



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION NATURAL AND HISTORIC RESOURCES

Office of the Assistant Commissioner
MAIL CODE 501-03A
PO Box 420
Trenton, New Jersey 08625
609-292-3541/Fax: 609-984-0836

CHRIS CHRISTIE
GOVERNOR

BOB MARTIN
COMMISSIONER

KIM GUADAGNO
Lt. Governor

March 15, 2012



Mr. Gregory Sandusky, P.E., P.L.S.
Mercer County Engineer
Department of Transportation & Infrastructure
Engineering Division
McDade Administration Building
640 South Broad Street
P.O. Box 8068
Trenton, New Jersey 08650-0068

**RE: Mercer County, Hopewell and Ewing Townships
Replacement of Bear Tavern Road Bridge over Jacobs Creek (Bridge 214.2)
Replacement of Jacobs Creek Road Bridge over Ewing Creek (Bridge 215.1)
Bear Tavern Road/Jacobs Creek Crossing Rural Historic District, (New
Jersey Register listed 10/3/2012)
New Jersey Register of Historic Places Act**

Dear Mr. Sandusky:

I am writing regarding your request for authorization for the above referenced project. In accordance with the New Jersey Register of Historic Places Act, the County appeared before the New Jersey Historic Sites Council at public meetings on December 15, 2011 and February 16, 2012, and made presentations in support of the application. By Resolution 2012-340 (attached), the Council recommended approval of the project with specific conditions. Pursuant to N.J.S.A. 13:1B-15.131, the Council's recommendation is provided to the Commissioner of the New Jersey Department of Environmental Protection, who may authorize, consent, temporarily deny, or deny the application. This authority has been delegated to me in accordance with N.J.S.A. 13:1B-4.

I have carefully reviewed the record, including the submittals made by the County and members of the public, before, during, and after the public meetings, and have considered the documentation provided, in light of my obligation to consider: (1) the public benefit of the proposed project; (2) whether there are feasible and prudent alternatives to the preferred alternative, and (3) whether sufficient measures could be taken to avoid, reduce,

or mitigate impacts to the New Jersey Register listed Bear Tavern Road/Jacobs Creek Crossing Rural Historic District expected to result from the proposed project.

Both the Township of Hopewell and a number of concerned citizens have provided documentation to the Department in support of Alternative 3B. Furthermore, a professional traffic engineer hired by local citizens to review the County's plans has submitted comments to the Department that raise concerns regarding the safety of the super elevation and geometry of the County's proposed alignment. The County has stated on the public record that it would not sign and seal plans for Alternative 3B. However, based upon the resolution adopted by the Historic Sites Council, it is clear that the County did not persuade the Historic Sites Council with its argument for the selection of the preferred alternative vis-à-vis traffic studies, design standards, and/or safety concerns.

As reflected in the attached resolution, the Historic Sites Council recommended the implementation of a project with elements from both the County's proposed project and the Alternative 3B, explored in the Alternatives Analysis included with the project documentation and advocated by some members of the public. Specifically, the Historic Sites Council recommended that the existing alignment and intersection of Bear Tavern Road and Jacobs Creek Road be maintained, and that the County construct new bridges at Bear Tavern Road over Jacobs Creek and Bear Tavern Road over Ewing Creek that are sympathetic to the surrounding historic district. The Historic Sites Council agreed that the historic Bear Tavern Road over Jacobs Creek truss bridge be rehabilitated and relocated to Howell Living History Farm, and that the County prepare interpretation panels for the Bear Tavern Road/Jacobs Creek Crossing Rural Historic District presenting the 18th- and 19th-Century periods of development.

The Historic Sites Council has recommended a project for which the Department does not have adequate information upon which to base its decision. Therefore, in accordance with N.J.S.A. 13:1B-15.131 and its implementing rules, specifically N.J.A.C. 7:4-7.2(e)(9)iii, I hereby temporarily deny this application, and request the information listed below.

Please note that I have asked the New Jersey Department of Transportation (NJDOT) to evaluate the feasibility and prudence of the County's preferred alternative and the HSC Alternative. On receipt of the information request below, I will ask NJDOT to conduct a technical review of: the traffic volume projections that would influence the bridge design; the current and projected traffic movement in the project area; the accident data as presented by the County and challenged in public testimony; the engineering and safety concerns raised in the public meeting regarding the County's preferred alternative; and finally to evaluate if each of the two alternatives represents a prudent expenditure of State Bridge Bond monies. Please submit:

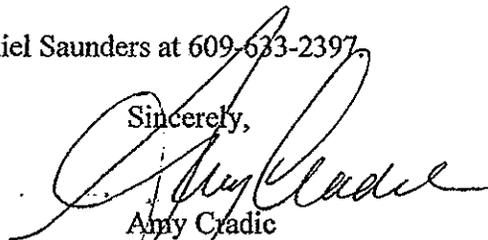
- An exploration of the Historic Sites Council (HSC) Alternative that includes the following:

- An evaluation of whether the HSC Alternative is feasible and prudent including a discussion of safety issues/concerns.
 - A description of the project elements that could be anticipated in a fully designed HSC Alternative project including guard rail, impact attenuators, and the bridge roadway profile, and a discussion of the anticipated effects of these project elements on the Bear Tavern Road/Jacobs Creek Crossing Historic District.
 - An evaluation of the feasibility of making Bear Tavern Road the through road by relocating the stop sign from Bear Tavern Road southbound to Jacobs Creek Road westbound, including a discussion of how that alternative would affect the number of stops and anticipated rear end collisions.
- An explanation of the methodology used in the traffic studies (including volume, predominate movements, accidents, etc.) and planning that informed the County's preferred alternative.
 - An explanation of the specific standards the project needs to meet and why those particular standards are being used. Please illustrate how Alternative 5A/B Modified 2 meets those standards, and explain what aspects of the standards can and cannot be met by the HSC Alternative.
 - A response to the concerns regarding the safety of the super elevation and geometry of the proposed alignment that were raised during public comment at the meeting. A copy of the professional engineer's letter is attached for your information and use.
 - An explanation of the relationship of the number of accidents at the Bear Tavern Road/Jacobs Creek Road "T" intersection to the statewide average of accidents for similar roadways. Please also explain how the comparative frequency of accidents in the data led to the design choices at the intersection.

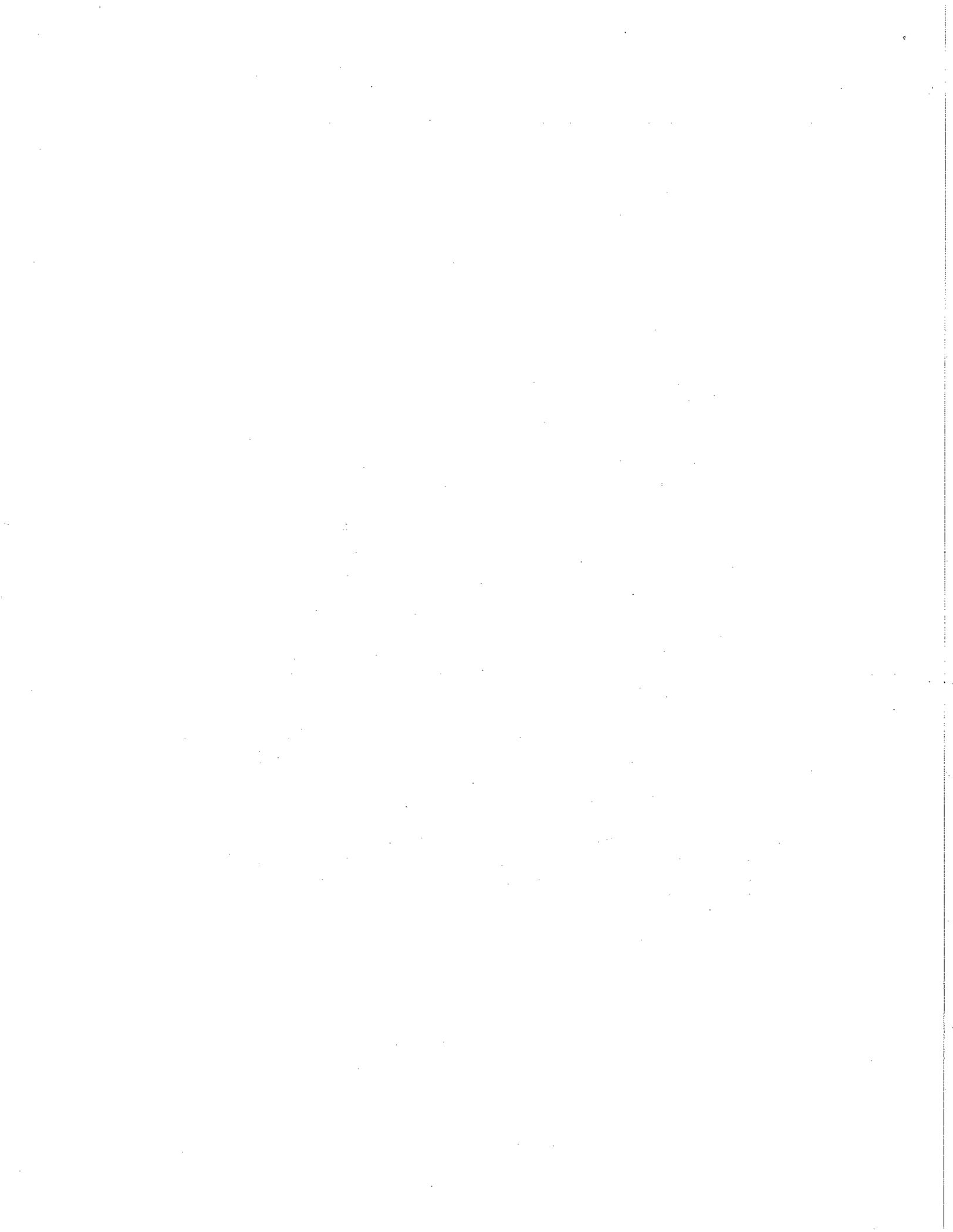
In accordance with the regulations, this additional information must be received within sixty days of the date of this letter. Failure to provide the requested materials will automatically result in a project denial. My final determination will be made within sixty days of receipt of the requested materials.

If you have any questions, please contact Daniel Saunders at 609-633-2397.

Sincerely,



Amy Cradic
Assistant Commissioner



NEW JERSEY HISTORIC SITES COUNCIL
RESOLUTION

HSC 2012-340

NAME OF PROPERTY ON STATE
REGISTER OF HISTORIC PLACES

Bear Tavern Road/Jacobs Creek Crossing Rural
Historic District

COUNTY
MUNICIPALITY
DATE REGISTERED
APPLICANT

Mercer
Townships of Hopewell and Ewing
10/3/2011
Mercer County

WHEREAS, the New Jersey Historic Sites Council, created pursuant to N.J.S.A. 13:1B-15.108 et seq., is authorized by N.J.S.A. 13:1B-15.131 to offer advice and recommendations concerning encroachments upon properties listed in the New Jersey Register of Historic Places to the Commissioner of the Department of Environmental Protection; and

WHEREAS, the jurisdiction of the Department of Environmental Protection/Historic Sites Council under the New Jersey Register of Historic Places Act, N.J.S.A. 13:1B-15.131, and its attendant regulation, N.J.A.C. 7:4, concerns the consideration of actions with effects, both direct and indirect, on New Jersey Register of Historic Places listed properties; and

WHEREAS, the County of Mercer has requested review to relocate and replace the Bear Tavern Road Bridge over Jacobs Creek (Bridge 214.2), demolish and replace the Jacobs Creek Road Bridge over Ewing Creek (Bridge 215.1), and improve intersection conditions within the Bear Tavern Road/Jacobs Creek Crossing Rural Historic District; and

WHEREAS, the New Jersey Historic Sites Council conducted an open public meetings on December 15, 2011 and February 16, 2012, pursuant to the requirements of the "Open Public Meetings Law", N.J.S.A. 10:4-6 et seq. ; and

WHEREAS, the New Jersey Historic Sites Council, based upon evidence presented at the public meetings, made the following findings of fact:

1. The Bear Tavern Road/Jacobs Creek Crossing Rural Historic District, which was listed on the New Jersey Register of Historic Places on 10/3/2011 and the National Register of Historic Places on 11/30/11, meets Criteria A and C in the areas of settlement, agriculture, architecture, military, transportation, and engineering. The period of significance is ca. 1729, the earliest year Bear Tavern Road can be documented, to 1930, the year before work began to pave and improve the road north of Jacob's Creek. The district possesses significance in the area of settlement and agriculture as a rural landscape that still reflects its 18th/19th century patterns of development, exhibited by such features as property lines, farmstead locations, field patterns, and circulation. Bear Tavern Road, an early regional road, and the 1882 Pratt thru truss bridge give the district its transportation significance. The district's architectural significance derives from its late 18th/early 19th century dwellings, whose construction materials, plan types, and

detailing are representative of the region's early domestic architecture. The district possesses military significance for its Revolutionary War associations. Bear Tavern Road (the colonial road) was the route Washington's troops followed on their march to Trenton on December 26, 1776. The Bear Tavern Road Bridge over Jacobs Creek (Bridge 214.2) and the Jacobs Creek Road Bridge over Ewing Creek (Bridge 215.1) are both contributing resources to the Bear Tavern Road/Jacobs Creek Crossing Rural Historic District.

2. The Bear Tavern Road/Jacobs Creek Crossing Rural Historic District has a period of significance spanning from 1729 to 1930. It has three main periods of development: the Colonial Era, Railroad Era, and Highway Era, with a particularly significant date of 1776. During the Colonial Era, Bear Tavern Road, along with a ford crossing Ewing/Jacobs Creek, was used by General George Washington and his troops, while traveling from the site of their crossing of the Delaware River to Trenton to attack the Hessians at the First Battle of Trenton. This began the important period now entitled the Ten Crucial Days. Washington's troop movements through this area are the most significant event at this location. This path is known today as the Victory Trail. During the second period of development, the Mercer and Somerset Railroad operated in the area from 1870 to 1882, when the railroad company sold its right-of-way to Mercer County for the development of Jacobs Creek Road. In the third era of development, roadway improvements were undertaken by the County in the early twentieth century that standardized the roadway.
3. The Bear Tavern Road Bridge over Jacobs Creek (Bridge 214.2), erected in 1882, is also individually eligible for listing on the New Jersey and National Registers of Historic Places under Criteria A and C (SHPO Opinion April 30, 1991). The bridge is a 75' long by 17.5' wide half hip pin-connected Pratt thru truss bridge fabricated by the King Iron Bridge and Manufacturing Company of Cleveland Ohio. It is supported on ashlar patterned stone abutments. The bridge is an excellent example of a standardized pin-connected Pratt design and is eligible under Criterion C for its technological significance. Truss bridge technology had been in development for several years at the time of manufacturing of the Bear Tavern Road, this produced a sleek, thin-membered bridge that sits lightly upon the landscape.
4. The Bear Tavern Road Bridge was closed to vehicular traffic September of 2009. This was precipitated by a July 15, 2009 bi annual bridge inspection where serious heavy section loss of members was observed. In addition, the final report submitted in September 2009 noted that the inspecting engineers observed bridge and roadway deflection when trucks that exceeded the posted weight limit of the bridge utilized the bridge. Without sufficient enforcement, to preclude larger trucks from using the route, the County closed the bridge.
5. The abutments that support Bear Tavern Road Bridge over Jacobs Creek were severely damaged during Hurricane Irene. The bearing stones started to rotate. In addition, the bridge itself suffered damage from the water beginning to twist the bridge at its bearings. Bear Tavern Road Bridge was disassembled and removed from its location, with emergency authorization on September 6, 2011, and with removal on October 10, 2011. The bridge was transported to Susan R. Bauer Inc. for cleaning, painting, and storage until such time that a preservation plan for the bridge can be developed.

6. Jacobs Creek Road Bridge over Ewing Creek is a 48-foot long and 24-foot wide concrete and steel stringer bridge with a modern beam guide rail. The bridge contributes to the Bear Tavern Road/Jacobs Creek Crossing Rural Historic District and is on the historic railroad bridge abutments.
7. Five cultural resource survey reports completed by professionally qualified archaeologists employed by both John Milner Associates, Inc. and Richard Grubb & Associates, Inc. were submitted as part of this application. The reports documented the results of background research and subsurface testing of the project's area of potential effects at the Phase I level. The reports make the following findings and recommendations:
 - The site of the Revolutionary War-era ford was southwest of the location of the current bridge.
 - The exact location of the ford could not be determined from documentary research.
 - Background research indicated that a sewer line had been installed in a portion of the project's area of potential effects
 - Subsurface testing and metal detecting within the project's area of potential effects did not identify any significant cultural material, and documented previous disturbance associated with the past sewer installation.
 - Pedestrian examination of the stream banks between the Jacob's Creek Bridge and Ewing Creek did not yield evidence of an earlier bridge.
 - No additional archaeological work was recommended.
8. A metal detecting survey of the alignment of Bear Tavern Road and the floodplain along Jacob's Creek completed by the Battlefield Restoration and Archaeological Volunteer Organization in consultation with Dr. Richard Veit of Monmouth University was provided to the Historic Preservation Office on December 6, 2011. The report makes the following findings:
 - Metal detection identified a total of 7 artifacts within the project's vicinity, consisting of: a long strap hinge, a small fragment of flat brass, a small sling buckle with modern black paint on the surface, an 18th century iron stirrup, a long bolt and several plates that were used as telephone pole furniture, an early American large cent, and a possible horseshoe fragment.
 - The consultant concluded that none of the artifacts found during the survey could be specifically linked to the Continental Army.

- The consultant also concluded that the paucity of artifacts recovered during the metal detecting survey indicates the area may have been subject to past artifact collecting.
9. A memorandum from Dr. Richard Veit that reviewed the previous archaeological surveys of the Bear Tavern Road--Jacob's Creek Crossing Rural Historic District, and interpreted the results of BRAVO's metal detecting survey was provided to the Historic Preservation Office on December 6, 2011. Dr. Veit makes the following conclusions regarding the immediate vicinity of the project site:
- The possible horseshoe fragment and the stirrup recovered during the metal detecting survey are likely associated with the site's use as a transportation route
 - The stirrup is of a form that was used from the 18th-century until the mid-19th century.
 - While the finds from the BRAVO survey corroborate 18th and 19th century written record, they "do not provide unequivocal evidence of the Continental Army's use of this route during the Christmas Campaign of 1776"
 - The ford was likely located adjacent to or immediately west of the current Jacob's Creek crossing.
10. The appropriate Standards to evaluate this project are the *Secretary of the Interior's Standards for the Treatment of Historic Properties--Rehabilitation*.
11. In accordance with N.J.A.C. 7:4-7.4, the undertaking constitutes an encroachment to the Bear Tavern Road/Jacobs Creek Crossing Rural Historic District. It is anticipated that the proposed project will have the following direct/indirect adverse impacts:
- permanent removal of the individually eligible and key contributing Bear Tavern Road over Jacobs Creek Bridge (removes a contributing historic structure and materials from the historic district); and
 - demolition of the Jacobs Creek Road Bridge over Ewing Creek (removes a contributing historic structure and materials from the historic district); and
 - realignment of the horizontal and vertical roadway profile of the Bear Tavern Road (diminishes the integrity of the contributing Bear Tavern Road by changing the character defining features of the roadway at time of listing); and
 - widening of Bear Tavern Road and the Bear Tavern Road crossing over Jacobs Creek (alters the character defining features of these resources and diminishes the integrity of the historic district's rural character); and

- widening of Jacobs Creek Road (diminishes the character and integrity of the historic district's rural character); and
- introduction of additional retaining walls (diminishes the character and integrity and of the historic district's setting and feeling); and
- introduction of curbing (diminishes the character and integrity of the historic district's setting and feeling); and
- additional guiderail (diminishes the character and integrity of the historic district's setting and feeling); and
- the introduction of rip rap in drainage basins (not a compatible material within the historic district); and
- installation of an impact attenuator (diminishes the character and integrity of the historic district's setting and feeling and blocks potential future access to the stream and Victory Trail); and
- introduction of warning devices & signage (diminishes the character and integrity of the historic district's setting and feeling); and
- introduction of concrete approach slabs and deck to Bear Tavern Road and the proposed new Bear Tavern Road Bridge over Jacobs Creek (introduces a non-compatible roadway and bridge deck surface material).

The project as proposed does not conform to Standards 2, 5, 6, and 9 of the *Secretary of the Interior's Standards for the Treatment of Historic Properties—Rehabilitation*.

12. The project as described by Mercer County in the Application for Project Authorization is necessary to improve the safety of the crossings and intersection, allow use of the crossings, and allow Bear Tavern Road to provide continuity of the County arterial roadway system. The roadway in the vicinity of the bridge is classified as Urban Minor Arterial with an average daily traffic (ADT) in excess of 6,000 vehicles per day.

The junction of Bear Tavern Road and Jacobs Creek Road presents several safety and operational concerns. There are two "T" intersections with a section of roadway between the Bear Tavern Road Bridge and the Jacobs Creek Bridge, where both Bear Tavern Road and Jacobs Creek Road use the same alignment for approximately 1000 feet. Prior to the closing of Bear Tavern Road Bridge, serious traffic conflicts occurred at the intersection. Data from Mercer County from November 2004 through May 2009 report 18 crashes at the intersection. Twenty-eight percent of those were rear-end collisions, which is more

than double the 2009 statewide average at un-signalized intersections on the municipal road system.

A study, prior to the closure of the Bear Tavern Road Bridge over Jacobs Creek, noted the prevailing movements at the intersection were north to west (left from Jacobs Creek Road to Bear Tavern Road) and east to south (right from Bear Tavern Road to Jacobs Creek Road) rather than direct through movements. The existing intersection configuration poses significant safety concerns since the prevailing movements do not receive the right of way, but account for such a large percentage of the traffic volume.

13. In order to address the project purpose and need, seven alternatives and modifications (altogether totaling 17) were considered in the 2009 Keller and Kirkpatrick Alternatives Analysis for the Bear Tavern Road Bridge over Jacobs Creek including:

- Alternative 1 - No Build
- Alternative 2 - Rehabilitation
- Alternative 3A - Modified Rehabilitation (Strengthen/Widen Truss Bridge)
- Alternative 3B - Modified Rehabilitation (New 2-Span Bridge & Trusses as Facades)
- Alternative 4A - Parallel Structure (One-way Each Bridge)
- Alternative 4B - Parallel Structure (new Two-way Bridge/Truss Bridge as Pedestrian)
- Alternative 5A - Replacement/ Relocation (Conventional 2-Span Bridge)
- Alternative 5B - Replacement/ Relocation (Context Sensitive Design 2-Span Bridge)
- Alternative 5A/5B - Modified 1
- Alternative 5A/5B - Modified 2
- Alternative 5A/5B - Modified 3
- Alternative 5A/5B - Modified 4
- Alternative 5A/5B - Modified 5
- Alternative 6A - Replacement/ Demolition (Conventional 2-Span Bridge)
- Alternative 6B - Replacement/ Demolition (Context Sensitive Design 2-Span Bridge)
- Alternative 7A - Complete Realignment (new crossing to the West)
- Alternative 7B - Complete Realignment (new crossing to East/ Truss Bridge local traffic)

14. The report identified Alternative 5A/5B Modified 3 as the preferred alternative. It included relocation of the existing truss bridge to a new site (the initially preferred new location was the Alliger Tract in Hopewell Township) and rehabilitation of the bridge for

pedestrian use. Then a new single span bridge would be constructed on a new alignment along Bear Tavern Road to improve traffic flow.

15. Although preservation in place is the preferred outcome (Alternative 2), the Bear Tavern Road Bridge over Jacobs Creek Bridge cannot be rehabilitated at its existing size, and existing location, for modern vehicular use meeting the *Secretary of the Interior's Standards for the Treatment of Historic Properties- Rehabilitation* due to the following factors:
 - a. the bridge's overall condition would require an extensive rehabilitation, which would heavily alter or replace historic fabric. More than 50% of the structural members would be altered or replaced. This would diminish the bridge's integrity to the point of no longer being individually eligible and, therefore, no longer a key contributing resource to the district;
 - b. rehabilitation does not correct functional deficiencies in the structure; or
 - c. address the accident rate of the intersection that is approximately 85 feet from the bridge.
16. In 2004, in the interest of moving the project forward, Hopewell Township formed the Bear Tavern Road Task Force. It included county representatives, local officials, business representatives, and members of the public. The goal of the task force was to recommend a preferred alternative based on a mediated decision making process that was transparent. The Bear Tavern Road Task Force endorsed Alternative 3B (widen and rehabilitate the existing bridge in place) at a Hopewell Township Committee meeting on November 8, 2004. After this decision was reached, the Task Force disbanded. The Township of Hopewell formally adopted a resolution that supported, "the replacement of the historic truss bridge (Mercer County #214.2), its restoration and relocation to the Alliger Park for use as a trail crossing over Woolsey Brook, in March of 2009. Subsequently, in April of 2010, the Township of Hopewell formally adopted, by resolution, Alternative 3B, as their preferred alternative. Since that time, the County has continued to consider alternatives while soliciting and incorporating public comments to the extent feasible. Mercer County has recently published all pertinent information concerning the Application for Project Authorization on the County's website.
17. Alternative 3B would consist of widening and rehabilitating the structure in order to meet H15 load carrying capacity. It would require the splicing of the bridge to add width, the vertical clearance would be increased, and structural underpinning would be required. The bridge would be extensively modified and the trusses would become non-functioning aesthetic applications on a modern structure.
18. Alternative 3B (Modified Rehabilitation and Replacement) has the following impacts to the historic district:
 - a. the alternative will render the individually eligible bridge no longer eligible and therefore no longer a key contributing resource to the historic district; and
 - b. it does not address the current traffic operations and safety issues; and

- c. will require the use of a pier in Jacobs Creek floodway which would be inconsistent with the intent of the Flood Hazard Area Control Act rules at N.J.A.C. 7:13-11; and
19. Alternative 3B would also include safety upgrades as a stipulation of using bridge bond funds. Alternative 3B has not been designed and therefore additional effects due to the introduction of new elements are not fully known at this time.
20. It is possible to redesign Alternative 3B to exclude the center pier from the water way; however, doing so would increase the bridge depth. The hydraulic opening of the bridge per environmental rules would be required to remain the same, thus a deeper structure would require raising the roadway profile. Although the preservation perspective favors rehabilitation of the Bear Tavern Road Bridge in place, the project alternatives have justified a widening. A widening would significantly alter the individually eligible bridge and have many impacts to the historic district such as a higher roadway profile.
21. A modern functioning truss bridge is not recommended for the following reasons:
- a truss, although compatible with the district overall, is not compatible with the most unique and significant areas of the historic districts development, the colonial era; and
 - a modern truss would not replicate the 1882 bridge, it would not be as sleek as the current bridge nor would the bridge be pinned-connected due to issues of inspection and maintenance; and
 - a truss bridge could not be built on the presently proposed minimized alignment as it calls for a curved structure to minimize impacts.
22. Mercer County is responsible for ensuring the safety of its roads and bridges to the traveling public. As evidenced by the closure of Bear Tavern Road in 2009, the county has deemed the bridge unsafe to carry traffic. Any alternative considered for the project must also receive Mercer County's approval as to the sufficiency of the proposal to meet safety concerns. Mercer County does not believe Alternative 3B will sufficiently meet safety standards and will not seal and sign a set of plans that delineates any further deviation from current safety standards as they would be responsible for any liability.
23. In order to address the project purpose and need, intersection improvements have been considered in conjunction with the bridge replacement through the project's history. The alternatives considered to correct the safety and deficiencies of the intersection include:
- Alternative 1-No Build (with potential introduction of a stop sign)
 - Alternative 2-Modified Intersection A (left and right turn lanes)
 - Alternative 3-Modified Intersection B 1 & 2 (Bear Tavern Road as primary movement)
24. An alternative that considered prohibiting the left hand turn movement from Bear Tavern Road onto Jacobs Creek Road (north) was not evaluated. Eliminating the ability to make a left hand turn would allow for the elimination of the left hand turning lane, while providing a safer driving condition at the intersection. This condition would be the same

as it has been for the last 27 months. Travelers wishing to access Jacobs Creek Road north of the Bear Tavern Road/ Jacobs Creek Junction would do so by using Washington Crossing Pennington Road (CR 546) located approximately 1 mile from the junction. Eliminating the left turn lane would reduce the cross section of the roadway and bridge by 10 feet.

25. The County believes that intersection improvements must be completed to address the intersection deficiencies that have resulted in motor vehicle accidents. Alternative 2 of a modified intersection with left and right turn lanes was dismissed due to the extensive disturbance it would have to the area historically and environmentally. Using traffic data, the County proposes to correct the deficiencies of the intersection by making Bear Tavern Road the primary movement and to provide a left turn lane for those traveling from Bear Tavern Road and turning left onto Jacobs Creek Road. Originally the proposed project had a substandard curve of a 350 foot radius. The current proposal has been further minimized to a 300 foot radius, the absolute minimum acceptable to the County.
26. In order to address the project purpose and need, several alternatives were considered for Jacob Creek Road Bridge over Ewing Creek including:
 - Alternative 1- No Build
 - Alternative 2- Rehabilitate Bridge/Widening
 - Alternative 3: Total Replacement
27. The County believes the bridge cannot be rehabilitated due to the following factors:
 - a. The bridge is currently functionally obsolete and structurally deficient and the County must address those conditions;
 - b. rehabilitation of the structure with a widening, would in essence constitute replacement of the structure, as the current abutments cannot accommodate a widening; and
 - c. rehabilitation does not improve traffic conditions or provide multiuse options for the roadway.
28. Based on comments from interested and consulting parties the County has chosen Alternative 5A/B- Modified 2 (Relocation of the existing bridge to Howell Living History Farm for pedestrian and horse drawn vehicle use) and replacement of both Bear Tavern Road Bridge and Ewing Creek Bridge, as well as intersection improvements.
29. The proposed project would construct new bridges over Jacobs and Ewing Creeks. Both bridges would be single span. The existing truss bridge over Jacobs Creek would be rehabilitated and relocated. The County's proposal included the realignment of Bear Tavern / Jacobs Creek Road in the vicinity of their intersection to the south of the Jacobs Creek crossing. The intersection would be reconfigured such that Jacobs Creek Road would be controlled at its intersection with Bear Tavern Road via stop control and Bear Tavern Road would be the thru movement. The Bear Tavern Road alignment would remain essentially unchanged along its northerly and southerly approaches however the alignment would curve to the left traveling north on a substandard radius of 300 feet. The

proposed curve would require obtaining a design exception. The new roadway section within the project limits would consist of 11 foot lanes and 4 foot shoulders. Shoulder and lane stripes would be installed. The roadway would be maintained as a two lane facility with the addition of a 10-foot left turn lane to accommodate southbound Bear Tavern Road traffic to access eastbound Jacobs Creek Road. Due to the close proximity of the Jacobs Creek Bridge to the intersection the new left turn lane would extend onto the bridge to the north requiring added width across the structure. Due to the tight curve proposed as a design exception to minimize impacts, the project would require implementation of safety measures to inform motorist of the roadway conditions including warning signs such as chevron arrows and 30 mph advisory signs, as well as pavement reflectors. The new roadway would be a banked curve. The project would also include the installation of retaining walls where deemed needed to minimize impacts to surrounding resources and properties. The project would include the installation of storm water basins, drains and outfalls to allow for proper drainage of the roadway and to comply with NJDEP regulations. Roadside safety devices such as guiderail and end treatments would be installed to meet current standards. Weathering steel guiderail was proposed.

Descriptions of the proposed structures are as follows:

•New Jacobs Creek Bridge

Proposed Bridge #414.2 (1100-060) would be a single span simply supported bridge with seven lines of horizontally curved weathering steel plate girders spaced at 8.75 feet on center. This structure would be located on a curved horizontal alignment with a baseline radius of curvature of 300 feet. This structure would support rectangular parapets, 11 foot wide lanes, a 10 foot turn lane and 4 foot wide shoulders in each direction and a 5 foot wide sidewalk on the west side. The total structure width would be approximately 49 feet out to out. The structure would contain a 9 inch thick one-course high performance reinforced concrete deck slab on a super-elevated grade with SIP formwork. Concrete approach slabs would be used on both bridge approaches. The superstructure would be supported on full height reinforced concrete abutments and spread foundations. Cast in place concrete cantilever retaining walls with spread footings would be provided on all 4 corners of the structure. Exposed components of parapets and substructure units would be covered with approved sandstone facing with limestone caps.

•New Ewing Creek Bridge

Proposed Bridge #4-215.1 (1100-062) would be a precast concrete three sided superstructure (7 segments) with a 40 foot clear span (measured along the fascias) configured on a 20 degree skew. This structure would be located on a tangent horizontal alignment of a broken back curve and will provide for rectangular parapets, 11 foot wide lanes and 4 foot wide shoulders in each direction and a 5 foot wide sidewalk on the west side. The total structure width would be approximately 39 feet out to out and 30 feet curb to curb. The bridge parapet would be reinforced concrete with sandstone façade and limestone cap. The precast structure would be topped with

a 5 inch minimum thickness high performance reinforced concrete deck topping cast on a super-elevated grade. Concrete approach slabs would be used on both bridge approaches. The precast structure will be supported on reinforced concrete cast in place pedestals founded on spread footings. Exposed components of the substructure units including wing walls would be covered with approved sandstone facing with limestone caps.

30. Keeping the existing alignment of the bridge best balances historic preservation with the operational need of the project.
31. The County has proposed to mitigate impacts on the historic district by including a pull off area off Jacobs Creek Road to accommodate the parking of two cars to provide safe access to view the Bear Tavern Road/Jacobs Creek Crossing Rural Historic District in the vicinity of the bridges and the old fording area.
32. The project provides a public benefit in that the individually eligible resource the Bear Tavern Road Bridge will be rehabilitated, preserved, and relocated to Howell Living History Farm. The relocated bridge completes a circulation route at Howell Living Farm that is superior in safety to what is available today. The effects of the project are mostly to the 19th century resources and would avoid impacts to the significant colonial era environment. The project will reopen Bear Tavern Road which has been closed since 2009.

NOW, THEREFORE, BE IT RESOLVED, by the New Jersey Historic Sites Council, that based on the above findings the Council recommends that the Commissioner provide authorization of the project with the following conditions:

1. The existing alignment of Bear Tavern Road and Jacobs Creek Road and their intersection shall be maintained.
2. The project shall include the replacement of the existing bridges with two new bridges, instead of widening the existing bridges.
3. The new design of the bridges shall be sympathetic to the historic character of the historic district so that it is in keeping with the original truss bridge as much as possible, resting lightly on the landscape. The new design of the bridges shall be in keeping with the Secretary of the Interior's Standards for the Treatment of Historic Properties.
4. The new design of the project shall be presented to the Historic Sites Council for review and approval.
5. Archaeological survey conforming to the Secretary of the Interior's Standards for Archeology and Historic Preservation shall be completed in areas that have not been

previously covered by prior archaeological surveys. All surveys shall be submitted to the Historic Preservation Office for review and approval.

6. The County shall prepare interpretation panels for the Bear Tavern Road/Jacobs Creek Crossing Historic District presenting both the 18th and 19th periods of development of the historic district. This should be done in consultation with the HPO and other identified interested parties. The use of digital interpretation methods will also be explored and enacted if deemed appropriate. The County shall ensure that all work is carried out by/under the direct supervision of a person or persons meeting at a minimum the Secretary of the Interiors Professional Qualifications Standards [48 FR 44738-44739].

7. The County shall rehabilitate and relocate the Bear Tavern Road Bridge over Jacobs Creek (Bridge 214.2) bridge to meet the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. As the intended relocation is Howell Living History Farm, an Application for Project Authorization shall be submitted pursuant to the New Jersey Register of Historic Places Act to consider effects to the New Jersey Register listed Pleasant Valley Historic District.

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IN FAVOR
AGAINST
ABSTAIN

Constance Greiff
Flavia Alaya
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The Council's recommendations and advice are forwarded to the Commissioner of the Department of Environmental Protection. The Commissioner makes a final determination.

L'Amoreaux Engineering
Traffic Engineering and Transportation Planning

Butler's Mill Corporate Center
116 East Butler Avenue • Chalfont, PA 18914
215.570.0113 office • 215.822.5684 fax

24 February 2012

Rollin R. LaFrance, AIA
10 Lupine Lane
Titusville, NJ 08560

Re: Review of Proposed Mercer County Bridge Realignment
Bear Tavern Road Bridge over Jacobs Creek, County Route 579
Hopewell and Ewing Townships, Mercer County, New Jersey

Dear Mr. LaFrance:

I have conducted a review of plans prepared by Parsons Brinckerhoff, signed on October 6, 2011 by Mr. Michael Troncone, PE, for the subject bridges. I prepared this letter to supplement professional comments I made at the Thursday, February 16, 2012 meeting of the New Jersey Historic Sites Council.

I neither believe nor intend to infer that Mercer County or any other agency, firm or individual is being intentionally negligent in their duties related to this design's preparation. I respect their efforts as design professionals. That does not mean I agree with them. It is easy to critique others' work. Sometimes the critique generates comments worthy of further discussion, and sometimes not. This time, it does.

As I stated on February 16, 2012, public safety is the most important roadway design element. Many roadway configurations for these bridges have been evaluated. Two relevant configurations now remain in the public light; one is the proposed bridge reconstruction and roadway realignment (either providing or prohibiting left turns from Bear Tavern Road to Jacobs Creek Road), and the other is reestablishment of the T-intersection in the field today. The proper way to evaluate safety is to compare the merits of each design and arrive at a reasonable conclusion.

Roadway design standards, such as NJDOT's, are created so that drivers' perceptions are reasonably consistent. When roadway design standards are not met, drivers' perceptions of the same roadway can vary. This means that one motorist may perceive a situation differently than another, and handle it differently as a result. This uncertainty compromises safety for the following illustrated reasons.

1. Bear Tavern Road motorists approaching the project area from the north will be descending a hill at a 6 percent grade, after a sizeable flat and open area. A flat, open roadway theoretically has an infinite design speed. Other than speed restrictions imposed by law enforcement there will be few clues to the observant driver that a right-hand 300-foot radius curve is ahead other than sight of the curve itself. According to the online NJDOT Roadway Design Tool, the Safe Speed for a 300 foot radius, with a four percent cross-slope (a/k/a superelevation) is 30 MPH. As a motorist approaches the curve, Bear Tavern Road descends for a considerable distance. The speeds of motorists approaching the curve are speculative, but it stands to reason that a downhill section following a flat, open area will be forced to accommodate speeds in excess of 30 MPH, with some motorists exceeding that speed considerably.

Apparently Mr. Troncone's design team has stated that the design speed of Bear Tavern Road in this area will be 40 MPH, and the speed limit will be posted at 35 MPH. Further, you supplied me with an emailed profile plan showing the design speed as 40 MPH. Based on this, one can reasonably conclude the design speed for the overall project will indeed be 40 MPH.

Therefore, a 30 MPH horizontal curve is proposed to be placed in an area with a 40 MPH design speed, requiring a design exception according to the NJDOT Design Exception Manual. This exception should only be incorporated after an analysis of apparent alternatives. The T-intersection exists, and therefore is apparent. A design exception should be only be granted if the County has or will demonstrate that modification of the T-intersection will create the need for design exceptions greater in scope than that of the realignment. I am not aware of any such analysis demonstrating this comparison. Further, the burden of proof rests with the County to demonstrate the proposed realignment, with the design exception, is preferable to the T-intersection.

If a design exception has been or will be granted, by definition, the possibility exists for unsuspecting southbound Bear Tavern Road motorists to be unpleasantly surprised by the 300-foot radius, and not be able to react in time to adequately compensate, especially in times of poor weather or visibility. For this reason, either the design speed should be adhered to throughout the project without exception, or another concept, the T-intersection, should be thoroughly explored for its ability to be constructed without the need for design exceptions. Finally, it's my understanding that the currently proposed design exception exists because of the historical components of the project area.

2. Motorists approaching the proposed, realigned Jacobs Creek bridge from the southwest will encounter two curves to the left. The first is an approximately 1910 foot radius curve, immediately followed by a left-hand 300-foot radius curve described above. This configuration is called a compound curve. According to NJDOT design standards, a compound curve will conform to standards if the ratio of the flatter curve to the sharper is 2.0 or less. Dividing 1910 by 300 is greater than 6.0, obviously greater than 2.0. The significance of this is that a motorist traverses a curve believing it to be of the same severity throughout. A change in curvature will violate that expectation. Again, unsuspecting motorists will be surprised, and will not be able to react in time to compensate.
3. The severity of accidents will be higher than the current configuration due to increased speed. Accidents will happen. The key is keeping people safe when they do. Prior to its recent closure, the majority of eastbound motorists turned left at the existing T-intersection, and southbound motorists turned right. The speed of these turns is less than 15 miles per hour. The energy, and therefore severity of accidents at 30 miles per hour is four times, not twice, that of 15 miles per hour. Keeping motorists at slower speeds in the project area is important to keeping them safe.

4. Motorists turning out of Jacobs Creek Road will be doing so at the top of a 4 percent cross-slope. As they turn, their vehicle's center of gravity will cause it to roll. Unfamiliar motorists will ease up on the accelerator to compensate. As a result, gaps in Bear Tavern Road traffic may not be correctly selected by motorists turning from Jacobs Creek Road, and Bear Tavern Road motorist may be surprised by a driver in front of them proceeding more slowly than is normally encountered. Unfamiliar Bear Tavern Road through motorists may be unable to anticipate this situation in time to compensate for it.
5. Any project in this area will allow for some accommodation of combination vehicles (tractor-trailers) when their presence was eliminated by the prior Jacobs Creek bridge's characteristics. Although most drivers of combination vehicles operate them with due care, the dynamics of newly-introduced combination vehicles will exacerbate any substandard design elements seen through to construction.
6. People are already familiar with the T-intersection configuration. Familiarity is the best way to minimize roadway misconceptions, thereby reinforcing safety.

For these reasons I believe the County has not demonstrated, nor will be able to demonstrate, that the realigned roadway will be a safer alternative than reinstatement of the current T-intersection. Therefore, the T-intersection should be examined for its ability to accommodate traffic volume from a capacity standpoint. I make this statement having not received any documentation to the contrary, which may or may not exist.

These comments add to and supplement my recent discussions and presentations. Please do not hesitate to contact me with any questions.

Yours truly,



Jeffrey A. L'Amoreaux, PE

