

**BURNT MILL BRIDGE aka
HEADQUARTERS ROAD BRIDGE OVER TINICUM CREEK,
Section 1012, BRC, Ridge Valley Rural Historic District
Tinicum Township, Bucks County, Pennsylvania**

Historical Assessment Summary

Prepared for the Delaware Riverkeeper Network, Bristol, Bucks County, PA

**Report includes Current Historical Designations and discussion of
Additional Historical Context Categories:**

- NATIONAL: TINICUM TOWNSHIP *Writer & Artist Enclave
Of the early to mid-20th Century*
- NATIONAL: *Architecture and Engineering: Cultural Preferences,
Earliest Example*
- NATIONAL: *Engineering: Wooden Bridge Technology*
- NATIONAL: *Engineering: Collection of Rural Bridge Types*
- REGIONAL & LOCAL: *Patterns of History, Development & Transportation*
- REGIONAL: *Community Development: Bucks County in the Early Republic*
- REGIONAL: *Community Development: Local Craftsmen to
Carry out Public Projects*
- NATIONAL/REGIONAL: *Architect/Engineer: A. Oscar Martin*

**Prepared by Kathryn Ann Auerbach, Historic Preservation Consultant,
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Note: KAA reports on HABS/ HAER studies of the bridge & additional topics related to reviews under the 106 projects, amendments to the Ridge Valley Rural Historic District and Historical Reports are independent of this Summary.

Ms. Auerbach has been involved in historical research and documentation in Bucks County for nearly forty years. She has compiled extensive surveys and successful National Register nominations for individual sites and historic districts, both urban and rural. Ms. Auerbach is an instructor for the nationally prominent Historic Preservation Certificate Program at Bucks County Community College. Among many projects, she has lead classes in Historic American Building Survey (HABS) documentation in conjunction with the National Park Service on Civil War Battlefield sites in Maryland and Virginia and her teams have been recognized four times with the Charles Peterson Prize national competition, most recently with first place. Her preservation and planning work has extended throughout the northeast in MA, NJ, NY, VT, PA MD and VA. She has consulted on extensive bridge surveys and evaluations throughout Pennsylvania.

BURNT MILL BRIDGE aka HEADQUARTERS ROAD BRIDGE
OVER TINICUM CREEK, TINICUM TOWNSHIP, BUCKS COUNTY, PA

Historical Assessment Summary

Prepared by Kathryn Ann Auerbach, Historic Preservation Consultant, June 2013

Resource: Multi-span, rural highway, beam bridge spans 80' over medium sized stream.
Stone sub-structure: **Built 1812**, stone buttress reinforcement west wing wall ca. 1935.
Super-structure: Timber stringer, wooden deck, wooden plank rails 1812 – 1919.
Concrete encased steel I-beams, concrete deck & pylons, pipe rail **1919**.
W-guiderail replaced pipe rail ca. 1990.
Jersey barrier replaced W-guide rail ca. 2001.

Designations: -Ridge Valley Rural Historic, contributing resource listed in the
National Register of Historic Places- applied 1990, listed **1992**.
-Lower Delaware **Wild & Scenic River**, contributing resource, **2000**.
-Tinicum Creek, PA **Exceptional Value Stream** Designation

Affirmation: Keeper of the National Register's letter of April 26, 2006 states:
"Both its (Burnt Mill Bridge) original construction and alteration occurred within the historic district's defined Period of Significance (1790-1940). The bridge is **historically significant** in the context of the development of the township, regional transportation, and the operation of local mills, and **IS OF ENGINEERING SIGNIFICANCE BOTH FOR ITS EARLY 19TH CENTURY CONSTRUCTION AND ITS SENSITIVE MODERNIZATION IN 1919**. Although the concrete deck shows signs of considerable deterioration and the deck has been altered with the removal of the 1919 railings, the bridge **RETAINS SUFFICIENT HISTORIC INTEGRITY TO CONTINUE TO CONTRIBUTE TO THE RIDGE VALLEY RURAL HISTORIC DISTRICT.**"

PA Historic Bridges: Based on the PA Historic Bridge Inventory conducted in 1993 by Lichtenstein & Associates, the age of bridges indicate that Burnt Mill Bridge is the
- **4th oldest bridge in Bucks County** and the
- **11th oldest bridge in Pennsylvania**.
Stone Arch bridges are the only older bridge type.

Bridge Type: Stone supports for a multi-span timber stringer wooden bridge.
- **Burnt Mill Bridge is the oldest documented stone supports for a Multi-span timber-stringer bridge in Pennsylvania**.
While once a fairly common rural bridge type in some areas, timber stringer and deck bridges of the 18th & 19th centuries have nearly disappeared from the entire inventory of historic bridges and often do not even appear as a bridge type. Only one other multi-span stone supported beam bridge is currently known in Bucks County, that of ca. 1835 Harpel's or Creamery Road Bridge over the Tohickon.

Additional Historical Context Categories:

NATIONAL: *Tinicum Township Writer & Artist Enclave of early to mid-20th century*

The majority of Tinicum Township is currently being evaluated for eligibility as a **National Historic Landmark**. Initiated with correspondence with the National Landmark office in 2008, studies are underway to document the area's **unique role as a home to many writers, artists and notables of national caliber during the early to mid-20th century**. **Tinicum Township retains the integrity of historical landscape and buildings and structures** that were in place during the first half of the 20th century.

Bordering the Delaware River, Tinicum is characterized by a rugged natural beauty secured with historical roots extending back nearly 300 years and evidenced through the handiwork of substantial structures created by the founding families. **Building on the framework of ancient roads and buildings** of the early Scot-Irish and German families, the agriculturally poor **township transitioned into an area of resort** and respite by the late 19th century benefitting both existing families as well as new arrivals.

The advent of the automobile encouraged writers and artists to settle within the hills and valleys and seek inspiration and quiet renewal, and in some cases to live the thrill of the pioneer lifestyle. With leading names such as S. J. Perelman, Nathaniel West, Dorothy Parker, John Wexley, Artie Shaw, Josephine Herbst and later James Michener, Tinicum became host to a unique blend of generational residents, serious artists and New York sophisticates. The resultant preserved landscape and collection of historical resources is a demonstration of the economic symbiosis between cultures and universal appeal and respect for the natural and historic settings that Tinicum offers. **Tinicum's unique handmade local quality and connection to heritage was retained and sustained, even as artists, notables and sophisticates were added to the demographic.**

Headquarters Road is a principal avenue through the township to view and experience this district, and was the visual image that captured the desire of this nationally significant collection of artists to settle here. It retains many of the character defining features of this image, such as winding narrow roads and one-lane bridges. Nearby artists include Charles Rudy- famous sculptor, John Wexley- Hollywood screenwriter "the king maker" and James Michener- internationally famous author.

Burnt Mill Bridge is a critical element of the ability of the township to convey this early 20th century image. It demonstrates both the heritage building traditions and natural stone materials that blended this resource to the landscape, as well as the modest yet effective upgrades in steel and concrete by recognized architect/ engineer A. Oscar Martin to carry modern motorized traffic. It retains evidence of the 1919 appearance that was in place upon the arrival of this bohemian trend. Burnt Mill Bridge joins with nearly ten other bridge upgrades (several recently destroyed) Martin executed during this era of renewed prosperity for the township and reinforces the complete physical picture of the 20th century phenomenon.

Additional Historical Context:

NATIONAL: *Architecture & Engineering: Cultural Preferences, Earliest Example*

Burnt Mill Bridge represents a **cultural preference** acceptance of **timber super-structure and stone masonry substructure as a permanent and valid bridge** engineering type by the **predominant German** founding families of Tinicum and upper Bucks County. As a source region for significant westward migrations by the descendants of immigrant first settlers, southeastern Pennsylvania became the trying ground for pure cultural expression, as well as the first cultural blends to both other groups and local landscape offerings of geology and climate. Designs that evolved and design choices made often reflected cultural preferences that ultimately **contributed to the national fabric of construction heritage and practice**. Early examples of building and bridge engineering methods and designs are highly significant to the understanding of the national vocabulary that followed as the 19th century progressed.

Burnt Mill Bridge represents **character defining features of stone masonry supports** that saw principal sourcing and refinement in the early Republic period. Referred to as “pillar bridges” the stone features include large, rough ashlar stone blocks on horizontal courses, diminishing to random stones in height, battered walls to provide the most stable “Pylon” or Pillar, rounded pier noseings to deflect water flows, slightly concave inside facades of abutments to deflect the earthen force of the approach ramps, water tables or a stepped foundation feature. Abutments and piers were placed at roughly 25 foot intervals to support the untrussed wooden timber spans. **The Burnt Mill bridge stone supports exhibit these character defining features of this formative period of engineering for these free standing stone support structures.**

Burnt Mill Bridge provides **information on the combination of stone and wood** to provide a lasting bridge crossing for over one hundred years until the deck replacement in 1919. Burnt Mill Bridge 1812 provides **the earliest documented evidence of bridges that became commonplace throughout the nation**, design ideas and preferences carried by the actual relative members of German founding families of this source region. While beam bridges are seemingly “un-engineered”, Burnt Mill demonstrates engineering in the stone supports and the understanding of the design capabilities of wooden beams, thus an **engineered choice with regard to span and placement of piers and abutments**. That this design is repeated in greater scale within 20 years with Harpel’s (Creamery Road) Bridge reinforces both the bridge type and its acceptance as a valid and permanent method of stream crossing. Wooden beam bridges on solid stone supports appear to have been built with more frequency in areas of Bucks County/ southeastern Pennsylvania that contained higher density of German immigrants and their successive generations, areas that sustained a relatively pure cultural imprint even into the 20th century, thereby showing cultural preference in bridge type.

Additional Historical Context:

NATIONAL: *Architecture & Engineering: Cultural Preferences, continued...*

Southeastern Pennsylvania retains pockets of intact settlement areas that represent the variety of cultural groups who arrived to settle under William Penn's Holy Experiment. This event, perhaps the first in the history of civilization that peoples from around the world were invited to live together under a loose Frame of Government, resulted in **successful permanent communities of different cultures** with different architectural and building traditions existing side-by-side.

German migration into Tinicum, to join earlier arrivals of Dutch and Scot-Irish, is verified by requests **in 1738 to form a township**. First and second generation immigrants brought a solid tradition of heavy timber construction and faith in wood as a material of substance and strength. Equally skilled in stone masonry, Germans in Tinicum and other upper Bucks communities accepted timber superstructure bridges on quality, permanent stone supports. This is in contrast to English preferences in southeastern Pennsylvania for full stone, thus the frequency of stone arch bridges in landscapes to the south and southeast, or on major interstate routes. Local artisans John Niece and Barnet Hillpot likely joined with **documented Barnet Snider and Christian Fretz in the construction of Burnt Mill Bridge, adding a true signature of cultural handiwork to the physical bridge**. Local stone and wood artists continued to contribute during technology changes that brought wooden truss covered bridges by the third decade of the 19th century.

While seemingly of local or regional importance, it is these **first permanent expressions of building art and engineering that established the nation's building traditions as well as provided the physical underpinnings of the creation and growth of the nation**. Only one other stone supported multi-span timber-beam bridge (again with ca. 1935 concrete deck) known to exist in upper Bucks County is the nearby, ca. 1835, 200 foot Harpel's aka Creamery – Fretz Valley Road Bridge. This bridge shares regional, cultural, engineering and familial associations with Burnt Mill Bridge. To view period historic bridges side-by-side with the stone homes of these founding families (in this case the Fretz's, Christian & Abraham and the Harples) gives a rare and unique glimpse of the very basic foundation of our nation.

A national bridge assessment study "A Context for Common Historic Bridge Types" prepared in 2005 (Parsons Brinckerhoff and Engineering and Industrial Heritage, National Cooperative Highway Research Program &c), while well-written and very comprehensive on truss types, provides minimal information on the timber stringer with stone supports, generally focusing on timber bridges with timber pylon supports and 20th century picturesque park-type timber bridges (representative examples given are of the latter). It does acknowledge the commonality and frequency of the type, especially for short, single spans, and the duration of use into the 20th century.

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Additional Historical Context:

NATIONAL: *Architecture & Engineering: Cultural Preferences, continued...*

The report notes that **timber bridges were among the earliest**, as “stone bridges were expensive and time-consuming”. It infers that these “bridges were all of a temporary nature”. This misunderstanding comes perhaps from a lack of information about these very early bridges, due in part to their rarity today, as well as a lack of understanding of the significance of the stone supports to verify the existence of a wooden structure and the local achievement to build a bridge. The report does qualify the limitations of its study and the need to gather more information on timber bridges.

The Burnt Mill Bridge, as the oldest documented bridge of its type in Pennsylvania, along with Harpel’s Bridge demonstrate sophisticated design of the stone supports, application for county assisted funds to construct the stonework, and acceptance of a timber beam deck as a permanent bridge by the locally dominant German population. The study does state that “very old (pre-twentieth century) examples would possess significance as an early representative example of the type if they retain integrity. In the case of Burnt Mill, the stone substructure retains very good integrity from its original engineered design, and clearly demonstrates the span capability of the wooden beam, namely 25 feet. Even without the original timber beams, the number and spacing of the stone supports provides clear evidence of the design and span. Documentation drawings rendered by A. Oscar Martin in the early 20th century (collection @ Bucks County Historical Society) for a similar bridge, now destroyed, provide measured specifications for the wooden super structure, including the wooden beams, board deck, wood railing and wrought iron nails to attach the railing. These drawings “complete the picture” of the design of the wooden superstructure assuming similarities within the same county, geographic setting and cultural group. **Thus Burnt Mill Bridge stands as a significant verification of a forgotten bridge type, and by age and size, may have provided a prototype for migrating cultural groups from Bucks County to repeat as settlement moved across North America.**

NATIONAL: *Engineering: Wooden Bridge Technology*

Burnt Mill Bridge contributes to a unique collection of wooden bridges in Tinicum Township that is exemplary on a national scale in representing some of the **oldest and most diverse variety of bridge types**. Burnt Mill 1812 and Harpel’s Bridge ca. 1835 verify wooden beam technology, there is one ca. 1832 Queen Truss pony bridge over the NHL Delaware Canal, one ca. 1867 Howe open pony wooden truss of multi-span, three ca. 1850-1880 covered Town or lattice trusses and one ca. 2005 Burr truss replication of the original 1832 Delaware Canal aqueduct over the Tohickon Creek. The majority of these bridges are located either in National Register Historic Districts, over National Landmark designated canal or within State Park boundaries, designations which help to reinforce the physical context for understanding the choice of wooden bridges.

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Additional Historical Context:

NATIONAL: *Engineering: Collection of Rural Bridge Types*

Tinicum Township's collection of bridges (including those crossing the Tohickon into other townships) is one of **the most comprehensive in the state and represents all major rural bridge types**. Included are natural stream fords (three active), supports for wooden beam spans (two), stone arch (one active), covered wooden Town truss bridges (three active), open wooden Howe truss (one), open wooden Queen post pony (NHL-one pedestrian), metal truss (one active King Iron Company bow string, four active Pratt pony), concrete deck girder arch- 1909 (one active), early concrete encased I-beam (five active), early solid concrete deck (at least three active), early concrete barrel arch long span- 1922 (one active), ca.1930 balustraded concrete T-beam long span (one active), ca. 1930 paneled parapet concrete T-beam single span (two active), mid-20th century early park-era crossings of the Delaware Canal (NHL) (three active). Additionally of interest is the reconstructed timber Burr truss aqueduct for the canal over the Tohickon Creek and a reconstructed Queen post timber bridge over the canal. This collection has rare trusses of wrought iron, one-of a kind open wooden truss designs, covered as well as some of the earliest examples of concrete technology. Burnt Mill is critical both by age and type to complete the full picture of rural bridge technology this remarkable collection represents.

Unfortunately, a significant steel plate girder bridge- 1921 over the NHL Delaware Canal, was recently completely destroyed and replaced. Likewise several early 20th cent., single span, one-lane concrete and I-beam spans were inappropriately replaced with intrusive modern bridges that altered stream characteristics, natural setting and serenity and historic road paths and degraded NR historic districts. In spite of these recent mistakes, this collection of nearly 34 historic bridges of all types (except plate girder) provides perhaps the most comprehensive representation of rural bridge solutions in preserved visual and historical context in the country. **The Burnt Mill Bridge is a critical component as the oldest bridge and representing the oldest type (save natural ford) of engineered crossing in this collection.**

REGIONAL AND LOCAL: *Patterns of History, Development & Transportation:*

Burnt Mill Bridge verifies by its placement the original course of the ca. 1747 Headquarters Road as a critical path to the only internal mill in the township, first Henry Myers' then Christian Fretz', as well as the regional path for travelers coming across from the Perkiomen (Goshenhoppen) Region to the Erwin's ferry crossing to New Jersey on the Delaware. Once the bridge was approved in 1812, connecting roads, Red Hill and Sheep Hole were confirmed to feed to this critical transportation artery. Burnt Mill Bridge was the only internal bridge crossing this major stream for another 60 years.

Additional Historical Context:

REGIONAL: *Community Development: Bucks County in the Early Republic*

Burnt Mill Bridge represents the significant growth and maturity of the County of Bucks during the Early Republic period, namely the capability of the young government to fund major construction projects including inter-state bridges, the county almshouse and a new set of county buildings built in conjunction with the relocation of the county seat from Newtown to Doylestown 1812. By its remote location 12 miles from the county seat in Doylestown Burnt Mill Bridge represents the effective outreach of the county system to meet the needs of its rural populations. It also represents the ascension of cultural groups that had been in the political minority, but now who were playing strong roles in the growth of the county, including the German heritage Stover and Fretz families, both very instrumental in the county court house and almshouse building projects.

The Early Republic aka Federal period witnessed an interest by township residents for public and private improvements, including William Erwin's brother Joseph investigating with the DuPont's of Delaware the potential to harness the power of the Delaware River for milling and manufacturing purposes. (Fackenthal, B. F. Collection, 1801-1939, Fol. 80, Erwin. Joseph, *Letter to Geo. Wall of Solebury, Erwinna, Sept. 10, 1801*. ALS 2pp., Spruance Library, Bucks County Historical Society). (Note: above materials found in unpublished report: Steffe, Michael J., Historical Research Report Erwin-Stover House, prepared for Bucks County Parks & Recreation Department, December 31, 2004). Petitions for road and bridge improvements from the township validated an interest in permanent contribution to the county's economic framework.

Refined stonework technique mirrored the maturation of Bucks County communities settled for nearly a century, benefitting from established economic base and second or third generation stability. The "building boom" of the post Revolutionary era was primarily an upgrade of established farms, transportation networks and crossroads communities with larger houses, barns and public buildings celebrating the autonomy and prosperity through solid, permanent stone construction. **New county buildings**, first at Newtown, then at the new county-seat of Doylestown in 1812, as well as the large county almshouse coupled with the **county's sponsorship of bridges** to improve transportation all **featured stone construction** primarily of cut and fitted ashlar technique. Houses and barns demonstrated dramatic cut corner quoins and jack arches to achieve an artistic strength, while wall ranges were skillful rubble ensembles in horizontal bed lines.

Bridges of county construction on principal interstate roads featured dramatic stone arches inspired by renewed interest in Roman government and building achievements. Only a handful of these remain today in Bensalem (Philadelphia Road) 18th century,

Additional Historical Context:

REGIONAL: *Community Development: Bucks County in the Early Republic, cont'd:*

Newtown (Center Street) 1794, Nockamixon (Old Easton Road) 1804, Springfield (Old Bethlehem Road) and in Warwick (Old York Road) 1808. Equally significant and requiring county-sponsorship for construction cost were the stone pillar bridges, such as Burnt Mill Bridge, built on important intramural thoroughfares. Road improvements of the mid-20th century, such as along Easton Road (Route 611), eliminated several significant stone arch bridges, including one of nine-arches entering Tincum Township across the Tohickon Creek, as well as many timber beam bridges. **The quality stonework of the Burnt Mill Bridge substructure stands as a testament of this significant county- sponsored growth period and contributes to the diminished remaining collection of county building projects celebrating its mature autonomy.**

REGIONAL: *Community Development: Local Craftsmen to carry out Public Projects*

Burnt Mill Bridge represents the southeastern PA approach to bridge building projects, namely that bridges were built by the local population of artisan and property owners, with an account of funding placed in charge of a neighbor to the chosen bridge site. Thus bridges take on a hand-made quality with distinctive characteristics of the stone masons and carpenters who also constructed the houses and barns in the community.

For important roads within townships, bridge improvements came after numerous petitions and, as noted, often with the help of local work force and supervision. Thus the **construction engineering preferences and technique were a reflection of local capabilities of skill, materials and economic support.** For rural and somewhat remote communities such as Tincum, wooden beam bridges on stone substructures were acceptable and serviceable solutions. Coupled with enhanced knowledge of and belief in wooden construction mastered by the local German heritage populations, wooden beam bridges were achieved with ease and competency.

Account books of William Erwin, son of Col. Arthur Erwin and landholder of substance along the river in Erwinna, document his work to oversee the “Building of a bridge at the mouth of the Tincum Creek” (Erwin, William, *Account Book, 1799 & 1800 (-1804), with Bucks County Commissioners...* MSC. 193, Fol. 3, 1 v., Spruance Library, Bucks County Historical Society, Doylestown, PA). This bridge, along the Delaware River, was the only other bridge crossing of the Tincum Creek, a large, strong stream that cuts through

Additional Historical Context:

REGIONAL: *Community Development: Local Craftsmen - Public Projects: cont'd:*

a major portion of the township. It carried the first road leading from Philadelphia to London's Ferry, replacing a stream ford crossing in place since before 1740. The majority of the abutments and pier, as well as the deck, of this bridge were completely replaced in the 1970's, only remnants of the stone wing walls remain.

Erwin's account book documents the local participation in the construction of a county bridge, namely the supervision by local resident William Erwin and the listing of "mechanics" or skilled carpenters and masons. The following names are included: Masons: John Neice (also listed as mason on a deed), George Neice, Moses Lauder, John Helwick and Mark Wismore, and carpenters: Joshua Opdyke, Charles Thompson, John Vancamper, Thomas Curtis, Thomas Lott and Barnet Hillpot (documented carpenter in other records) (Ibid.). John Neice and Barnet Hillpot were known property owners in Tincicum at the turn of the 19th century. (Adams, Harry, Federal Direct Tax of 1798, Tincicum Township. Bedminster, PA: Adams Apple Press. 1994, pp. 225, 228) There would be a strong likelihood that some of these artisans, such as John Niece and Barnet Hillpot, participated in the construction of the Burnt Mill Bridge a decade later under supervision of George Snyder and the Christian Fretz family, adjoining property owners.

Several petitions were submitted to the county from 1805-1811 for the construction of a bridge by Fretz's mill, approved in 1812. (BC Bridge File #83, docket 2, ps. 4, 85; File #104, docket 2 ps. 294-307; File #112, docket 2, ps 360, 364) In 1805 the committee to view the site for a bridge described "that the width of the said Creek at the place where the bridge is wanted is about eighty-five feet that it would require a Bridge of ten feet High to be above the Highest Freshet in said Creek..." (Ibid.) County budgets printed in the *PA Correspondent & Farmers' Advertiser* 2/28/1814 and 1/30/1815 list George Snyder (local resident) as overseeing the construction of a "bridge over Tincicum Creek" and 1815 bridge account book shows Christian Fretz paid \$21.75 for 175 bushels of sand. (BM B-20, p.8, Spruance Library) An undated county bridge index (ca.1887-1919) lists "Burnt Mill" bridge "spans Tincicum Creek on road from Red Hill to Erwinna, 80 ft. long and 16 ft. wide, open wooden structure." (BC Bridge records, microfilm, Spruance Library).

Rare surviving examples of county sponsored bridges, in particular from the pre-Civil War era, represent local, vernacular construction of public projects, in contrast to retaining a regional private bridge company to execute the construction. For Bucks County, even covered bridge construction in the 1870's, and bridge abutment and framework assembly into the 20th century, was carried out by local artisans. Early examples of the success of this method, such as Burnt Mill Bridge, are highly significant in understanding this county approach to public projects.

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Additional Historical Context:

NATIONAL/ REGIONAL: *Architecture/ Engineering, significant designer A. O. Martin*

Burnt Mill Bridge is significant in the body of work of Architect/Engineer Adam Oscar Martin to provide “modern” solutions in concrete and steel, while retaining the record of history and character defining features of the previous bridge. While quickly disappearing, many examples still exist of Martin’s exemplary bridge work at the cusp of concrete technology, amplified by the survival of his detailed engineering drawings. Burnt Mill Bridge demonstrates Martin’s simple and effective “repair” to the deck of the bridge while respecting and retaining the stone substructure. His concrete encased I-beam and concrete deck design was a prototype that was continued by successor county engineer John S. Roberts and was further utilized in the first decades of state bridge repairs after the adoption of a vast network of rural roads and bridges in the 1930’s. Burnt Mill verifies the execution of the Martin design for larger bridges as well as single-span crossings, and demonstrates the strength and longevity of the solution through its continued service for over eighty years.

The early 20th century saw a change in bridge maintenance policy by the County of Bucks with the installation of Adam Oscar Martin as county engineer by 1902. This newly created position came at the advent of new engineering technology as well, that of the use of steel I-beams and reinforced concrete for load bearing construction. Martin (1873-1942), a Bucks County native, trained in architecture and engineering from Drexel Institute, and benefitting from architecture experience in Buffalo as well as Philadelphia, embraced the opportunity to establish a practice in his home county by ca. 1897. By 1900 he offered designs for two stone arch bridges to the county, ironically possibly serving as county commissioner as well (an Adam Martin is listed as commissioner on bridge placques from 1900-1902). **As the county’s first bridge engineer, serving from 1900 – ca. 1923, Martin directed the repair and new construction of over 100 bridges throughout the entire county.** A collection of Martin’s bridge drawings (as well as many of his other architectural designs) is held at the Bucks County Historical Society’s Spruance Library. This collection provides unique insight into the emerging technologies of the early 20th century, Martin’s practical and sensitive approach to design, and a record of bridges and bridge types that no longer exist.

Martin’s Pennsylvania German background guided him in a conservative and practical solution to design challenges. His architectural training and personal aesthetic combined many philosophies of the Arts and Crafts, Colonial and Spanish Revivals with a keen knowledge and sensitivity to scale, patterns and settings of Bucks County’s building traditions. As a result, his pleasing designs consistently won favor with clients throughout the county. **This attentiveness to scale and setting, surface textures and affinity for the heritage of local wood and stone craftsmanship comes through in**

Additional Historical Context:

NATIONAL/REGIONAL: *Architect/Engineer: A. Oscar Martin, cont'd:*

Martin's collective body of bridge work. Nearly one half of the bridges documented in the BCHS collection were “repairs”, incorporating elements of existing bridges, maintaining road alignments and widths, using existing stone abutments and piers and repairing or replacing the superstructure. Martin rehabilitated open wooden beam and truss bridges, covered wooden truss bridges, metal truss and stone arch bridges.

Martin's new designs for either deck replacement or entire new construction included metal plate girder bridges, reinforced concrete deck, concrete encased I-beam and concrete deck, reinforced concrete beam and deck, concrete arch and stone arch constructions. **Many of his “repairs” were simply replacing wooden beam and deck components in I-beam and concrete, while maintaining the footprint and profile elevations of the existing bridge.** Concrete decks were macadamized to blend with the approach roads and open wooden railings were replaced with open pipe rail. Martin designed well over fifty concrete bridges of various types from 1906-ca.1923. This “modern” phenomenon was worthy of note at the time, as seen in the *Trenton Evening Times*, August 19, 1914 “Concrete Bridges are Erected in Bucks” “Bucks County's reinforced concrete bridges are justifying the faith of the County Commissioners, who first introduced the plan of substituting them for old-fashioned iron and wooden bridges. The assurance is given by County-Engineer A. Oscar Martin, of Doylestown, who designed all of them.”

Martin's work with concrete and steel appears first in 1906 with designs for a single arched span at Auchey's Mill in Milford Township. He had designed a stone arch approach to the mill, but changed to concrete and steel with success. That same year he designed two longer spans, the first with two arches on Dark Hollow Road at Stover's Mill over the Tohickon Creek from Bedminster into Tinicum Township and the second with a single 72-foot span on Allentown Road at Campbell's Mill over the Unami Creek in Milford Township. (Both latter bridges recently destroyed, Campbell's Mill featured in an article “What Makes a Bridge Great?”, Stidger, Ruth W., ed. *Better Roads*, 2/2005). Martin continued to design closed and open spandrel arch spans, although not as prolific, into the 1920's, the large two-span bridge in Point Pleasant being among his last in 1921.

Martin developed a concrete substitute for wooden bridge decks by ca. 1908. These were primarily encased steel I-beams replicating the wooden beam spans of approximately 25 feet. He used eight I-beams for a 16 foot wide deck (wooden beams used only six), the standard bridge width, and used a raised square concrete curb and end concrete pylons to receive the 2” or 2 ½” pipe railing. Occasionally he raised the approach and deck slightly to increase the hydraulic opening. Quite often he made

Additional Historical Context:

NATIONAL/REGIONAL: *Architect/Engineer: A. Oscar Martin, cont'd:*

repairs to the existing stonework, even to entire encasement in concrete “jackets”. Concrete “caps” or diaphragm seats for the I-beams were placed on top of the stone features, and concrete coping was used on the wing walls. Date stones (generally marble) were nearly always incorporated to commend the county’s interest in its bridges. Martin also built some bridges with full reinforcements, either an integrated deck, or with reinforced concrete beams (four for 16’ width) depending on the span and circumstance.

The majority of I-beam bridges through the 1920’s were replacements of mostly wood beam bridges, labeled as “repairs” with 16’ wide deck of 8-beams averaging 15” high & 25’ in length (29’-30’ spans used 18” I-beams). These I-beam bridges were mostly shorter, of one or two spans to about 50+ feet. While some beam bridges used new abutments and a single pier of concrete, Martin commonly used existing stone piers, abutments and wing walls, although often with repairs, concrete refacing and coping on the top surface. The new concrete deck was always covered with macadam or stone grit with a center crown. The concrete itself contained rough, pebbly aggregate and was a medium-tan color that eased its harshness. Martin attempted to maintain historical features, existing path, stone walls, arches and setting and took a conservative approach to utilize what was there and make minimal overall changes.

Burnt Mill Bridge appears to be among the longest of the “Repairs” (another over the Mill Creek in Rushland was nearly identical, age unknown and since replaced) with three spans approaching 75 feet. There is no notation on repairs to the stonework, just to add a concrete cap to receive the new beams and seal into the deck. Occasionally Martin corrected the creek channel to better align under the bridge, and changed the approach over the creek to skewed (especially with new concrete arched bridges) to achieve the design and connect the road path. This is not the case at Burnt Mill. Martin’s “repairs” to rural bridges were nearly exclusive to 16-foot width and replaced the wooden decks of shorter span bridges. Longer spans were either repairs to covered bridges (120-180’ spans) or repairs and widening of stone arch bridges. Spans of 50 to 75 feet were often new concrete arch spans, **the retention of the stone substructure of Burnt Mill further demonstrates it was sound and capable of reuse.** The use of galvanized pipe railing of 2” to 2 ½” diameter was common with Martin’s beam bridges. The marble date stone was often placed slightly recessed in the bridge pylon or at the inside face of solid parapet walls at crown of arch. Burnt Mill’s 1919 date plaque is in the north pylon.

Thus Burnt Mill Bridge demonstrates the quality and engineering of the 1812 stone substructure and its minimal alteration in 1919 to accommodate the new concrete deck of A. Oscar Martin. The superstructure not only illustrates Martin’s engineering formula for

Additional Historical Context:

NATIONAL/REGIONAL: *Architect/Engineer: A. Oscar Martin, cont'd:*

the replacement of wooden beam spans, but his stylistic treatments as well. This formula became a prototype copied by subsequent county engineer John S. Roberts and into the mid-1930's with early Pennsylvania Department of Transportation bridge improvements. **Perhaps most importantly, through Martin's documentation drawings, the suitability of the stone substructure is verified, not only by virtue that he called out no repairs to the stone, but also in that his choice to "repair" the deck, rather than to place a new concrete arch span at this location, answers to the quality of the existing stone.**

EVALUATION CRITERIA:

The following criteria are those established by the **National Register of Historic Places**: Applications are guided by discussions presented in “A Context for Common Historic Bridge Types”, Parsons Brinckerhoff & c, October 2008.

Criterion A: A bridge associated with events that have made a significant **contribution** to the **broad patterns of our history**. **YES APPLICABLE**.

- Burnt Mill Bridge, 1812, was built during a **significant period of construction** of county based public projects, and affirmation of the maturity of the county government to accomplish large projects. It represents the method used by the county to contract with local population to oversee projects and hire local craftsmen.

- The construction of the bridge served as the **only reliable bridged crossing** within the interior of Tinicum township for local mills and intramural and interstate commerce for **60 years** before the construction of the next bridge. With the approval of Burnt Mill Bridge in 1812, additional roads leading to the bridge crossing, such as Red Hill and Sheep Hole Roads, were approved as public roads, thus facilitating further economic stability for the area.

- Previous to and with the installation of the 1919 deck, Burnt Mill Bridge **served the new influx of artists and writers**, many of whom required reliable automobile transport. The bridge reinforced the allure of the area for having a strong rural heritage with substantial stone buildings and structures that complimented the dramatic natural landscape.

Criterion B: A bridge associated with the lives of **persons significant** in our past.

APPLICABLE UNDER CRITERION C, demonstrating craft & work of a master.

- Burnt Mill Bridge is directly associated with local miller and heritage family member **Christian Fretz**, as well as neighboring heritage family member Barnet Snider.

- The bridge is associated with **A. Oscar Martin**, significant architect and engineer, working for the County of Bucks. Martin’s wife belonged to the Fretz family.

Criterion C: The bridge embodies the **distinctive characteristics** of a type, period, or method of construction, or represents the **work of a master** or possesses high artistic values. **YES APPLICABLE**.

- Burnt Mill Bridge is the **oldest documented example of stone supports for a timber beam bridge in Pennsylvania**, and possibly an even greater region.

- Burnt Mill Bridge represents a **cultural preference/ acceptance of timber beam** construction as a permanent type of bridge, in particular as built with substantial, engineered stone supports. Known as a “Pillar Bridge”, this type found acceptance with the **German heritage populations** of upper Bucks County, and by its early age, would have served as a prototype for other bridges (such as Harpel’s Bridge) in the area as well as in extended migration areas throughout North America.

EVALUATION CRITERIA: continued

Criterion C: continued

- Burnt Mill Bridge represents **character defining features of Federal era stonework** with large cut blocks, horizontal bed lines, battered vertical facades, curved inside faces of abutments, “water table” footer feature, lap stones and rounded pier noseings for strength to operate with hydraulic forces. It represents knowledge of stone engineering and design that has proved serviceable for 200 years.
- Burnt Mill Bridge represents **local stone masonry craft and material.**
- Burnt Mill Bridge represents the **work of a master, i.e. A. Oscar Martin,** demonstrating his method of timber deck repairs in concrete and steel I-beams, his railing and surface treatments and his sensitivity to maintaining context sensitive design and historical record. This is verified by the existence of his engineering drawings.
- Martin’s design served as a **prototype**, not only for single span bridges, but also as in this case with multi-span bridges, design continued to be used by successor John S. Roberts and ca. 1930-40 era Pennsylvania Department of Highway projects.
- Burnt Mill Bridge is part of a **nationally significant collection of wooden bridges** of a broad range of design that exist within Tinicum township.
- Burnt Mill bridge is part of a **nationally significant collection of rural bridge designs** of nearly every type that is represented also with the Tinicum township collection.

Criterion D: A bridge that has yielded, or may be likely to yield, important information in history or prehistory. APPLICABLE UNDER CRITERION C.

- Burnt Mill Bridge has the potential to **yield more information** on the construction, engineering and stability of stone supports for pillar/ beam bridges, serving **200 years.**

INTEGRITY AS A COMPONENT OF NATIONAL REGISTER ELIGIBILITY:

Integrity in a bridge means retaining its historic appearance and materials and its ability to function in the manner in which it was designed. Seven aspects set forth by National Park Service publication “*How to Apply the NR Criteria for Evaluation*” (2, 44-45)

1. Location is the place where the historic property was constructed...
2. Design is the combination of elements that create the form, plan, space, structure and style of a property.
3. Setting is the physical environment of a historic property.
4. Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
5. Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history...
6. Feeling is a property’s expression of the aesthetic or historic sense of a particular period of time.
7. Association is the direct link between an important historic event or person and a historic property.

In the Keeper’s 2006 letter integrity is verified as present in Burnt Mill Bridge. In addition to being a contributing resource to the Ridge Valley Rural Historic District, the bridge holds integrity to meet National Register Criteria in its own right and as a part of nationally significant trends and collections.

As a pillar bridge to carry a 25 foot beam span, with multiple spans to cross the Tincum Creek, Burnt Mill maintains integrity of its original 1812 construction, verifying the bridge type and the engineering of the stone supports to sustain service for 200 years.

As a critical component of two nationally significant collections, namely Tincum Township’s wooden bridge collection and rural bridge collection, Burnt Mill Bridge provides crucial information on timber beam bridges, age and cultural affiliations, as well as parameters of design.

INTEGRITY AS A COMPONENT OF NATIONAL REGISTER ELIGIBILITY: cont'd

As a critical component of the national landmark historical event of Tinicum Township serving as the home to many nationally famous writers, artists and notables of the early and mid-20th century. This includes the 1919 deck as well, and the material and heritage associations that complimented the entire Tinicum landscape as an area of choice for this group of residents.

1. Burnt Mill Bridge maintains integrity of location, in its original 1812 site and original road path from 1747.
2. Burnt Mill Bridge maintains integrity of design both for the engineered stone substructure and the Martin 1919 deck elements.
3. Burnt Mill Bridge maintains integrity of setting in that the surrounding physical environment is basically unchanged from the mid-19th century, natural vegetated stream banks, rock outcrops and narrow approach roads, fenced pastures, historic stone homes and barns and stone retaining and wing walls.
4. Burnt Mill Bridge maintains integrity of the stones comprising the substructure, nearly all are the original stones in original locations. The superstructure retains its original reinforced concrete components, aggregate, I-beams, steel mesh &c, as well as evidence of the pipe railing and 1919 datestone.
5. Burnt Mill Bridge maintains integrity of workmanship including the overall massing, design elements and stone masonry arrangement for greatest strength. It retains critical elements of the superstructure design and details as directed by A. Oscar Martin and verified via his engineering drawings.
6. Burnt Mill Bridge maintains integrity of the aesthetic feeling of the 1812 construction with the rounded (vs. pointed) noseings on the piers, notched stones, horizontal bed lines and gradated blend of large cut base stones up to smaller, rubble stone. It maintains integrity of character defining elements of Martin's 1919 design including curbs, railing and finish edges of pylons, contrasting with finishes of the 1920-40 era.
7. Burnt Mill Bridge maintains integrity of association to A. Oscar Martin's work, as well as association to the craft of its initial buildings including Barnet Snider and Christian Fretz, whose stone homes remain in the neighborhood.

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