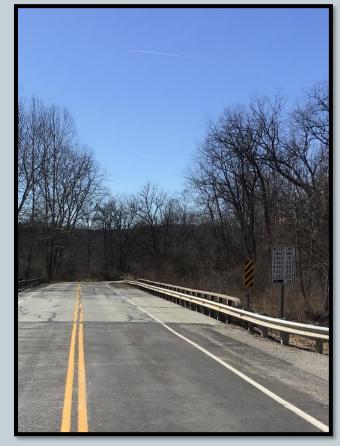
NTC-002-0071 Medina Line Rd. over Mohler Ditch

o NTC-053-0072 Barber Rd. over Wolf Creek

o RFT-174-0250 Wheatley Rd. over Riding Run

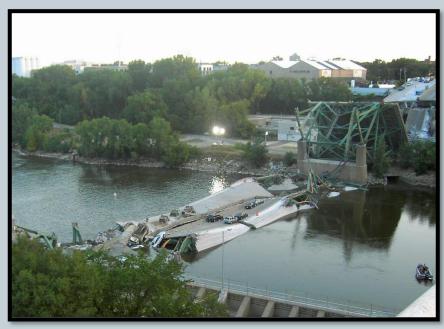
SAG-111-0000 Highland Rd. over Cuyahoga River

TWC-126-0114 Glenwood Dr. over Tinkers Creek



Highland Rd (SAG 111-0000) over the Cuyahoga River

In the News: "Fracture Critical" What is it?



The I-35 Bridge in Minneapolis. Collapsed in August 2007

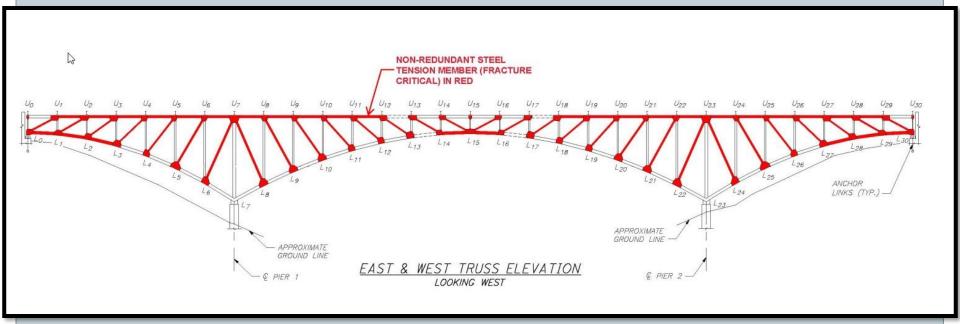


The Fern Hollow Bridge in Pittsburgh. Collapsed in Jan 2022



The Francis Scott Key Bridge in Baltimore. Collapsed in March of 2024

Why it matters to us? The High-Level Bridge!



The photo above shows all the non-redundant "fracture critical" members in red.

Our Most Expensive & Complex Bridge

- The High-Level Bridge in Akron and Cuyahoga Falls
 - o Built in 1948
 - Is over 900 feet long
 - Spans 210 feet above the Cuyahoga River Valley



The High-Level Bridge Project's Timeline

| Project Schedule - 15 to 20 Year Replacement Strategy | | | | | | | | | | | | | | | | | |
|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 |
| Life Cycle Cost Analysis Study | | | | | | | | | | | | | | | | | |
| Planning | | | | | | | | | | | | | | | | | |
| Engineering Studies, Surveying, Mapping, Environmental Studies, Public Involvement \$0.4M | | | | | | | | | | | | | | | | | |
| Preliminary Engineering & Public Involvement \$3.2M | | | | | | | | | | | | | | | | | |
| Right-of Way Acquisition \$0.3M | | | | | | | | | | | | | | | | | |
| Utility Relocation \$0.5M | | | | | | | | | | | | | | | | | |
| Additional Environmental Studies, Documentation & Clearance \$0.3M | | | | | | | | | | | | | | | | | |
| Final Engineering & Public Involvement \$2.4M | | | | | | | | | | | | | | | | | |
| Project Sale & Award | | | | | | | | | | | | | | | | | |
| Construction \$65.0M | | | | | | | | | | | | | | | | | |

Total Project Estimated Cost = \$72.1 M

Recently Completed Projects in 2023



Current Bridge Construction Projects to be built in 2024

- Granger Road Bridge (BAT 079-0221) Replacement
 - Construction Cost \$1,564,984.31 (Federal/SCE)
- N. Revere Road Bridge (BAT 114-0320) over Revere Run
 - o Construction Cost \$583,862.52 (SCE)
- Steels Corners Bridge (STW 100-0490) Repair
 - Construction Cost \$1,049,492.25 (Federal/SCE)
- SUM-Misc. Bridge (AKR 033-0107, AKR 632-0148, AKR 010-0374, AKR 059-0275) Maintenance repairs of five bridges
 - Memorial Parkway, W. North St., Portage Path L & R, Front St.
 - o Construction Cost \$458,617.75 (SCE)
- Ira Road Bridge (BAT 046-0066) Replacement
 - Estimated Construction Cost \$474,886 CY 2024 (Federal)



Upcoming Bridge Construction Projects to be built in 2025 - 2029

- Brecksville Road Bridge (RFV 017-2461) Replacement
 - Estimated Construction Cost \$2,400,000 CY 2025 (SCE)
- Three Small Bridge Replacement Design Build
 - Minor Road (COP 207-0091,)
 Medina Line Road (NTC 002-0071,)
 and Vanderhoof Road
 - Estimated Construction Cost \$1,700,000 CY 2025 (SCE)
- Wheatley Road Bridge (RFT 174-0250) Rehabilitation
 - Estimated Design Cost \$125,000 in CY 2024 (SCE)
 - Estimated Construction Cost \$650,000,000 CY 2025 (SCE). SCE recently submitted for LBR funding.

- Portage Lakes Drive Bridge (COV 075-0082) Rehabilitation
 - Estimated Design Cost \$60,000 (SCE)
 - Estimated Construction Cost \$260,000CY 2025 (SCE)
- Highland Road Bridge (SAG 111-0000) Replacement
 - Estimated Design Cost \$400,000 in CY
 2025 (SCE/Cuyahoga County)
 - Estimated Construction Cost
 \$2,600,000 CY 2027 (SCE/Cuyahoga County)
- Akron Peninsula Road Bridge (BST 010-1127) Replacement
 - Estimated Design Cost \$280,000 CY2025 (SCE)
 - Estimated Construction Cost \$1,200,000 CY 2027 (SCE)

Upcoming Bridge Construction Projects to be built in 2025 - 2029

- Snyder Ave Bridge (BAR 003-0160)
 Replacement Design Build
 - Estimated Construction Cost \$1,900,000 CY 2025 (Federal/SCE)
- Glenwood Drive Bridge (TWC 126-0114)
 Replacement
 - Estimated Design Cost \$325,000 in CY 2024 (SCE/Twinsburg)
 - Estimated Construction Cost \$3,400,000 CY 2027 (Federal/SCE/Twinsburg)
- Mt Pleasant Rd Bridge (GRT 007-0150) Rehabilitation Design Build
 - Estimated Construction cost \$1,300,000 CY 2025



Snyder Ave Bridge (BAR 003-0160). Programmed to be replaced in 2025

Not Funded and Need Funding

• Number of bridges needing replaced in the next 10yrs that have a general appraisal rating of 5 or less: **50**

Grand Total (SCE Budget for bridge replacements over the next 5 yrs)
Additional \$ Needed (over the next 5 yrs for inflation)
Additional \$ Needed (over the next 6-10 yrs for additional bridges)

Total (over the next 10 yrs)

+ Design and Right Of Way costs @ 15%

\$23.14 Million

\$10.00 Million

\$30.00 M

\$63.14 M

\$ 9.47 M

TOTAL COST TO REPLACE ALL BRIDGES:

\$72.61 M

Summit County Bridges (Based on 2023 GA)

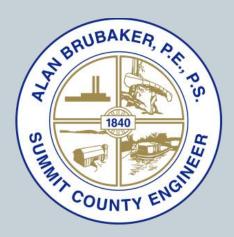


Questions?

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