INDIVIDUAL INVENTORY FORM **NHDHR INVENTORY NUMBER:** PET0028

Name, Location, Ownership

1. Historic name: Main Street Bridge
2. District or area: Downtown Peterborough Commercial, Civic, and Residential Historic District
3. Street and number: Main Street Bridge over Contoocook River (No. 092/089)
4. City or town: Peterborough
5. County: Hillsborough
6. Current owner: Town of Peterborough

Function or Use

7. Current use(s): transportation/road-related
8. Historic use(s): transportation/road-related

Architectural Information

9. Style: concrete rigid-frame bridge with stone facing
10. Architect/builder: John H. Wells
11. Source: Plans
12. Construction date: 1940-1941
13. Source: Plans; Research
14. Alterations, with dates: _____
15. Moved? no ☒ yes ☐ date: N/A

Exterior Features

16. Foundation: Concrete abutments, stone faced concrete and rubble stone wing walls
17. Cladding: N/A
18. Roof material: N/A
19. Chimney material: N/A
20. Type of roof: N/A
21. Chimney location: N/A
22. Number of stories: N/A
23. Entry location: N/A
24. Windows: N/A
    Replacement? no ☒ yes ☐ date: N/A

Site Features

25. Setting: Village center
26. Outbuildings: N/A
27. Landscape features: Contoocook River, retaining walls

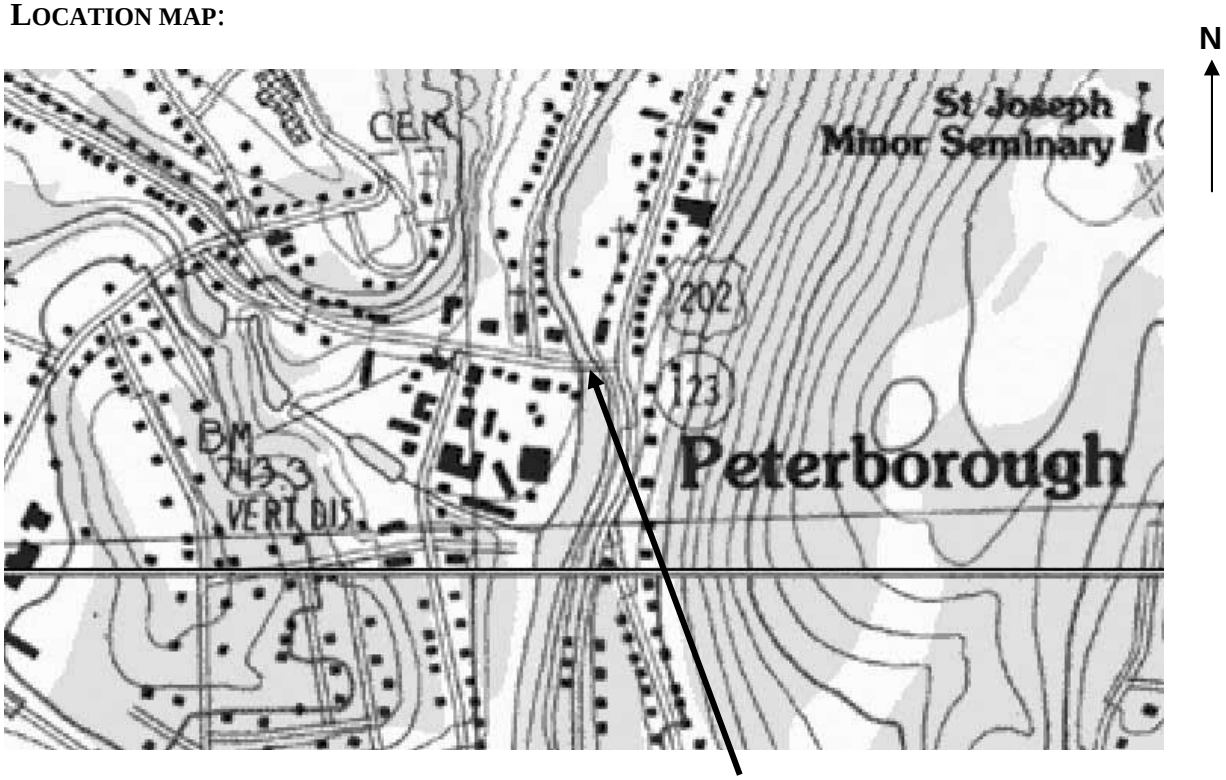
35. Photo 1 36. Date: June 2010
37. Direction: NE
38. Image File: PET0028_01

28. Acreage: Less than 1 acre
29. Tax map/parcel: --
30 UTM reference: 19.259155.4751195
31. USGS quadrangle and scale: Peterborough North, 1:24000

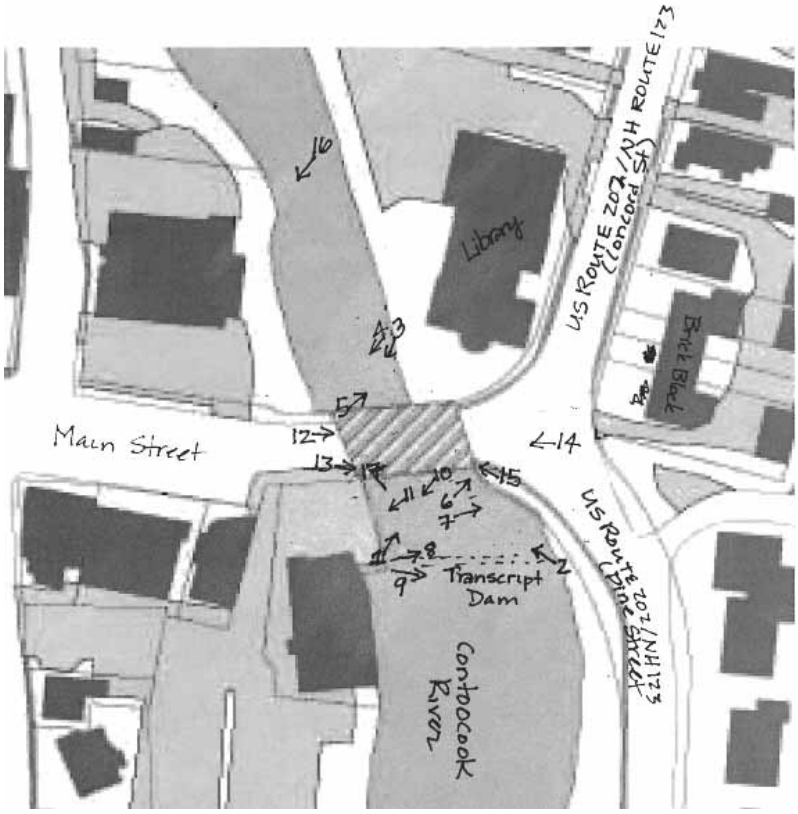
Form prepared by

32. Name: Laura B. Driemeyer
33. Organization: Preservation Company, Kensington, NH
34. Date of survey: June 2010

39. LOCATION MAP:



40. PROPERTY MAP: also showing photo numbers



41. Historical Background and Role in the Town or City's Development:

Main Street Bridge over the Contoocook River (No. 092/089) is located in the center of Peterborough in the Downtown Peterborough Commercial, Civic, and Residential Historic District. It carries the eastern terminus of Main Street over the Contoocook River. The river flows in a predominantly northerly direction from Pool Pond and Contoocook Lane on the Jaffrey/Rindge border to Penacook, where it empties into the Merrimack River. Nubanusit Brook enters the Contoocook River less than one-quarter mile south of the bridge. Immediately south of the bridge is the Transcript Dam (rebuilt 1925), the site of the ca. 1829 grist mill dam. From the 1870s through the 1950s the railroad crossed Main Street just west of the bridge, running in a southwest-northeast-direction and crossing over the river just north of, or downstream from, the bridge. The wood footings of the former railroad trestle remain extant slightly downstream from the bridge. Stone retaining walls line both sides of the river immediately adjacent to the bridge at all four quadrants. The east end of the bridge (and Main Street) terminates at the juncture of U.S. Route 202/N.H. Route 123 (Concord and Pine streets). The Peterborough Town Library (built 1893, with later additions) is located immediately northeast of the bridge and faces the bridge. The Brick Block (1-7 Concord Street, see PET0027), built 1830-1831, is located on the east side of Concord Street, opposite the bridge. Peterborough's historic nineteenth- and early twentieth-century commercial and civic district is located immediately west of the bridge, along Main and Grove streets and several side streets and Concord, Pine, and Granite streets are lined predominantly with nineteenth-century houses in addition to several churches.

Main Street is an early important east-west road that runs between the juncture of Concord and Pine streets on the east side of the Contoocook River and High and Union at the west end of the village center. Main, Pine, and High streets are some of the earliest roads in Peterborough, laid out by 1760. Concord Street largely dates to the 1830s though the southern end of it near the bridge crossing was likely present before then.

In the twentieth century, the highways that passed through the center of Peterborough strongly influenced the town's traffic patterns and the Main Street Bridge was part of those highways. In 1909 the New Hampshire Legislature had adopted plans to establish a trunk line highway system or three primary north-south routes, one up the west side of the state, one up the middle, and the third along the east side of the state. The routes oftentimes followed existing roadways but with improvements to accommodate increased automobile traffic. The completion of these primary north-south arteries by 1915 was soon followed by the establishment of a group of east-west cross roads, including the South Side Highway. By 1919 an additional three trunk line routes and eighteen cross state roads had been established, including the Contoocook Valley Road.[1]

By 1920 two of these highways ran through the center of Peterborough and crossed the Contoocook River via the Main Street Bridge. Meanwhile, in 1915 the state had passed a new law that all bridges constructed on the all the trunk line and cross state routes have a minimum ten-ton capacity. The "South Side Highway" (now N.H. Route 101) was the major east-west traffic corridor in southern New Hampshire. The highway ran from the Connecticut River at Bellows Falls to the East Side Road (now N.H. Route 1) in Portsmouth and passed through the center of Peterborough, crossing the Main Street Bridge. The Contoocook Valley Road ran southwest to northeast up the Contoocook River Valley from the Massachusetts border in Rindge to the Central Road (another

[1] James Garvin, "The Trunk Line Road System," *New Hampshire Highways* (January/February 2004): 28-29. James L. Garvin, "New Hampshire Good Roads Projects, 1904-2004," MS, New Hampshire Division of Historical Resources, (2004), 3. Frederic E. Everett, "The State and its Roads," *The Granite Monthly* LII, No. 4 (April 1920): 138-139.

east-west route) in Hopkinton, also passing through the center of Peterborough and across the Main Street Bridge.[2]

In the 1930s both of these state highways became numbered routes. The South Side Road became the numbered route N.H. Route 101. In Peterborough, N.H. Route 101 entered the town from the east, ran along Wilton Road, turned north to run along Granite Street, the north end of Pine Street, and then turned west, crossing over the bridge and running along Main Street before continuing west out of the town center along Union Street through West Peterborough and then to the Old Dublin Road. In 1937 a pre-mix pavement was laid down on the north end of Pine Street (see Plans, Sheet 1). In 1958-1959, stretches of N.H. Route 101 were rebuilt along sections of Wilton and Dublin roads, creating a bypass along the southern edge of the village center. In 1934 the Contoocook Valley Road became part of the newly designated U.S. Route 202, a 600-plus mile federal highway running between Delaware and Maine. Historically U.S. Route 202 ran north along Grove and Main Streets, crossed over the Main Street Bridge and continued north along Concord Street. In 1958 the highway was rerouted from Grove and Main streets in Peterborough to run along Granite Street, which remains the current route.[3]

The Main Street crossing is one of the earliest crossings in the town of Peterborough, with a bridge in this vicinity by 1755.[4] The earliest types of bridges in this location are unknown though in the early nineteenth century the crossing was known variously as "Smith Bridge" and "Great Bridge," the latter a name used for much of the nineteenth century.[5] In 1842 a stone double-arch bridge was erected at the crossing, possibly replacing an earlier stone arch bridge.[6] Being known as the "Great Bridge" by 1836 suggests a stone arch bridge may have been in use at this location before the 1842 one. Such bridge types, though expensive to build, were favored on heavily traveled roads or in locations of importance and considerable visibility, which was the case with the Main Street Bridge.[7] The 1842 old dry-stone double-arch bridge sat on dry stone masonry abutments. Each arch had a span of 38'-0", a width of 25'-0", and a clear height of about 11'.[8] The bridge may have been damaged (but not destroyed) in the flooding during the 1938 Hurricane, as the area around the bridge was fully submerged.[9] This event likely provided one of the reasons for replacing the bridge, as the bridge design plans date to 1939. The other likely reason for replacement was a need to upgrade the bridge as it was part of the state and federal highway system (U.S. Route 202 and N.H. Route 101). In the 1930s there was a concerted effort to upgrade those roadways with state and federal legislation and funding provided by both the state and federal government for the trunk line highways in particular.[10] The new bridge would be wider and have a longer clear span and higher clearance.

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[2] Everett, 138-139.

[3] George Abbot Morison and Etta M. Smith, *History of Peterborough, New Hampshire* (Rindge, N.H.: R.R. Smith, 1954), 289. The route was built with state and federal aid. Ibid.

[4] It was one of four bridges built across the town's two major waterways by 1770. Morison and Smith, Albert Smith and John Hopkins Morison, *History of the Town of Peterborough, Hillsborough County, New Hampshire, With the Report of the Proceedings at the Centennial Celebration in 1839* (Boston: Press of G.H. Ellis, 1876), 266.

[5] Daniel Searle, "Map of Peterborough, N.H.," 1819, reprinted in Morison and Smith, 148. John Lund, "Plan of the Establishment of the Phoenix Manufacturing Company and Lower Main and Grove Streets in Peterborough, N.H.," 1836 reprinted in Morison and Smith, 925.

[6] Smith and Morison, 213.

[7] Parsons Brinckerhoff and Engineering and Industrial Heritage, "A Context for Common Historic Bridge Types," NCHRP Project 25-25, Task 15. Prepared for the National Cooperative Highway Research Program, Transportation Research Council, National Research Council (October 2005), 3-49.

[8] New Hampshire Department of Transportation, Bridge Design, Design Card, Bridge No. 092/089.

[9] Historic photos show that the bridge was still intact and in use after the flood waters had receded.

[10] Garvin, "New Hampshire Good Roads Projects, 1904-2004," 13.

Survey work and borings were done, respectively, in July and November 1939. Construction of the Main Street Bridge began in 1940 by the state, as Federal Aid Project No. 18-B (1) U.S. Route 202 and N.H. Route 101 (1). The project was estimated to cost $59,271.19 and it was completed the following year.[11] As previously noted, at the time of the new bridge construction Main Street between Grove Street and Concord Street was part of U.S. Route 202 and N.H. Route 101. Because of its importance as a major crossing on federal and state routes, and because of its central location in Peterborough, a temporary bridge was erected immediately south of the construction site (see Plans). The new bridge was wider and extended further south than the older bridge. Consequently it spanned a small recessed area between the abutments of the old bridge and the projecting concrete platform of the grist mill/Transcript Building site (see Sheet 4 and historic photos). John H. Wells, a civil engineer employed with the New Hampshire Highway Department since the early 1930s designed the new bridge, with two other bridge design engineers assisting with some aspects of the setting design (see plans). D'Ambrosio Construction Company built the bridge.[12]

The bridge designer John H. Wells had a lengthy career with the New Hampshire Highway Department and is known to have designed a number of notable bridges. He had joined the State Highway Department soon after graduating from Worcester Polytechnic Institute (Class of 1930). He remained with the department for at least twenty-five years. He is known to have designed at least two other concrete rigid-frame bridges, the pair of bridges in the center of Exeter, over the Squamscott River (Nos. 102/074 and 103/074). Each is shorter than the Main Street Bridge (clear spans of 50'-0") and neither has stone facing. The reinforced concrete balustrade railings have a flat rectangular cap rail over closely spaced 6" x 6" square posts set 1' on center and separated by arched spandrels.[13] A versatile designer comfortable working with a variety bridge types, some of Wells' better known designs from the 1930s and early 1940s include concrete arches, steel through arches, skewed Pratt trusses, and continuous girder bridges. Wells designed the Edna Dean Proctor Bridge in Henniker (No. 120/112, built 1939, rehabilitated 2001) also over the Contoocook River. This double concrete arch bridge also has stone facing and like the Peterborough Bridge replaced an earlier stone arch bridge destroyed by the flooding associated with the Hurricane of 1938.[14] His well-known steel through-arch bridge designs from this period include the Chesterfield-Brattleboro Bridge (No. 040/095, built 1937, bypassed 2003), the Orford-Fairlee Bridge (No. 062/124, built 1937), and the NH Route 175 Bridge over the Pemigewasset River in Woodstock (No. 177/149, built 1939). He designed a Skewed Pratt truss bridge (designed with Henry B. Pratt) over Rocky Branch River (No. 191/139) in Bartlett (built 1936, bypassed 1990). In 1941 he designed a continuous girder bridge over the Connecticut River between Stratford, New Hampshire, and Bloomfield, Vermont, that was finally constructed in 1947 (No. 029/206, rebuilt 2000).[15] By 1970 he had left the State Highway Department and was the chief structural engineer at Jackson & Moreland, Boston.[16]

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[11] "Bridges Started But Not Completed in 1940," State Department of Highways, Annual Report, 106. Partial photocopy in author's possession.

[12] Bridge Design, Design Card, No. 092/089. Plans, 1940, Sheet 12a. No information has been located on this firm to date.

[13] Preservation Company (Laura B. Driemeyer), "Crawley Falls Road Exeter River Bridge," NH State No. 643, forthcoming.

[14] Lisa Mausolf, "Edna Dean Proctor Bridge (Bridge No. 120/112)," HAER No. NH-31 (1997) <http://hdl.loc.gov/loc.pnp/hhh.nh0265> (accessed December 2009).

[15] James L. Garvin, "Engineers Known To Have Worked in Bridge Design at the New Hampshire Highway Department from the 1920s to the 1940s, with Notes on Jobs with Which They were Associated," 3, Revised 7/2000, 10/2006, copy at New Hampshire Division of Historical Resources. New Hampshire Department of Transportation, Bridge Summary (30 March 2010) <http://www.nh.gov/dot/bureaus/bridgedesign/BridgeInspection.htm>.

[16] Garvin, "Engineers Known to Have Worked in Bridge Design," 3.

42. Applicable NHDHR Historic Contexts:

88. Automobiles, Highways and Culture 1900-present

43. Architectural Description and Comparative Evaluation:

The Main Street Bridge over the Contoocook River (Bridge No. 092/089), constructed 1940-1941, is a single-span, concrete rigid-frame bridge with an arch effect and stone facing. This two-lane bridge carries Main Street (formerly U.S. Route 202/N.H. Route 101) over the Contoocook River in the center of Peterborough village, the commercial and civic center of the town. The bridge has a skew of 21 degrees, with a cast-in-place concrete deck, reinforced concrete abutments, and stone-faced cyclopean concrete wings. The Main Street Bridge has an overall length of 86'-0-½" with a clear span of 75'-0". The bridge's overall width of 43'-3" includes two 15'-0"-wide travel lanes between granite curbs and 4'-10-½"-wide sidewalks on each side. The width between the railings is 39'-9". The arched bridge deck measures an atypically wide 14'-0" at the abutments and tapers to 2'-6" at the center. The tapered legs measure 5'-6-¼" at the top and 3'-2-½" at the bottom. The wearing surface is covered with 4.5"-thick asphalt. The stone-faced concrete railings are cast integral with the deck and rise 2'-9" above the sidewalks. The railings are trimmed with rock-faced cap stones. Rectangular end piers anchor each end of the railings and each has a concrete light standard with a multi-faceted globe. On the southeast and northwest approaches, steel pipe and pales railings, each panel 7-10-½" wide, extend from the end piers along the curving edge of the sidewalks. Other nice aesthetic finish details include ring stones on the arches, some reused from the earlier stone bridge, and corbelling at the top of the northwest and southeast legs in response to the curve of the roadway at those junctures.

Owing to its placement at a historic crossing and the presence of existing stone walls and/or wing walls at each quadrant of the site, each one different. The construction involved integrating the new structure into those existing features, often through reuse of the older materials while also leaving some of the older features in places. The northeast quadrant has a straight wing wall, constructed of mortar rubble masonry, a continuation of the earlier library retaining wall along that side of the river bank. The roughly 40'-long flared northwest wing wall consists of an 8'-wide section constructed of reinforced concrete with mortared stone facing that abuts the older dry laid masonry wall. A 1" cork joint separates the bridge leg and new wall section. Roughly centered in the older section is a box channel, roughly 7'-6" x 7', which likely provided run off from the old H.B. Needham Basket Co. Mill (set back from Main Street on Depot Street, removed 1911-1924, see Sheets 1, 3, and 4).[17] The southwest wing wall is also straight and seems to be largely the retaining wall pre-dating the new construction. The southeast flared wing wall, which is also partially part of the U.S. Route 202 Retaining Wall (see PET0029), is reinforced concrete with mortared stone facing. The 46'-10"-long wall connects to the older loose rubble stone retaining wall along Pine Street/U.S. Route 202.

New Hampshire Department of Transportation Bridge Design inspection reports reveal that the Main Street Bridge is largely intact, retaining most of its original features, but that the deck and superstructure are in poor condition. The original plans show a two-panel steel pipe and pales fence extending from the northeast end pier but historic photos show it was omitted during final construction. The inspection records show that by 1980 the bridge exhibited only minor amounts of deterioration. Over the years since that 1980 report, various elements of the bridge have shown signs of wear and tear typical to a seventy-year-old concrete bridge subjected to New England

[17] Sanborn Map Company, *Digital Sanborn maps 1867-1970* [electronic resource] (Ann Arbor, MI: Bell & Howell, UMI, 2001) for Peterborough, NH: 1911, 1924 (hereafter Sanborn Map Company, Peterborough 1911, 1924).

weather conditions, with overall deterioration of the different elements, especially the underside of the deck. Comparatively little work, however, has been done on the bridge between 1980 and the present. In 1993 the wearing surface was repaved. Some work occurred in 2005 including new paving of the approach at the east end and a new sidewalk on the south side as it exhibited heavy spalling and some exposed rebar. The bridge was added to the municipal redlist in June 2003. The overall conditions of the bridge have continued to deteriorate such that in January 2010 the bridge load calculation determined a reduced load be posted with a weight limit of 15 tons and that the bridge must be replaced or extensively rehabilitated to carry all legal loads.[18]

Concrete Rigid-Frame Bridges/Comparative Evaluation

The concrete rigid-frame bridge is a deck bridge but it differs from simple span bridges supported by abutments in one significant way. The use of "continuous construction" improved upon the more traditional method of beams supported by abutments through the use of a built-up joint between the horizontal and vertical members. In a rigid-frame bridge the deck and abutments are rigidly jointed with steel reinforcement bent at right angles and tied to the reinforcement in the deck and abutments. This allows the load to be transmitted through the joint to the abutments or legs allowing both the deck and the abutments to carry the load and in turn reducing the amount of material necessary in the horizontal members as they are no longer the sole bearers of all the load.[19] Because the forces are distributed evenly through the bridge, there is no need for substantial abutments to counter outward pressure or lateral force, such as with concrete arch bridges.[20] This homogenous unit represents a high point in American concrete bridge design.[21] The design of this bridge type, however, required the technological expertise to calculate the forces, and the New Hampshire State Highway Department had a number of engineers with such expertise.[22] In the 1920s and 1930s the State Highway Department was staffed with a group of knowledgeable young engineers working under the able tutelage and guidance of forward thinking State Bridge Engineer John W. Childs and Assistant State Bridge Engineer Harold E. Langley. These men (a number of them graduates of Worcester Polytechnic Institute) brought with them the ability to perform the advanced engineering needed to analyze statistically indeterminate frames constructed in these decades.

This bridge technology proved popular especially in the 1930s for several additional reasons. The use of statically indeterminate designs provided significant cost savings in materials and construction costs.[23] Though the construction method required expensive framework, it used the construction materials efficiently. This, in turn, reduced the amount of excavation necessary for the abutments, in contrast with many other bridge types of the period, because of the efficient distribution of forces.[24] In the case of the Main Street Bridge this allowed for the incorporation of existing elements into the new designs. Cost savings also was possible because "[c]ontinuous designs, which are a subset of statically indeterminate structures, also had the considerable advantage of reducing the number of

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[18] Bridge Design, Design Card and Inspection Reports, Bridge No. 092/089 [1941-present].

[19] Matthew Roth (Historic Resource Consultants), "Merritt Parkway Bridge No. 744 (Sport Hill Road Bridge)," HAER No. CT-55 (1986), HAER, CONN, 1-FAIRF, 18- < http://memory.loc.gov/ammem/collections/habs_haer/ > (accessed September 2008). Richard M. Casella (Louis Berger & Associates), "Barnstead Bridge (Bridge No. 097/108)," HAER No. NH-30 (1997) [HAER, NH, 7-PITTS, 1-] < http://memory.loc.gov/ammem/collections/habs_haer/ > (accessed September 2008).

[20] Excerpt on concrete rigid-frame bridges from forthcoming volume, James L. Garvin, *New Hampshire's Historic Highway Bridges: Wood, Metal, and Masonry*. Copy kindly provided to author.

[21] Parsons Brinckerhoff and Engineering and Industrial Heritage, 3-96.

[22] Patrick Harshbarger and Ingrid Wuebber (TranSystems & URS Corporation), "Robert John Prowse: A Monograph," 14-15 < http://www.nh.gov/nhdhr/publications/prowse.htm> (accessed June 2010).

[23] Ibid., 17. For a concise discussion of statically indeterminate structures see ibid., 16-18.

[24] Patrick Harshbarger, Lichtenstein Consulting Engineers, *North Carolina Department of Transportation Historic Bridge Inventory* (January 2005), 47.

expansion joints, an area of high maintenance in bridge decks due to moisture-related deterioration and the impact of moving vehicles."[25] In addition, this bridge type lent itself to "extreme adaptability to architectural expression as compared with ordinary types of construction."[26] In village and town centers this bridge type was popular and often faced with stone.[27]

Concrete rigid-frame technology was first developed in Germany for building construction. The low construction costs associated with this technology soon prompted its use for bridge construction over smaller crossings and for railroad grade separations. In the United States, the technology was first used in the 1920s on bridges over the increasing number of parkways, such as the Bronx and Merritt Parkways. Arthur C. Hayden, design engineer for the Westchester County Park Commission of New York introduced the reinforced concrete rigid-frame bridge to American engineers in the early 1920s. Between 1922 and 1925 Hayden designed eight concrete rigid-frame bridges built over the Bronx Parkway. Over the next five years, after the reorganization of the commission as the Westchester County Park Commission, seventy-one additional concrete rigid-frame bridges designed by Hayden were erected along the new Hutchinson and Cross County Parkways. In 1926 Hayden's article "Rigid Frames in Concrete Bridge Construction," appeared in *Engineering News-Record*. The article highlighted the strength, economy, and architectural benefits of the concrete rigid-frame bridge. Hayden presented two types of structural analysis, accompanied by drawings of arrangements of steel reinforcement for several different forms of rigid-frame bridges. The engineering community adopted Hayden's analytical methods and widely copied his designs. By 1932, over 200 rigid-frame bridges had been constructed throughout the United States and Hayden was recognized as the leading expert of this bridge type and its chief early promoter in the United States.[28]

New Hampshire was one of a comparably small number of states to wholeheartedly adopt the concrete rigid-frame bridge for use on its roadways, especially in the 1930s. By 1933 the Highway Department was one of fifteen state agencies to have adopted the concrete rigid-frame as a standard bridge design. In New Hampshire eighty concrete rigid-frame bridges were built between 1929 and 1940.[29] In contrast with New York, however, most of these designs spanned waterways.

The use of this bridge type coincided with the rise of bridge construction in concrete, especially on government-funded building projects. During the Depression era the use of concrete for bridge construction was popularized for several reasons. The form and material lent itself to economical and durable bridge construction by local labor at a time when money was scarce but labor was not. "Economical, long-lasting, and capable of being built with local labor, the concrete bridge put federal highway dollars targeted for economic relief directly into the hands of laborers, who needed it most."[30] After the Second World War this bridge type remained popular for grade separations on highways.[31] "The form was inexpensive, easily constructed, and aesthetically appealing for a standardized bridge structure."[32]

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[25] Harshbarger and Wuebber, 17.
[26] Arthur G. Hayden, *The Rigid Frame Bridge* (New York: John Wiley & Sons, 1931), vii, quoted in Harshbarger and Wuebber, 14.
[27] Peterborough has two other such bridges, including one in Downtown Peterborough. Other well-known examples include one in Bennington, also in the town center and crossing the Contoocook River.
[28] Casella, 6.
[29] Harshbarger and Wuebber, 14.
[30] Casella, 6
[31] Parsons Brinckerhoff and Engineering and Industrial Heritage, 3-96.
[32] Ibid.

Of the 3,795 bridges in the most recent NHDOT's Bridge Summary, 316 are concrete rigid-frame bridges with concrete decks cast in place (the type is designated CRF), 203 of which were built between 1922 and 1960. Of these it is not known how many have arch effects and stone facing. Each bridge in the summary would have to be individually researched to determine if it has both of these attributes as they are not noted in the summary.

In 1989 a thematic review was done of concrete rigid-frame bridges. The committee reviewed thirty-three (33) concrete rigid-frame bridges, considered to be the most significant based on three primary criteria, historicity, technological significance, and environmental quality and assigned scores based on the criteria. All the bridges dated from the 1930s or 1940, a period identified as between "early flourishing phase" and "mature flourishing phase." Not surprisingly, the ones with the highest scores (16-20 points) tended to have stone facing or a concrete balustrade or open railings. The Peterborough Main Street Bridge was ranked as one of the four highest rated bridges, receiving a score of nineteen (19) and was one of three bridges rated in Peterborough.[33] The Main Street Bridge received such a high score because it was considered to be in original condition and of state historical significance since it was on the former location of U.S. Route 202 and N.H. Route 101. Its design by the New Hampshire Highway department was considered to be by a prolific builder of conventional types and it was considered an excellent example of a widely used type. The 75'-0" length of its clear span was considered to be of noteworthy length and it was considered unusual or novel because of the stone facing and concrete lamp posts as well as the sidewalks. Furthermore it was considered to be of noteworthy proportions and details and to have had only minor site alterations.[34]

Since 1989, of the bridges rated in thematic review, one bridge has been replaced and two others have been rebuilt. In addition, at least two others have compromised integrity through the replacement of original railings with ones that meet modern design standards. Within that remaining group of twenty-eight (28), sixteen bridges have stone-facing and arch effects, including the three bridges in Peterborough. What was once a typical or popular bridge type with these attributes, especially in village centers, in New Hampshire is becoming increasingly less well represented.

Comparables

Of the twenty-seven bridges listed in the NHDOT database for the town of Peterborough, two other bridges, as noted previously, in addition to the Main Street Bridge, are concrete rigid-frame bridges and both have arch effects and stone facing. They are:

Bridge No. 087/087 (Grove Street over Nubanusit Brook, built 1936)

Bridge No. 057/108 (Union Road over Nubanusit Brook, built 1937)

Bridge No. 087/087 carries Grove Street over Nubanusit Brook in the center of Peterborough and is the shortest of the three bridges, measuring just 54'-0" in length with a clear span of 47'-1-¾". The single-span, two-lane bridge measures 31'-6-½" between the curbs and 43'-5-½" between the 3'-3"

[33] The other two bridges in Peterborough, Bridge No. 087/087 (Grove Street over Nubanusit Brook, built 1936) and Bridge No. 057/108 (Union Road over Nubanusit Brook, built 1937), also both stone faced with arch effects, received scores of sixteen (16) and fourteen (14), respectively. The other three highest rated bridges in New Hampshire with scores of 19 or 20 were Bridge No. 163/184 in Alton (NH Route 11 over the Merrimeeting River, built 1934), Bridge No. 096/087 in Bennington (NH Route 31 over Contoocook River, built 1934), and Bridge No. 144/056 in Jackson (NH Route 16 over Ellis River, built 1938). These three bridges also have arch effects and stone facing but vary in length and the Jackson Bridge has two spans.

[34] "Reinforced Concrete Rigid Frame Bridges, Thematic Review (1989)." Copy available in Bridge Design, New Hampshire Department of Transportation.

high railings. Six-foot-wide sidewalks line each side of the bridge. The deck measures 3'-7" at the abutments and tapers to 1'-7" at the center. The legs taper from 3'-5" at the top down to 1'-9" at the bottom. Like the Main Street Bridge, concrete light standards are located atop the end piers of each of the railings. The stone facing is more ashlar like than on the Main Street Bridge. The 1936 flooding had washed out the westerly or upstream side of an earlier bridge, requiring construction of this bridge that same year.[35] The Grove Street Bridge retains full integrity aside from some general deterioration such as can be found on any seventy-year-old concrete-and-masonry bridge in New England.

The Grove Street Bridge was designed by New Hampshire Highway Department engineers Wesley E. Haynes and George R. Whittum (who also worked on the Union Road Bridge). Haynes is known to have designed another concrete rigid-frame bridge with an arch effect (though not stone faced) two years later in Whitefield (Bridge No. 110/105).[36]

The thematic review assigned this bridge a score of sixteen points. It was considered to be in original condition and of state historical significance because it was along the former location of U.S. Route 202 (that ran along Grove Street for a time until 1958 when it was rerouted out of the center of town to Granite Street).[37] The New Hampshire Highway Department, designer of the bridge, was considered to be a prolific builder of conventional types and the bridge was considered an excellent example of a widely used bridge type for its structural system and materials and for its aesthetic. Its span length fell into the category of typical length but the stone facing and sidewalks represented unusual or novel design features. The site was considered to have undergone only minor alterations since the bridge's construction.

Bridge No. 057/108 carries Union Road over Nubanusit Brook and is roughly 9' downstream from a dam and mill pond. It was built in 1937 after the earlier bridge was damaged in the 1936 flood.[38] The bridge is slightly shorter the Main Street Bridge, measuring 73' in length with a clear span of 65'. Also two-lanes wide, the bridge measures 24' between curbs and 29'-7" between the railings. The bridge has a 5'-wide sidewalk on the downstream side and 3'-high railings. The form is more characteristic of concrete rigid-frame bridges with arch effects, as the deck measures 4'-2" at the abutments and tapers to 2'-6" at the center. The tapered legs measure 4'-0" at the top and 2'-8" at the bottom. The bridge, though in poor condition and on the municipal redlist, remains largely in original condition. Some granite capstones on the railing at the south were missing by 1980 and have not been replaced.[39]

The Union Road Bridge replaced an earlier bridge that had been extensively damaged in the 1936 flood. Emergency Relief funds paid for the new structure that at that time carried N.H. Route 101. The bridge was designed by R. D. Field, Alfred Mercer Whittemore, and G. R. Whittum.[40] Field is the best known of the three bridge design engineers. Other known concrete bridge designs by Field

[35] New Hampshire Department of Transportation, Bridge Design, Design Card and Inspection Reports, Bridge No. 087/087 [1941-present]. Morison and Smith, 627.
[36] Preservation Company (Laura B. Driemeyer), "Crawley Falls Road Exeter River Bridge."
[37] The bridge plans identify the road as Grove Street, not as U.S. Route 202, suggesting Grove Street became part of that route soon after the bridge's construction.
[38] Morison and Smith, 627.
[39] "New Hampshire Department of Transportation, Bridge Design, Design Card and Inspection Reports, Bridge No. 057/108 [1941-present].
[40] Ibid. 1937 Bridge Design Plans.

include the multi-span concrete rigid-frame Wales Bridge over Soucook River in Loudon (1935) (Bridge No. 054/065) and a continuous T-beam concrete bridge over Otter Brook in Keene (1935).[41]

The 1989 thematic review assigned the Union Road Bridge a score of fourteen (14) points. The bridge was considered to be in original condition and because it was on the former route of N.H. Route 101 it was of State Historical significance. As with the two other concrete rigid-frame bridges in Peterborough, the designer of the bridge, the New Hampshire Highway Department, fell into the category of a prolific builder of conventional types and the bridge is considered an excellent example of a widely used type. The 65'-0" clear span fell into the category of significant length and its stone facing and sidewalk on the downstream side placed it in the category of a noteworthy example. The bridge was considered to be typical but in an attractive location though the site was greatly altered.

44. National or State Register Criteria Statement of Significance:

The Main Street Bridge over the Contoocook River (No. 092/089) is eligible for listing on the National Register of Historic Places under Criterion C as a well-preserved and largely-unaltered, excellent example of a widely-used bridge type, the concrete rigid-frame bridge with arch effect and stone facing. It is also eligible under Criterion A at the state level for its association as a design of a conventional bridge type by the New Hampshire Highway Department, a prolific builder of such bridges along state and federal roadways. Furthermore, it is eligible under Criterion A at the state level because of its association with the state-wide pattern of federal-aid-funded bridge replacement along federal and state routes.

Criterion A: The Main Street Bridge over the Contoocook River, constructed in 1940-1941, is eligible under this criterion at the state level for its association with the pattern of the use of a widely-used bridge type designed by a prolific builder, the New Hampshire Highway Department. New Hampshire was one of a comparably small number of states to wholeheartedly adopt the concrete rigid-frame bridge for use on its roadways, especially in the 1930s. By 1933 the Highway Department was one of fifteen state agencies to have adopted the concrete rigid-frame as a standard bridge design. In New Hampshire eighty concrete rigid-frame bridges were built between 1929 and 1940. The bridge is also eligible under this criterion for its association with the state-wide pattern of improved alignment of major state and federal routes in the 1930s, including U.S. Route 202 and N.H. Route 101, with the use federal and state aid. This involved bypassing older bridges and construction of new ones or, as seems to be the case with the Main Street Bridge, the replacement of an older existing bridge.

Criterion B: The Main Street Bridge over the Contoocook River, constructed in 1940-1941, is not eligible under this criterion. Though the designer, John H. Wells, was a long-time employee of the State Highway Department and a prolific designer and builder of conventional bridge types, his design of this bridge does not rise to the level of significance within a historic context.

Criterion C: The Main Street Bridge over the Contoocook River, constructed in 1940-1941, is eligible under this criterion as an outstanding, well-preserved example of a

[41] James L. Garvin, "Engineers Known to Have Worked….", 2. John Moore, "Highway Department Employees Connected with Bridges," MS, New Hampshire Department of Transportation, Bridge Design files.

conventional bridge type, a concrete rigid-frame bridge, with notable aesthetic features including stone-facing, concrete lamp posts, and sidewalks. This bridge type with these features was popular notably in highly visible locations, such as waterway crossings in a town center. The Main Street Bridge has a high degree of physical integrity with no major alterations. Minor alterations have included repaving of the wearing surface in 1993 and a new sidewalk on the south side of the bridge in 2005. During the 1989 thematic review of concrete rigid-frame bridges in New Hampshire the committee identified thirty-three (33) concrete rigid-frame bridges as significant and rated them. The Main Street was one of the four highest-rated bridges, receiving a score of nineteen (19). The bridge was built during the mature flourishing phase of construction of this bridge type. It was and is an excellent example of a widely used type. The bridge's proportions (a clear span of 75'-0") and details (stone facing, concrete light posts, and sidewalks along both sides of the bridge) are noteworthy. Though some the buildings in the immediate vicinity of the west end of the bridge have lost integrity and the railroad is no longer present, the site remains that of the town center and an important crossing in the town's center, adjacent to a highly-trafficked federal and state highway route.

45. Period of Significance:

1941-1959

46. Statement of Integrity:

The Main Street Bridge, although in poor physical condition, is largely in original condition and therefore retains integrity of design, materials, and workmanship. The bridge is unaltered and retains its historic form, stone facing, stone-faced railings, sidewalks (though the south one was replaced in 2005), and concrete light standards and multi-faceted globes. The bridge does have significant problems, however, with spalling and efflorescence on the underside of the concrete deck and the approaches and stone-faced railings are not up to modern safety standards. The bridge retains integrity of location and setting as a primary crossing in the town center, though some of the buildings immediately west of the bridge have compromised integrity due to alterations and replacement siding and windows. The bridge retains integrity of feeling and association as it still carries vehicular traffic over the Contoocook River to and from the village center and though it is no longer part of U.S. Route 202/N.H. Route 101it does abut the rerouted U.S. Route 202.

47. Boundary Discussion:

The boundaries of this resource are coextensive with the footprint of the bridge, including its abutments.

48. Bibliography and/or References:

PRIMARY SOURCES

"Bridges Started But Not Completed in 1940," State Department of Highways, Annual Report, 106. Xerox copy in author's possession.

Moore, John. "Highway Department Employees Connected with Bridges." MS, New Hampshire Department of Transportation, Bridge Design files.

New Hampshire Department of Transportation, Bridge Design, Design Card and Inspection Reports, Bridge No. 087/087 [1941-present].

New Hampshire Department of Transportation, Bridge Design, Design Card and Inspection Reports, Bridge No. 092/089 [1941-present].

New Hampshire Department of Transportation. Bridge Summary. 30 March 2010. <http://www.nh.gov/dot/bureaus/bridgedesign/BridgeInspection.htm>.

Historic Photographs

Collections of the Peterborough Historical Society, Peterborough, New Hampshire.

Maps, atlases, and plans

Carrigain, Philip. *New Hampshire*. Concord, NH: 1816. [David Ramsey Historical Map Collection. http://www.davidrumsey.com/]

Hurd, D. H., & Co. Town and City Atlas of the State of New Hampshire. Boston: D. H. Hurd and Co., 1892.

Lund, John. "Plan of the Establishment of the Phoenix Manufacturing Company and Lower Main and Grove Streets in Peterborough, N.H."

"Plans of Proposed Federal Aid Project No. 18 B(1), U.S. Route 202 & N.H. Route 101" [Bridge No. 092/089]. State of New Hampshire, Highway Department, Bridge Design, 12 sheets, 1939.

Sanborn Map Company. *Digital Sanborn maps 1867-1970* [electronic resource]. Ann Arbor, Mich.: Bell & Howell, UMI, 2001. [Peterborough, NH: 1884, 1892, 1904, 1911, 1924, 1924 updated to 1941]

Sanborn Map Company. Microfilm, collection of New Hampshire State Library. [Peterborough, NH: 1924 updated to 1951.]

Searle, Daniel. "Plan of Peterborough" 1805. Microfilm collection of New Hampshire State Library, Concord, New Hampshire.

Searle, Daniel. "Map of Peterborough, N.H." 1819. Reprinted in Morison and Smith.

Unpublished Papers, Theses, and Reports

Casella, Richard M. (Louis Berger & Associates). "Barnstead Bridge (Bridge No. 097/108)." HAER No. NH-30 (1997) [HAER, NH, 7-PITTS, 1-] <http://memory.loc.gov/ammem/collections/habs_haer/ > (accessed September 2008).

Garvin, James L. "Builders of Bridges in New Hampshire." 9 August 1999; updated April 2008. Copy at New Hampshire Division of Historical Resources.

_____. "Engineers Known To Have Worked in Bridge Design at the New Hampshire Highway Department from the 1920s to the 1940s, with Notes on Jobs with Which They were Associated." Revised 7/2000, 10/2006. Copy at New Hampshire Division of Historical Resources.

_____. Excerpt, *New Hampshire's Historic Highway Bridges: Wood, Metal, and Masonry* (forthcoming). Copy provided to author.

_____. "New Hampshire Good Roads Projects, 1904-2004." MS, New Hampshire Division of Historical Resources, 2004.

Harshbarger, Patrick (Lichtenstein Consulting Engineers). *North Carolina Department of Transportation Historic Bridge Inventory* (January 2005).

Harshbarger, Patrick and Ingrid Wuebber (TranSystems & URS Corporation). "Robert John Prowse: A Monograph," 14-15 <http://www.nh.gov/nhdhr/publications/prowse.htm> (accessed June 2010).

Parsons Brinckerhoff and Engineering and Industrial Heritage. "A Context for Common Historic Bridge Types," NCHRP Project 25-25, Task 15. Prepared for the National Cooperative Highway Research Program, Transportation Research Council, National Research Council. October 2005.

Preservation Company (Laura B. Driemeyer). "Crawley Falls Road Exeter River Bridge." NH State No. 643 (forthcoming).

"Reinforced Concrete Rigid Frame Bridges, Thematic Review (1989)." Copy available in Bridge Design, New Hampshire Department of Transportation.

Mausolf, Lisa. "Edna Dean Proctor Bridge (Bridge No. 120/112)." HAER No. NH-31 (1997). <http://hdl.loc.gov/loc.pnp/hhh.nh0265> (accessed December 2009).

Roth, Matthew (Historic Resource Consultants). "Merritt Parkway Bridge No. 744 (Sport Hill Road Bridge)." HAER No. CT-55 (1986) < http://hdl.loc.gov/loc.pnp/hhh.ct0472> (accessed September 2008).

SECONDARY SOURCES

Everett, Frederic E. "The State and its Roads." *The Granite Monthly* LII, No. 4 (April 1920): 135-144.

Garvin, James. "The Trunk Line Road System." *New Hampshire Highways* (January/February 2004): 25-29.

Hayden, Arthur G. *The Rigid Frame Bridge*. New York: John Wiley & Sons, 1931.

Morison, George Abbot, and Etta Marinda Smith. *History of Peterborough, New Hampshire*. Rindge, N.H.: R.R. Smith, 1954.

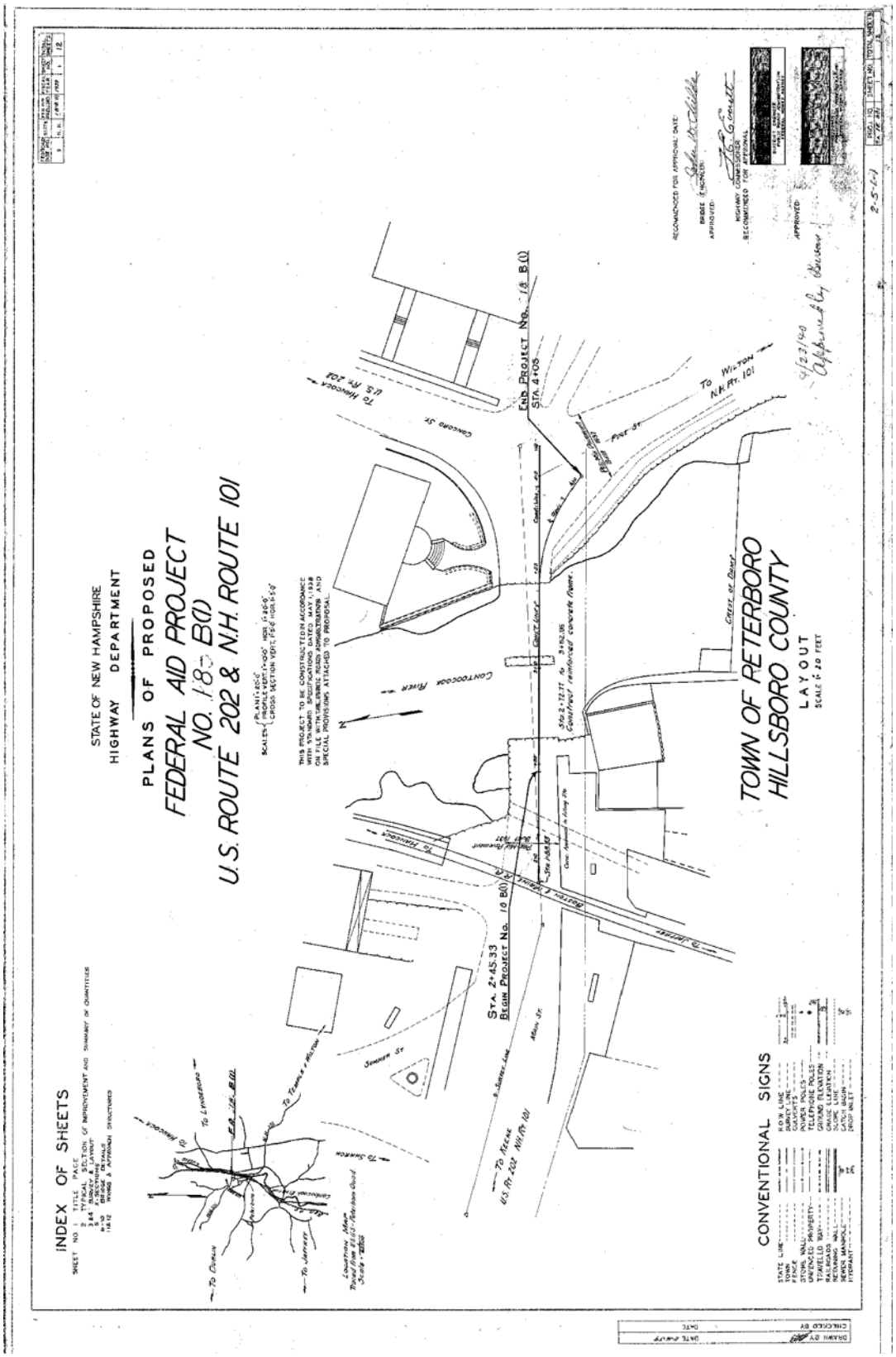
New Hampshire State Highway Department. *Annual Report of the State Highway Department of New Hampshire*. Concord, NH: State Highway Department, 1940.

Smith, Albert, and John Hopkins Morison. *History of the Town of Peterborough, Hillsborough County, New Hampshire, With the Report of the Proceedings at the Centennial Celebration in 1839*. Boston: Press of G.H. Ellis, 1876.

Surveyor's Evaluation

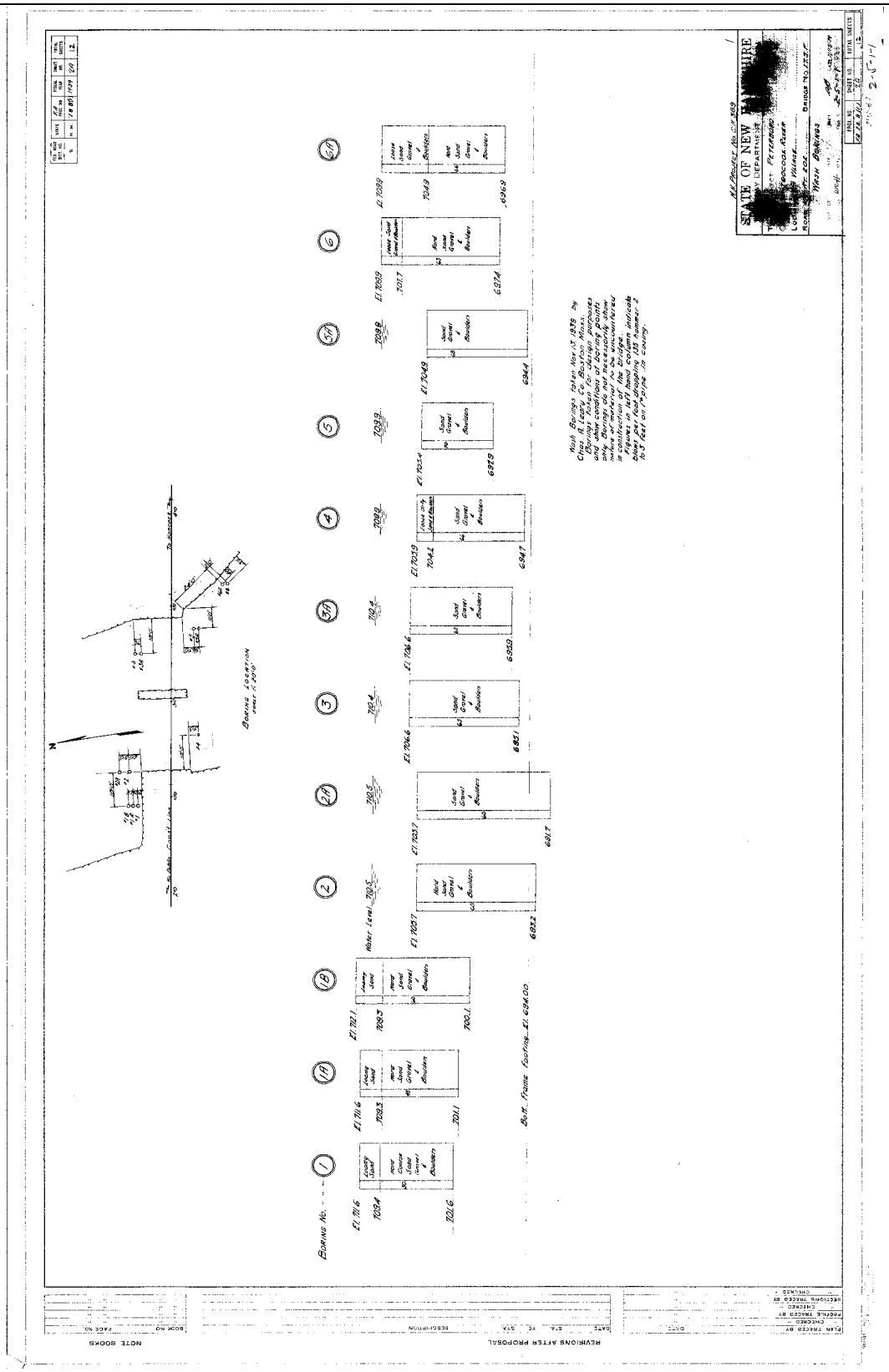
NR listed:	individual	☐	NR eligible:		NR Criteria:	A	☒
	within district	☐	individual	☒		B	☐
			within district	☐		C	☒
Integrity:	yes	☒	not eligible	☐		D	☐
	no	☐	more info needed	☐		E	☐

Historic Drawings and Plans

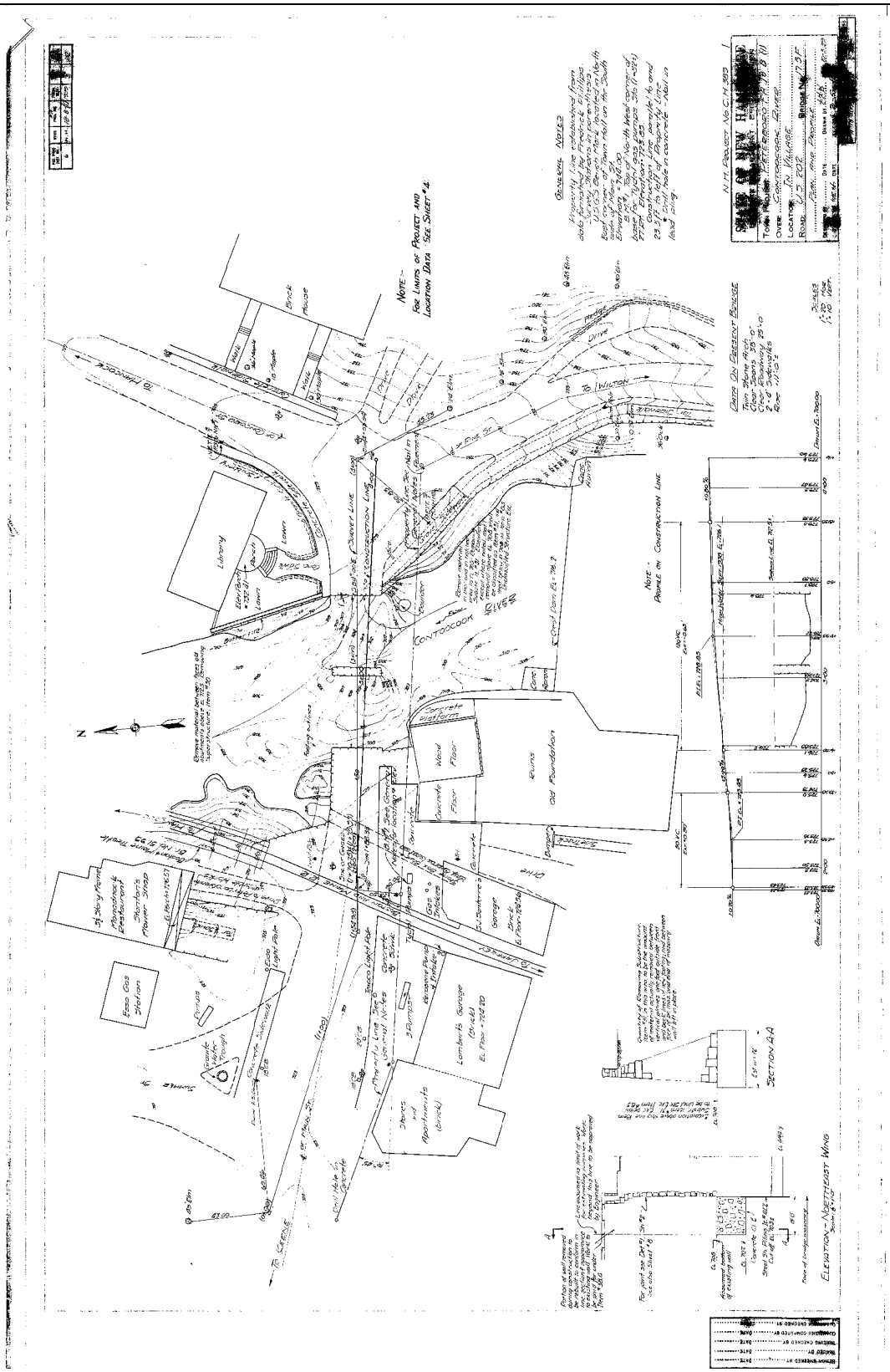


Sheet 1. Title Page. NHDOT Bridge Design (1940).

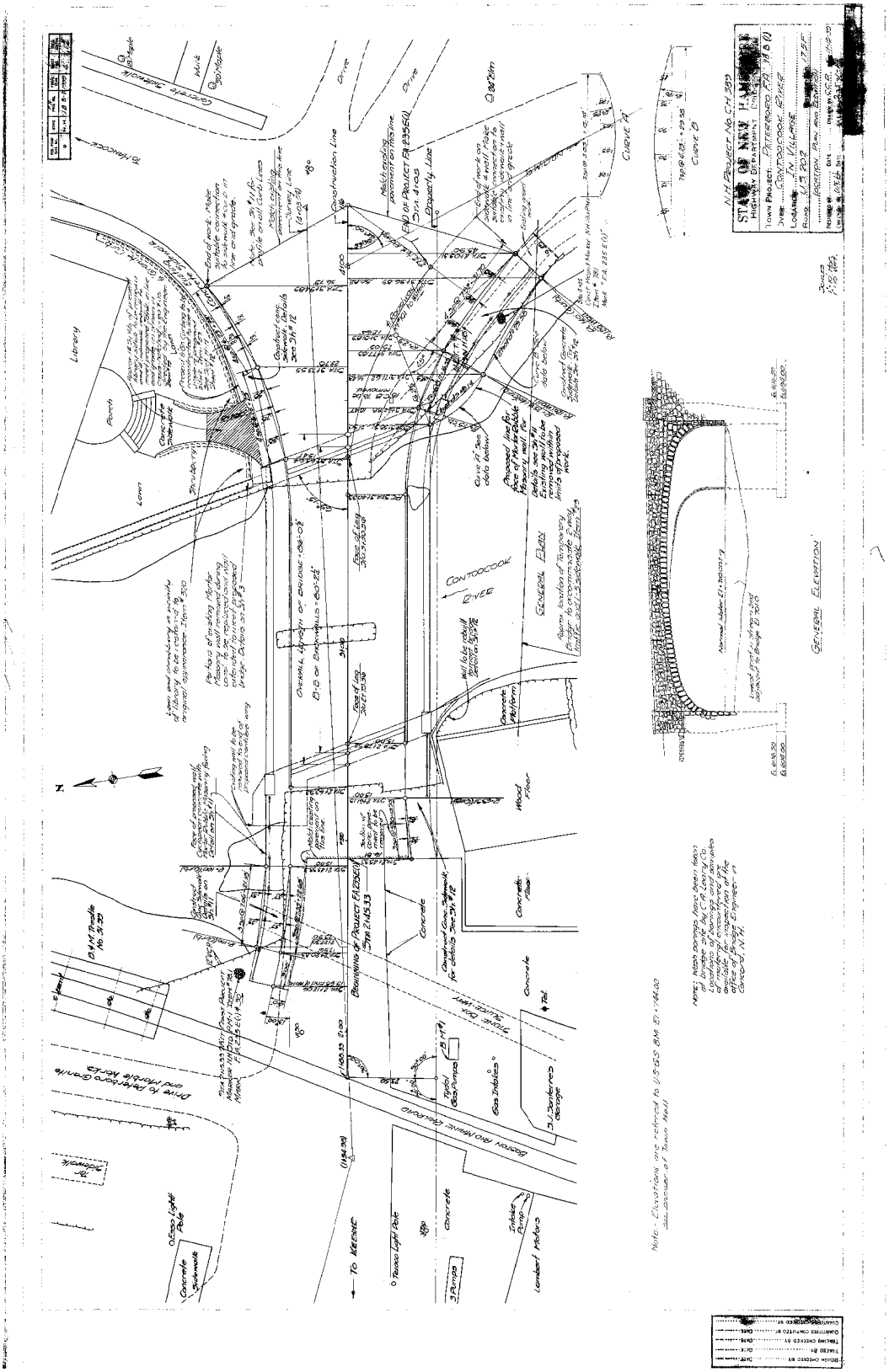
Sheet 2. Estimate of Quantities and Typical Details. NHDOT Bridge Design (1940).



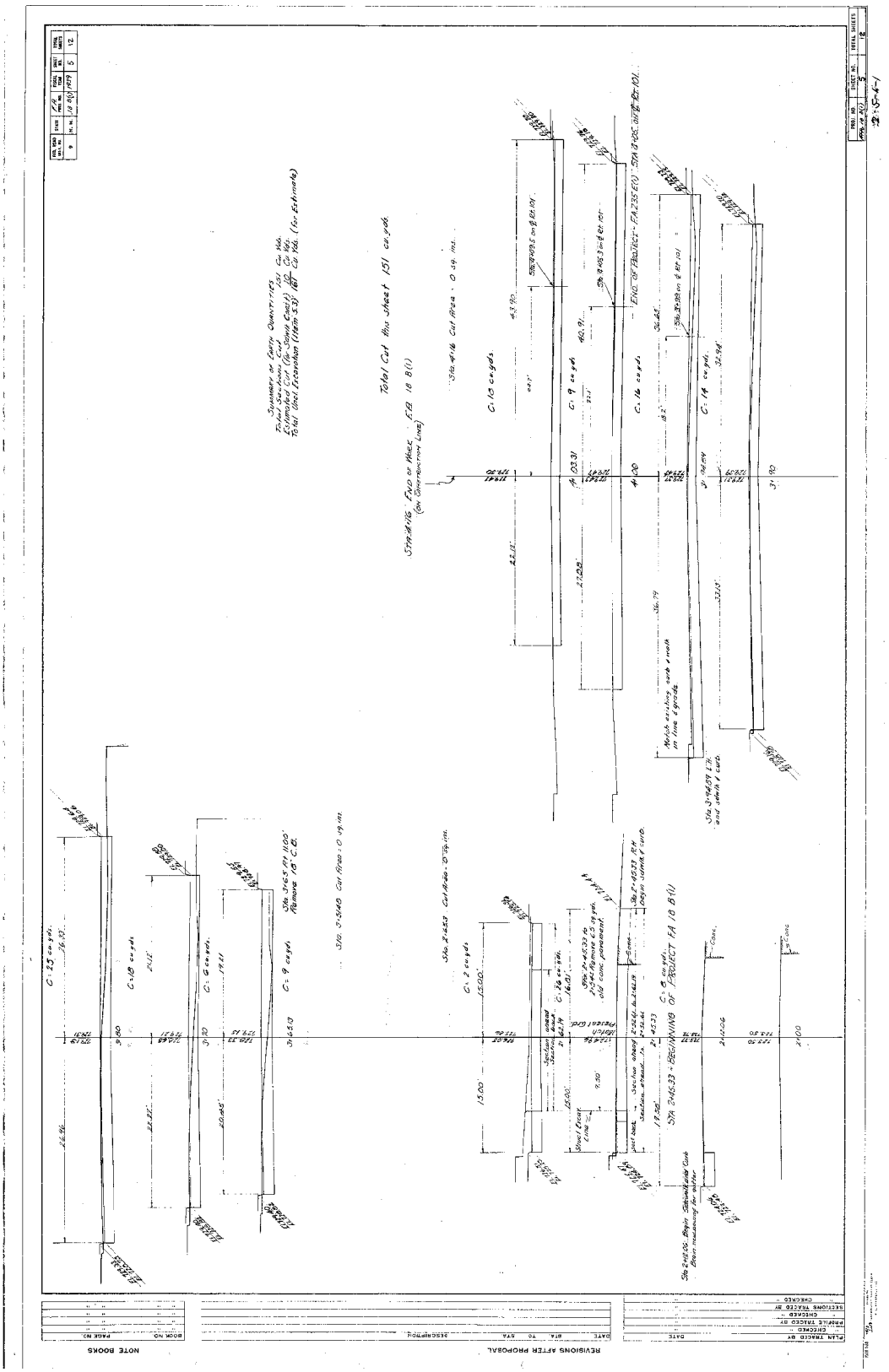
Sheet 2a. Wash Borings. NHDOT Bridge Design (1940).



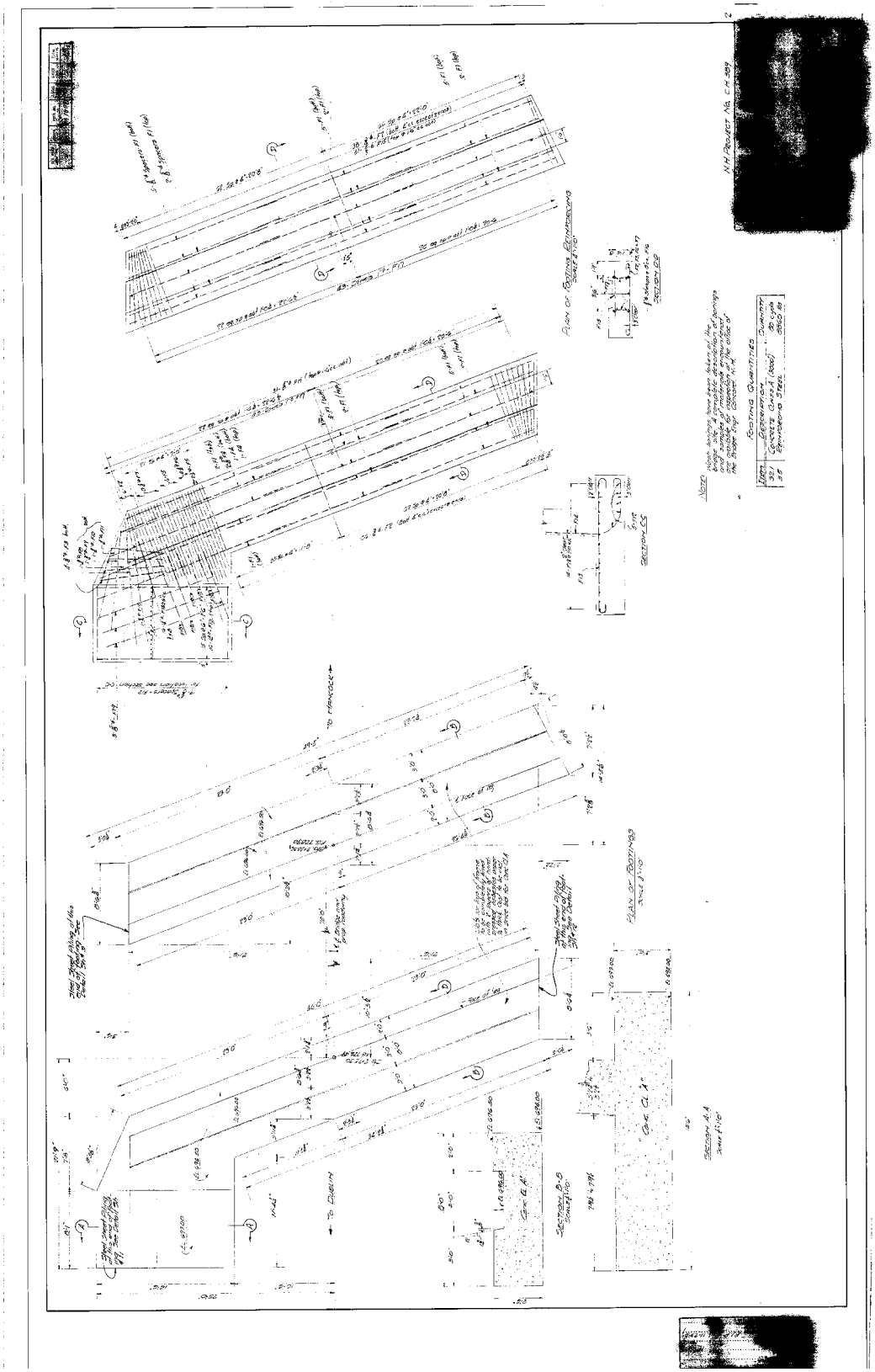
Sheet 3. Plan and Profile. NHDOT Bridge Design (1940).



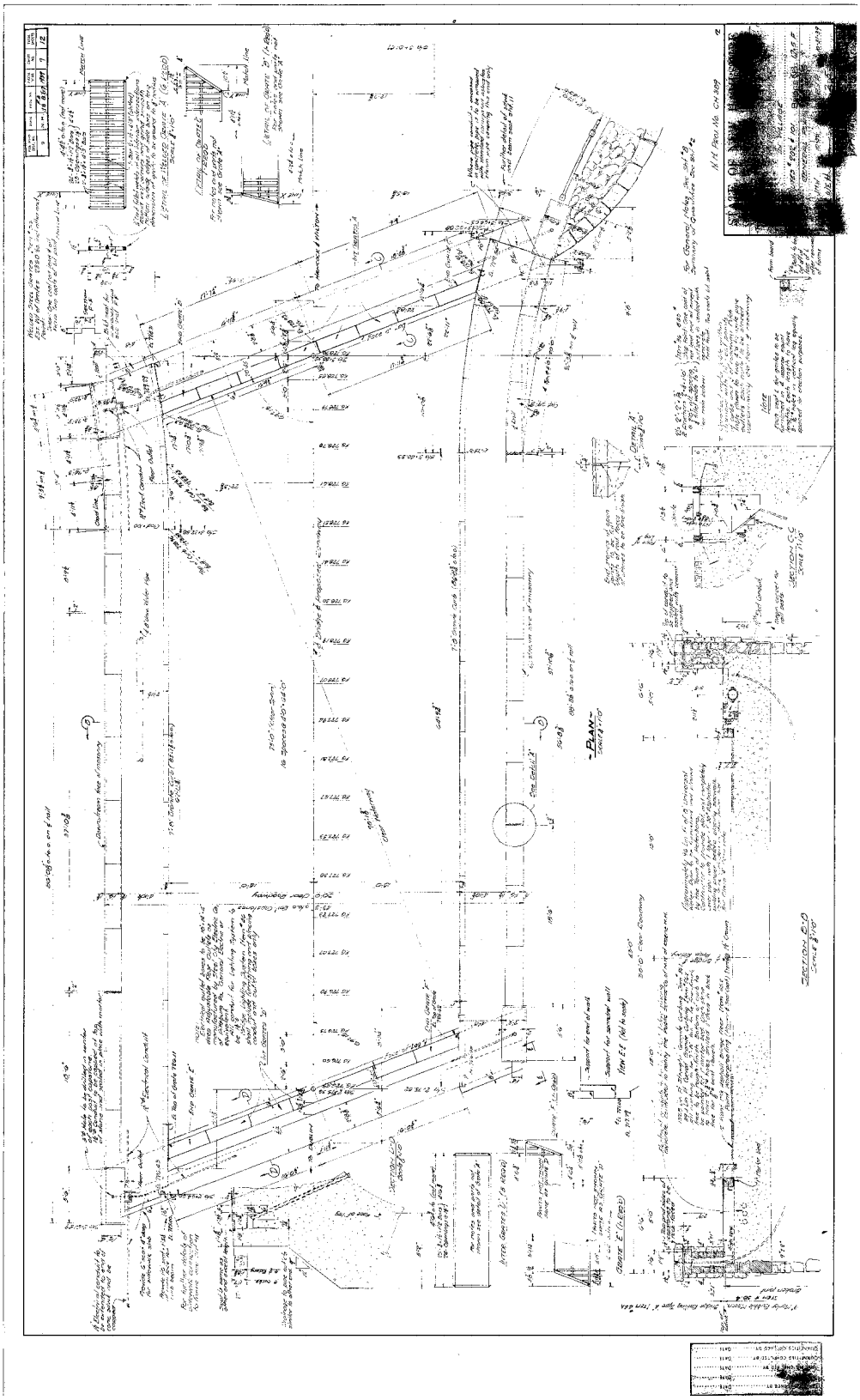
Sheet 4. Location Plan and Elevation. NHDOT Bridge Design (1940).



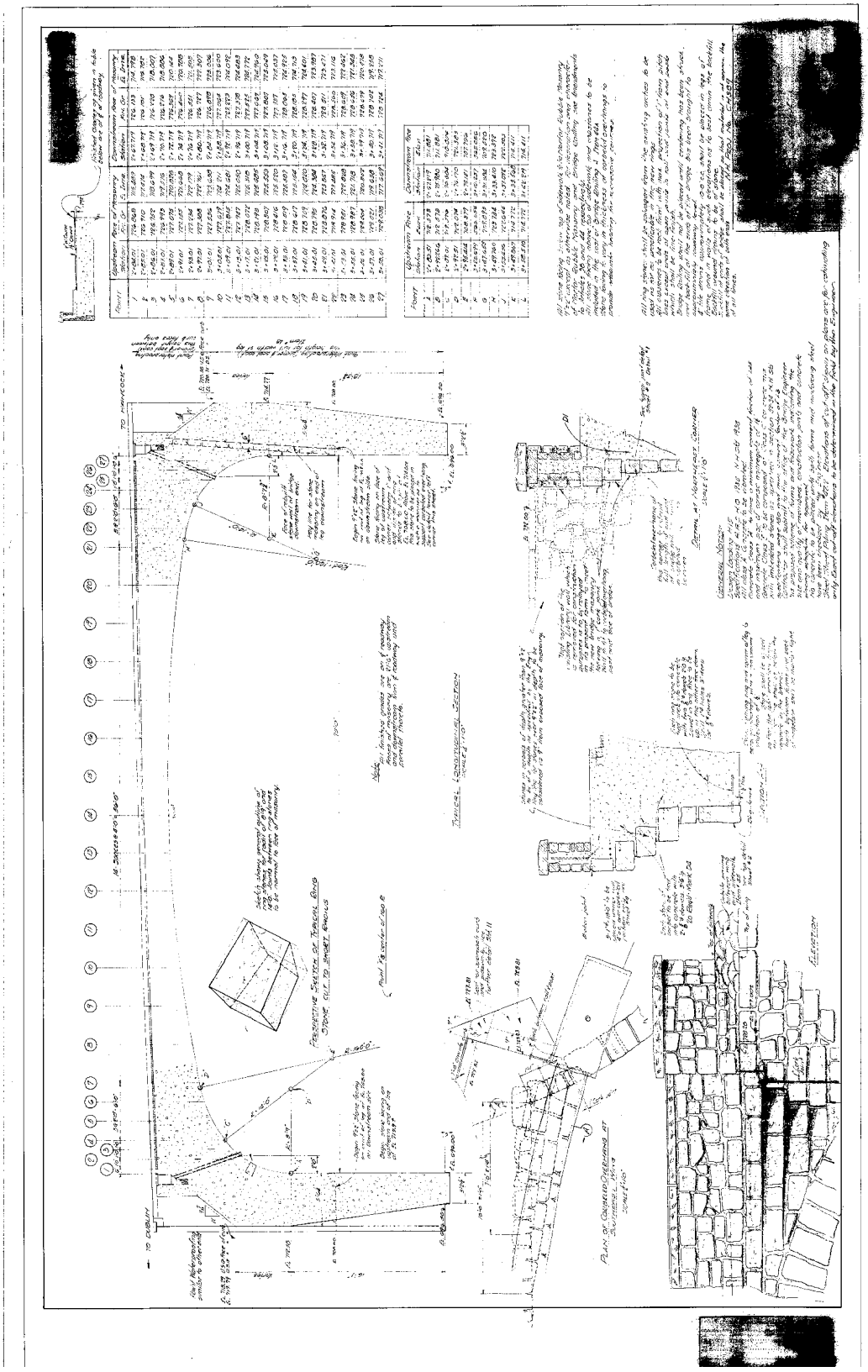
Sheet 5. Summary of Earth Quantities. NHDOT Bridge Design (1940).



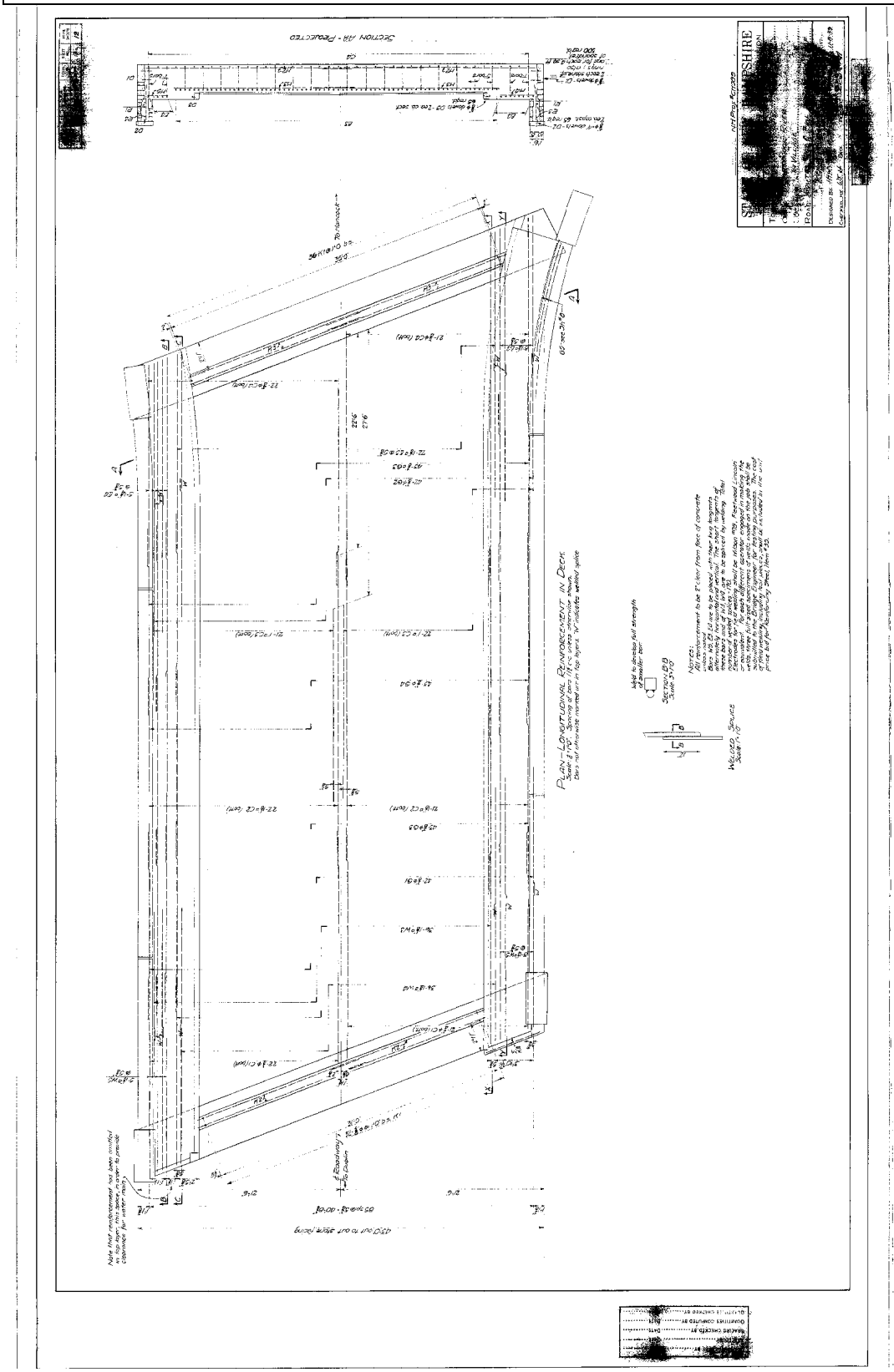
Sheet 6. Plan of Footings and Footing Reinforcing. NHDOT Bridge Design (1940).



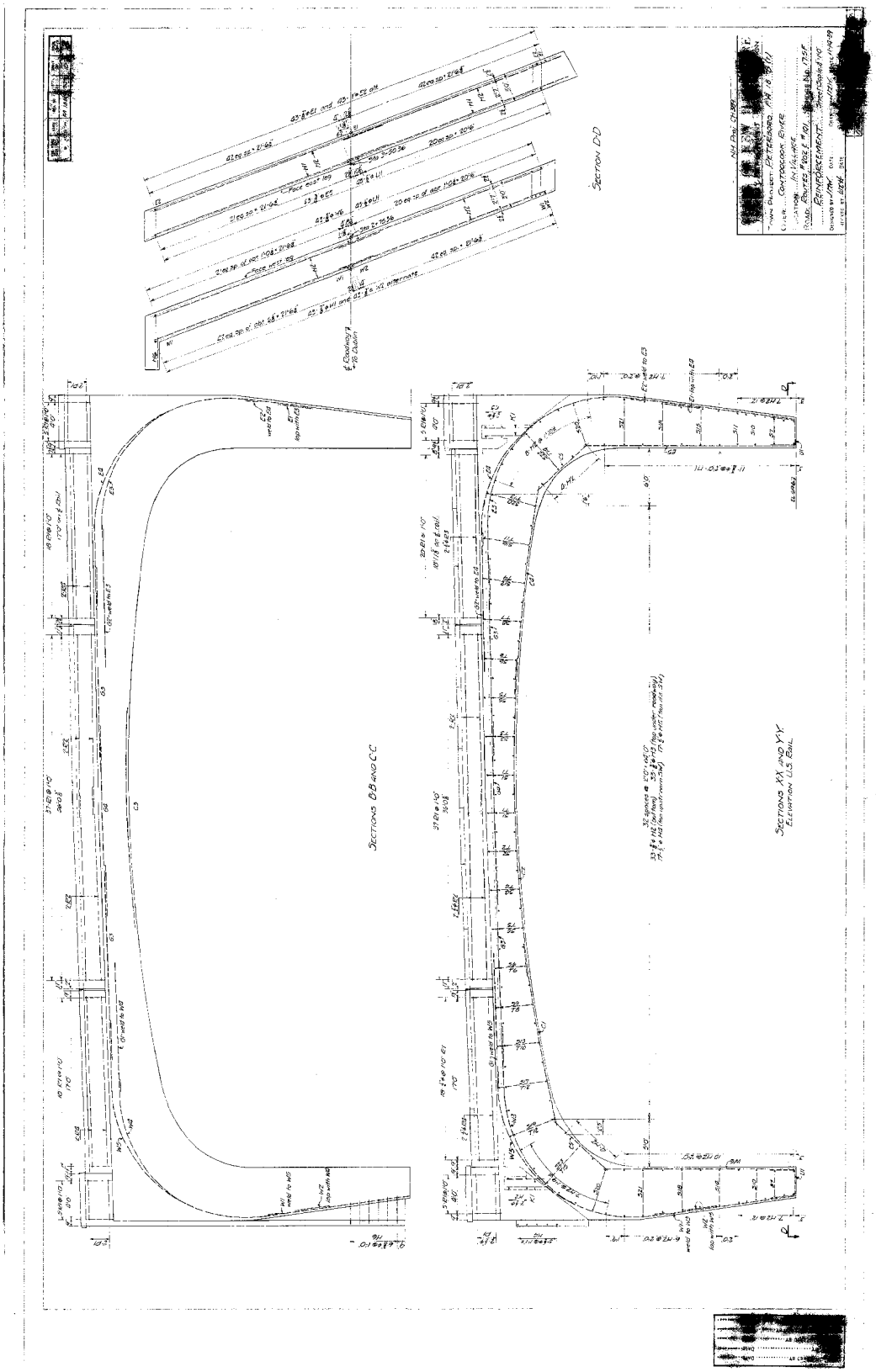
Sheet 7. General Plan Details. NHDOT Bridge Design (1940).



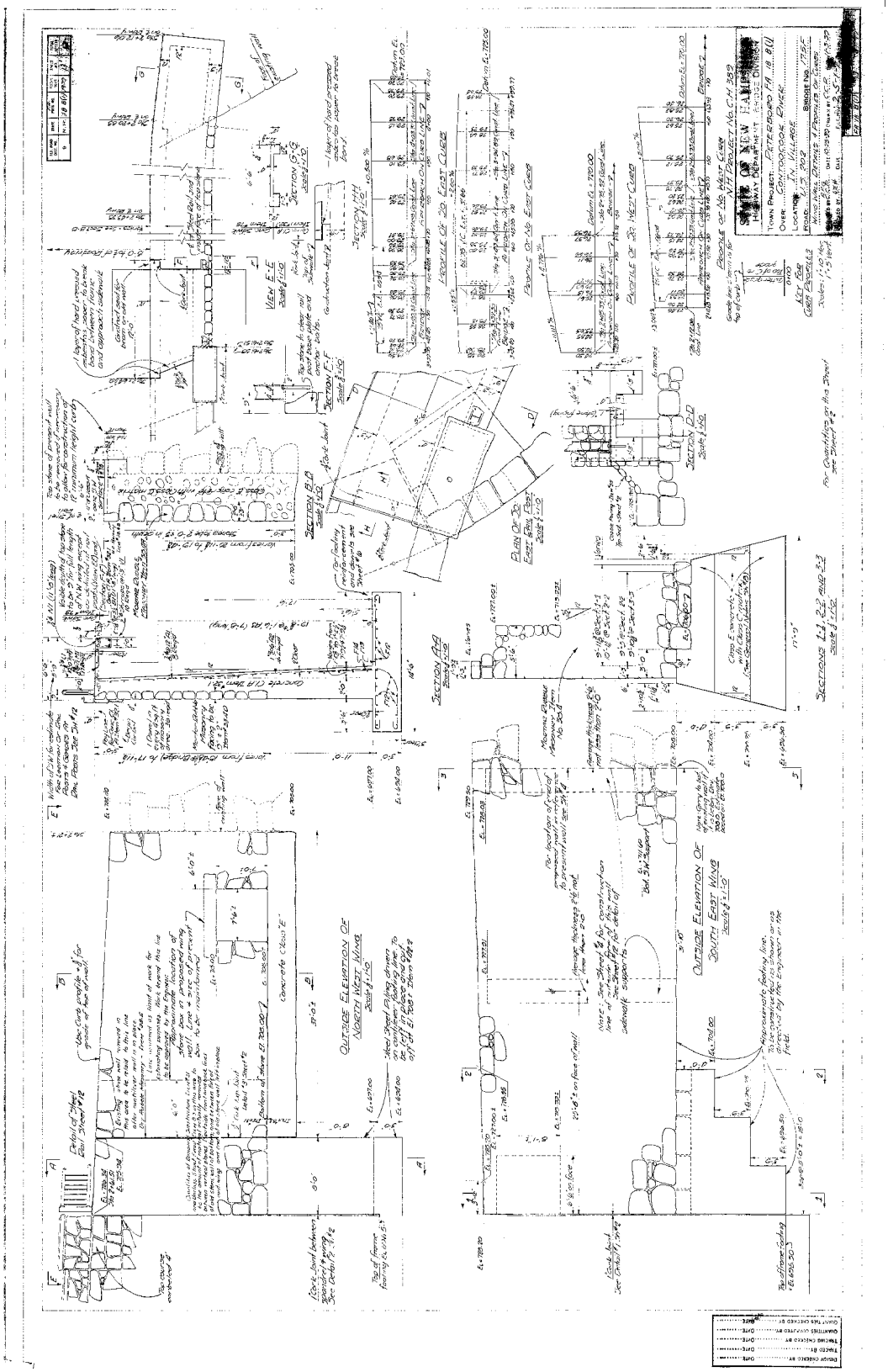
Sheet 8. Bridge Details. NHDOT Bridge Design (1940).



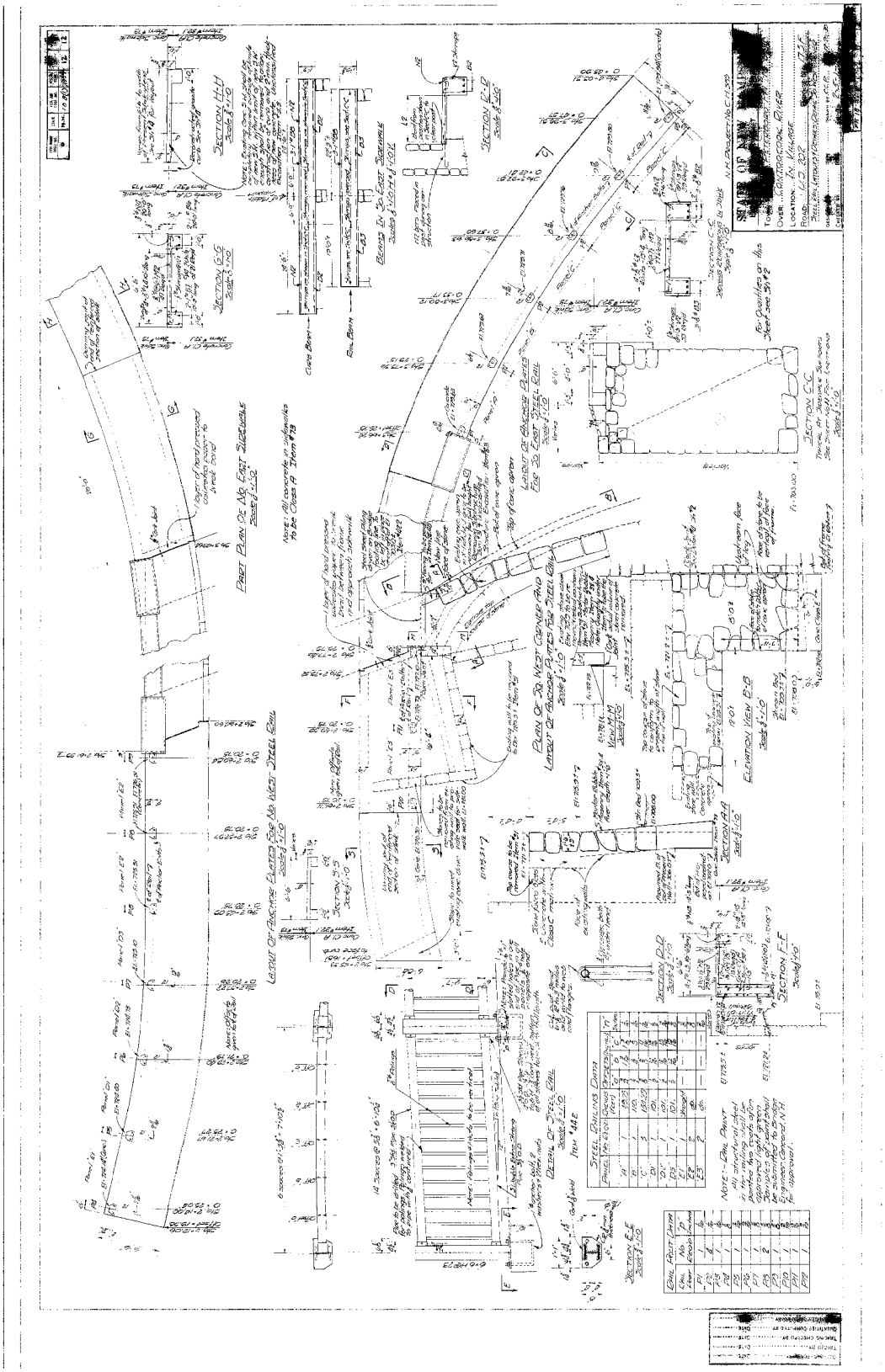
Sheet 9. Plan-Longitudinal Reinforcement in Deck. NHDOT Bridge Design (1940).



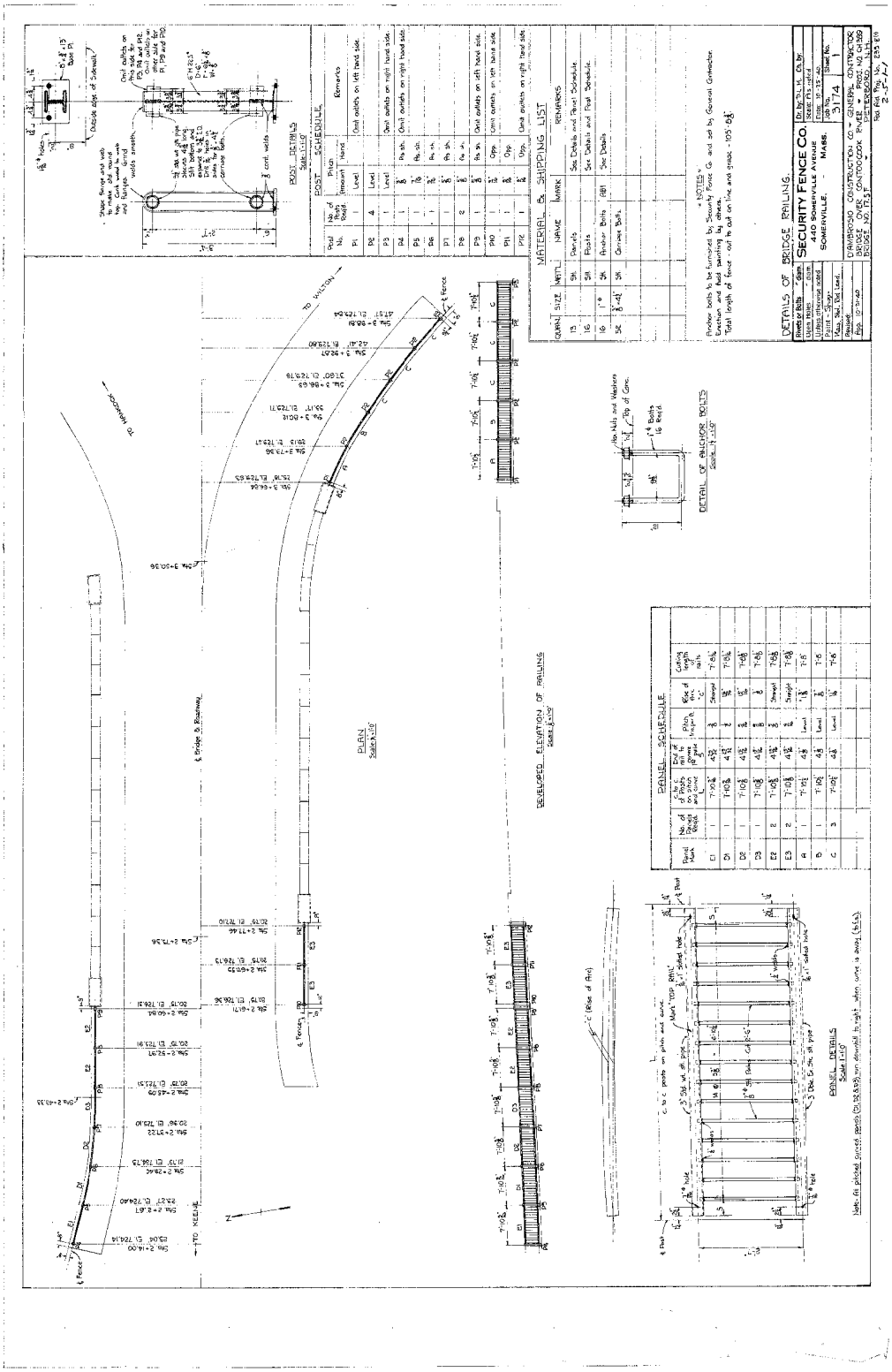
Sheet 10. Reinforcement. NHDOT Bridge Design (1940).



Sheet 11. Wing wall details and profiles of Curbs. NHDOT Bridge Design (1940).



Sheet 12. Steel Rail Layouts and Detail Southwest Corner. NHDOT Bridge Design (1940).



Sheet 12a. Details of Metal Bridge Railings for Approaches. NHDOT Bridge Design (1940).

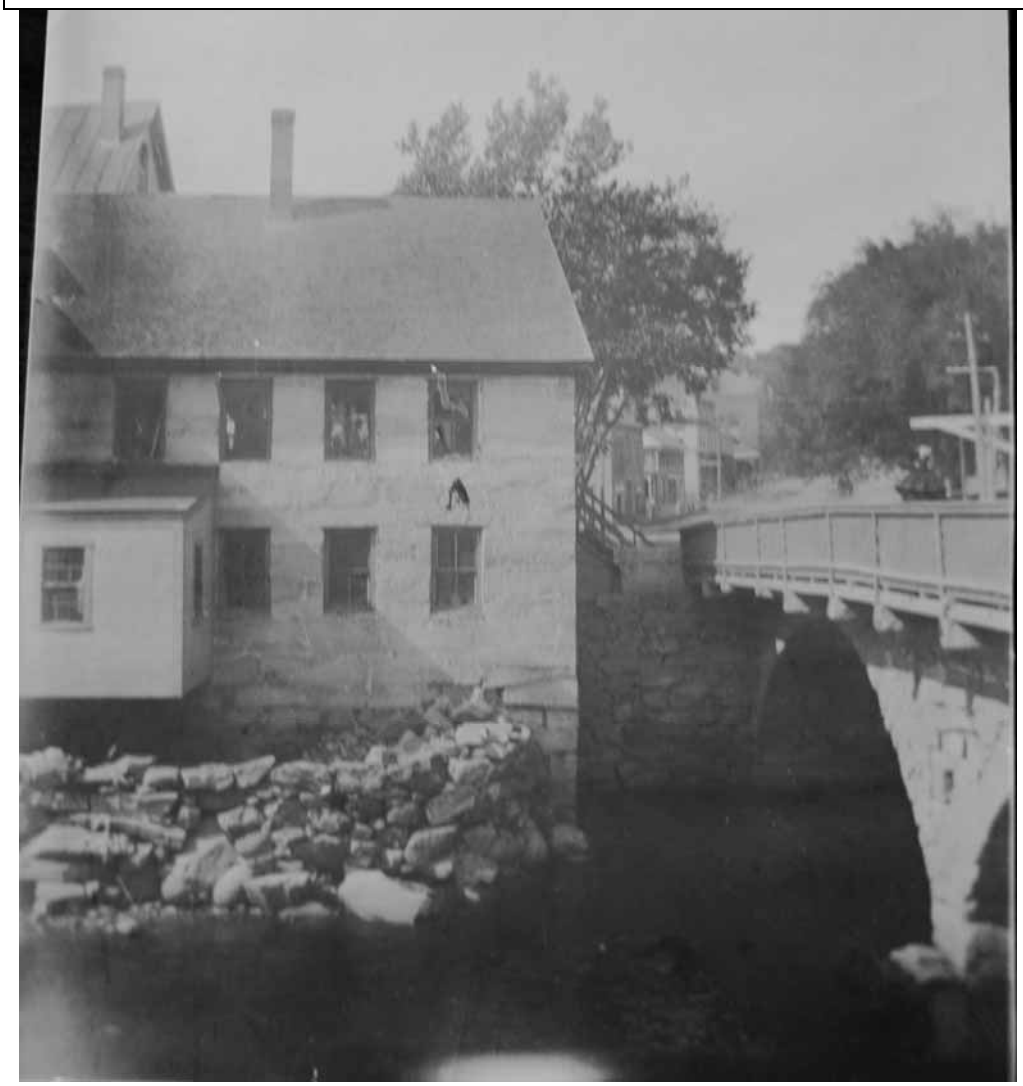
Historic Photos and Views

Painting, east end of Main Street and Pine Street, at Stone Arch Bridge and retaining wall along Pine Street. View ca. 1840s. Collection of Peterborough Historical Society, Peterborough, New Hampshire.

Main Street from above Pine/Concord streets, looking west across bridge. View ca. 1870s. Collection of Peterborough Historical Society

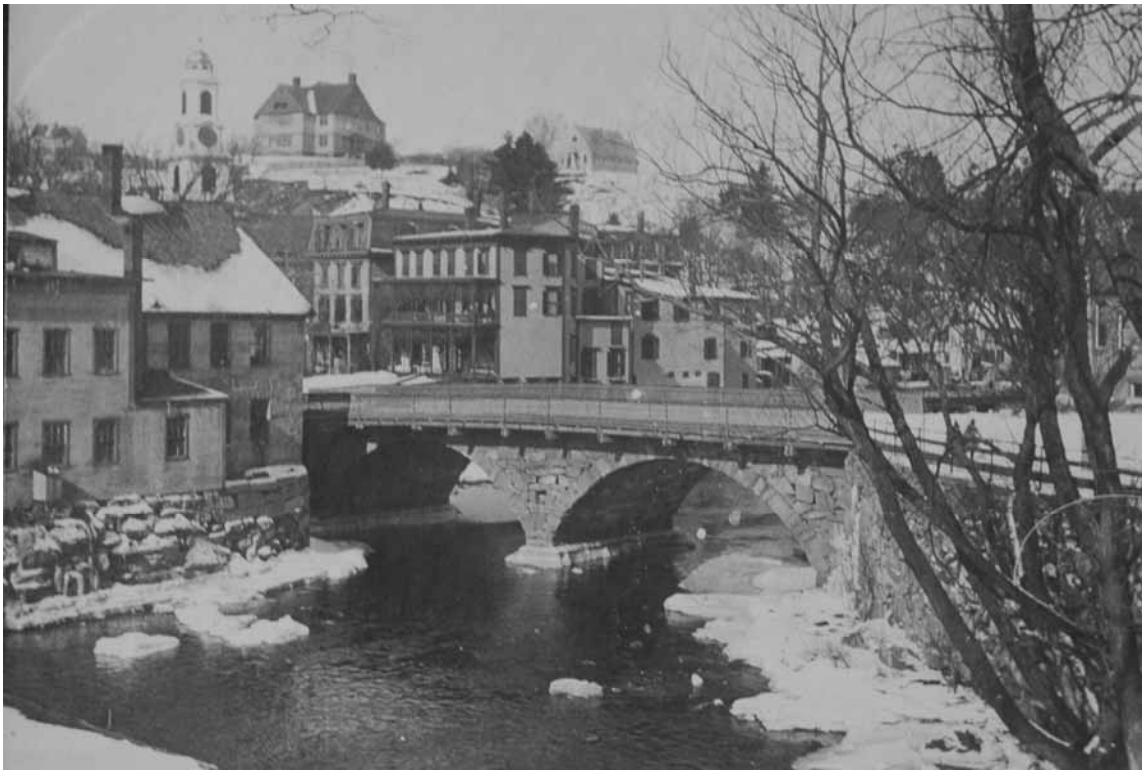
View southeast from northwest side of 1842 bridge (Main Street). Collection of Peterborough Historical Society.

Stereoscope view of 1842 Stone Arch Bridge, view before 1893. Collection of Peterborough Historical Society.



West end of north elevation of old bridge and southeast wingwall/retaining wall. Collection of Peterborough Historical Society.

North side of west end of old bridge and retaining wall with railroad crossing and old grist mill in background. Collection of Peterborough Historical Society.

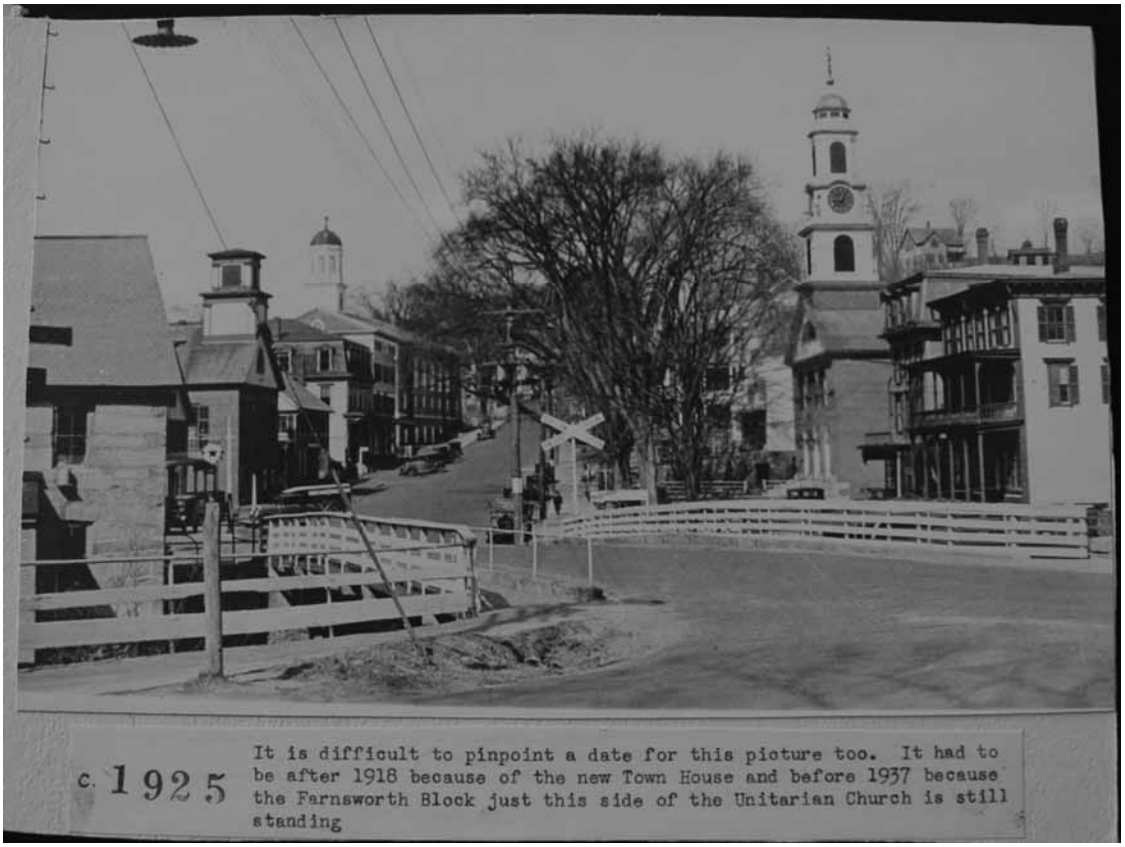


1842 Stone Arch Bridge and retaining wall, looking northwest. View after 1893. Collection of Peterborough Historical Society.

Looking east from west end of 1842 bridge towards library (northeast) wingwall/retaining wall. Brick Block in background. View ca. 1900. Collection of Peterborough Historical Society.

1842 Stone Arch Bridge, looking southeast from northwest side of bridge. Collection of Peterborough Historical Society.

East end of 1842 stone arch bridge and masonry retaining wall, view 1914-1938. Collection of Peterborough Historical Society.



Looking west from east side of 1842 Stone Arch Bridge. View ca. 1925. Collection of Peterborough Historical Society.

September 1938 Flood and Hurricane, west end of bridge and south side of Main Street, before fire that destroyed buildings on south side of Main Street between the bridge and Depot Street. Collection of Peterborough Historical Society.

Looking west across 1842 bridge from Pine/Concord streets. View just after September 1938 flood and fire. Collection of Peterborough Historical Society.

Looking northwest towards Main Street in village center, from east side of Contoocook River. View after September 1938 flood and fire but before bridge replacement in 1940-1941. Collection of Peterborough Historical Society.

Looking west along Main Street with the Transcript Building site next to the bridge now unoccupied. View after Hurricane of 1938 and before bridge replacement. Collection of Peterborough Historical Society.

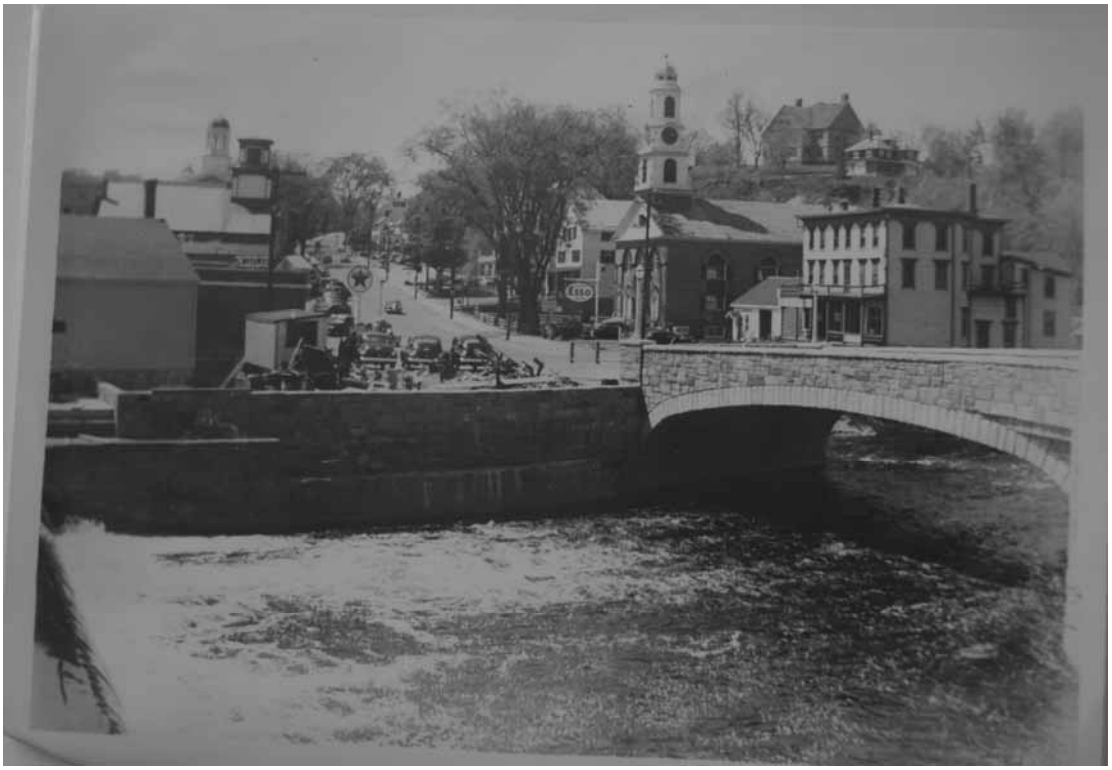
Demolition of 1842 Stone Arch Bridge, 1940-1941. View looking southweast. Collection of Peterborough Historical Society.

Construction of new concrete rigid-frame bridge, view 1941. Collection of Peterborough Historical Society.

East end of 1940-41 Main Street Bridge and retaining wall, looking northeast. Collection of Peterborough Historical Society.

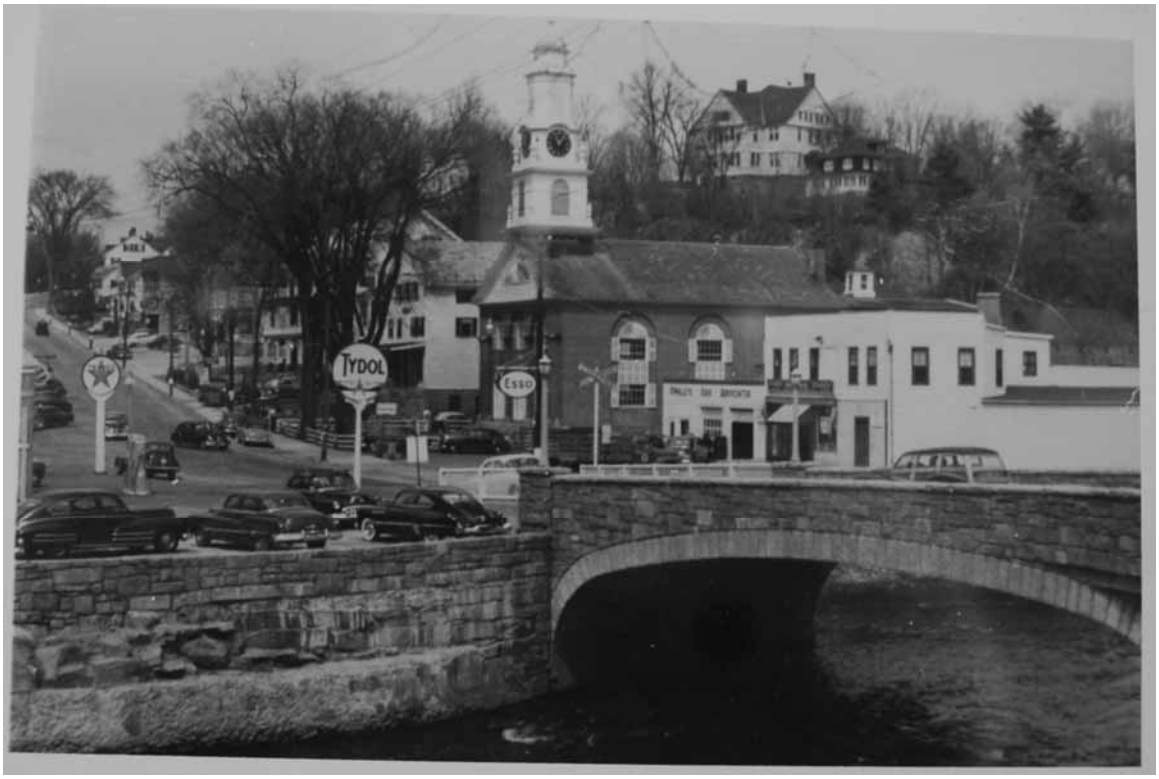
Looking east from west end of 1940-1941 bridge towards library (northeast) wingwall/retaining wall. Brick Block in background. Collection of Peterborough Historical Society.

South (upstream) face of new bridge, view 1940s. Collection of Peterborough Historical Society.



Looking west on Main Street, from east side of Contoocook River. View 1940s. Collection of Peterborough Historical Society.

Looking west from east end of 1940-1941 bridge, along Main Street. View 1940s. Collection of Peterborough Historical Society



Upstream (south) elevation of bridge, looking northwest. View around 1950. Collection of Peterborough Historical Society.

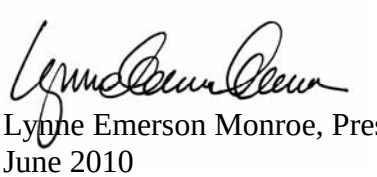
Looking west from east end of 1940-1941 bridge, along Main Street. View 1950s. Collection of Peterborough Historical Society

View 1970s, from above Pine Street. Collection of Peterborough Historical Society.

Looking west from east end of 1940-1941 bridge, along Main Street. View 1973. Collection of Peterborough Historical Society

Digital Photography Statement

I, the undersigned, confirm that the photos in this inventory form have not been digitally manipulated and that they conform to the standards set forth in the NHDHR Draft Digital Photo Policy (3/1/09-1/31/10). My camera was set to the following specifications: "fine" image quality (compression ratio 1:4) and "large" image size (3008 x 2000 pixels). These photos were printed using the following: HP Photosmart Pro B9280 printer using HP Vivera pigment inks on HP Premium Photo Paper, glossy.

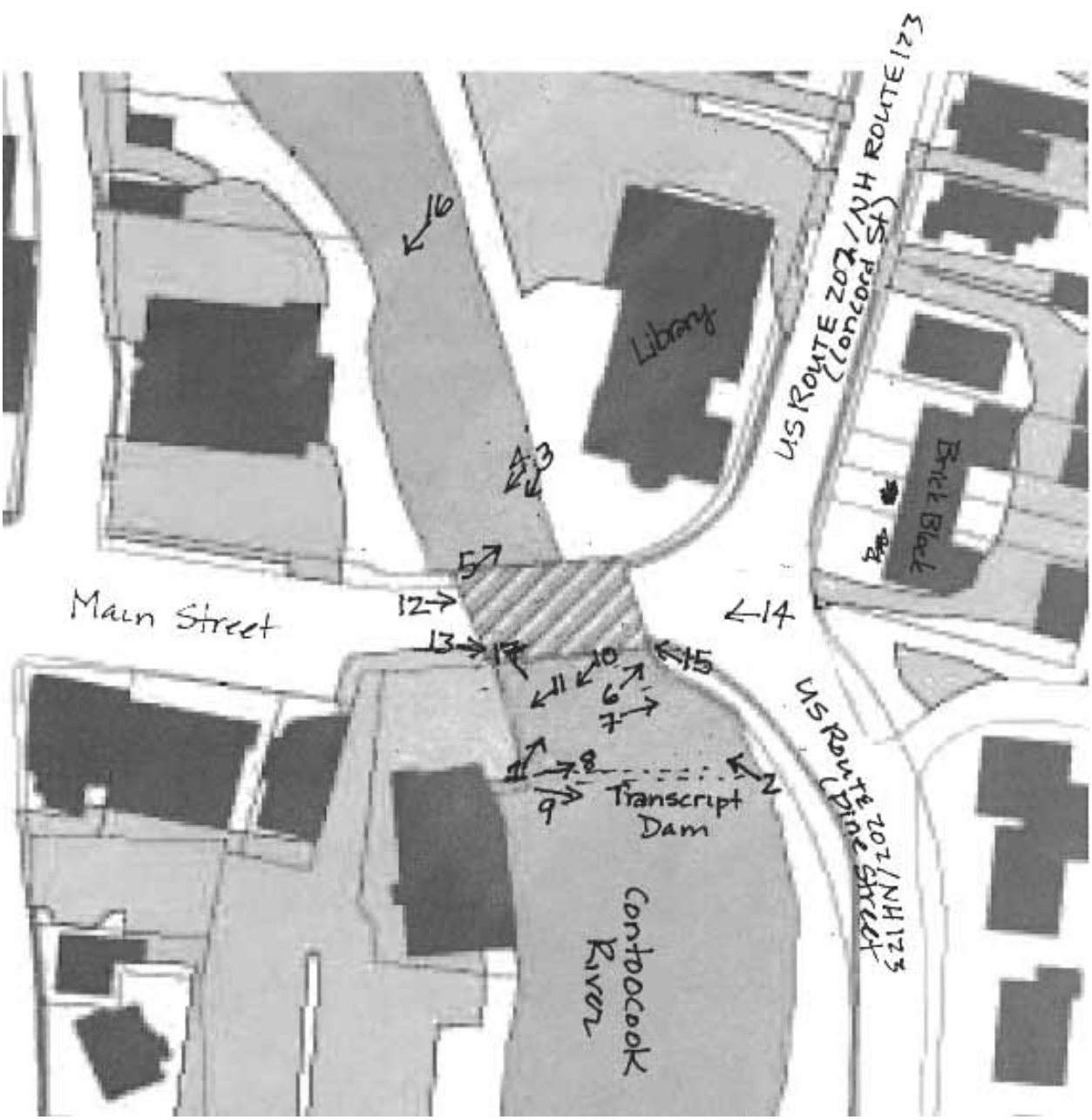


Lynne Emerson Monroe, Preservation Company
June 2010

Digital Photo Log

The photos for this project are named PET0028_01 through PET0028_17, where the first 7 digits are the survey number of the individual property and the last two digits are the photo number.

Photo Key


US Route 202/NH Route 123
(Concord St)
Library
Brick Block
Main Street
16
4
3
5
12
13
17
14
10
15
11
6
7
1
8
9
2
Transcript Dam
Contoocook River
US Route 202/NH 123
(Pine Street)

Address: Main Street Bridge Date taken: June 2010 Image files stored at: Preservation Company

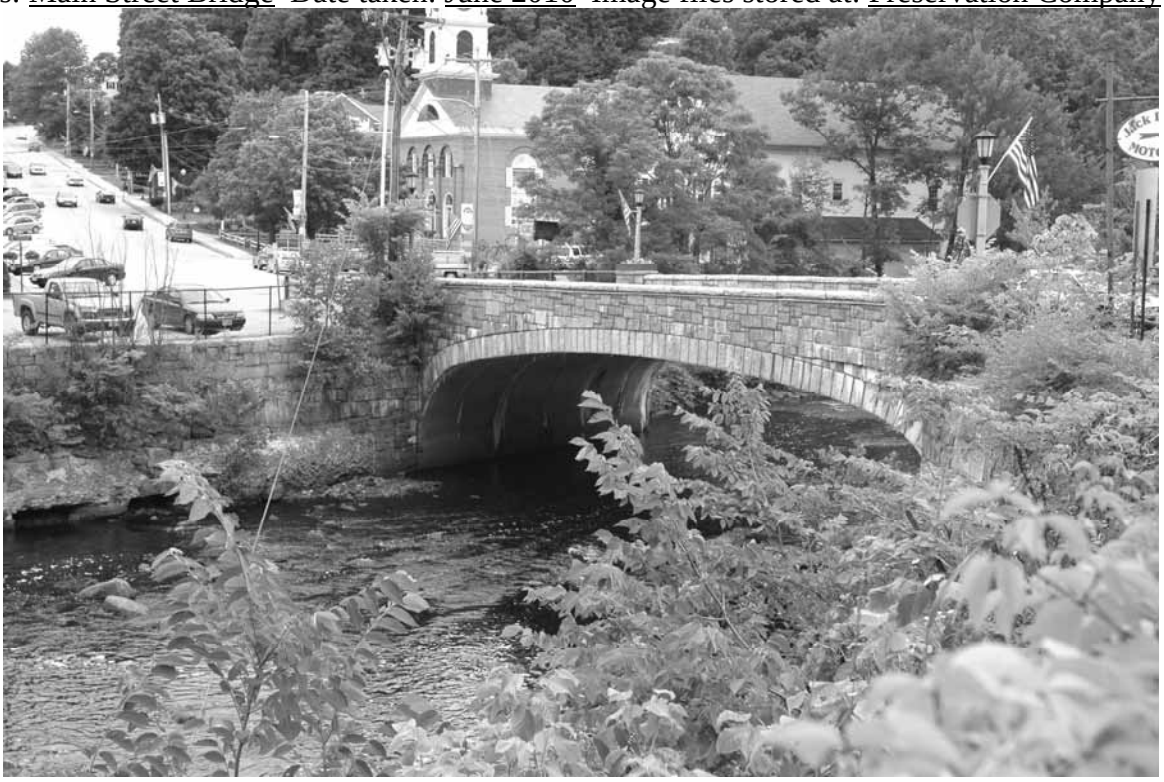


Photo 2: South elevation, looking northwest towards commercial and civic center
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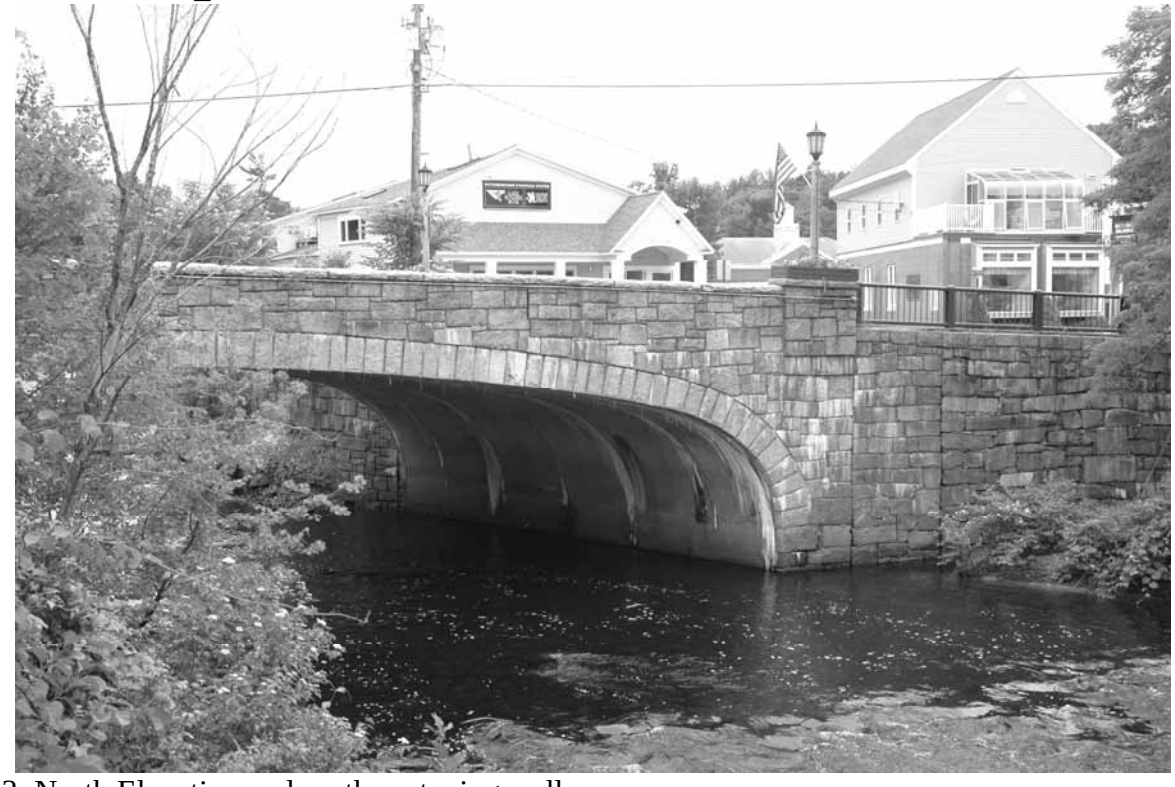

Photo 3: North Elevation and northwest wing wall
Image File: PET0028_03 Direction: SW

Photo 4: Northwest wing wall and older retaining wall with box channel
Image File: PET0028_04 Direction: SW

Photo 5: Northeast wingwall/library retaining wall
Image File: PET0028_05 Direction: NE

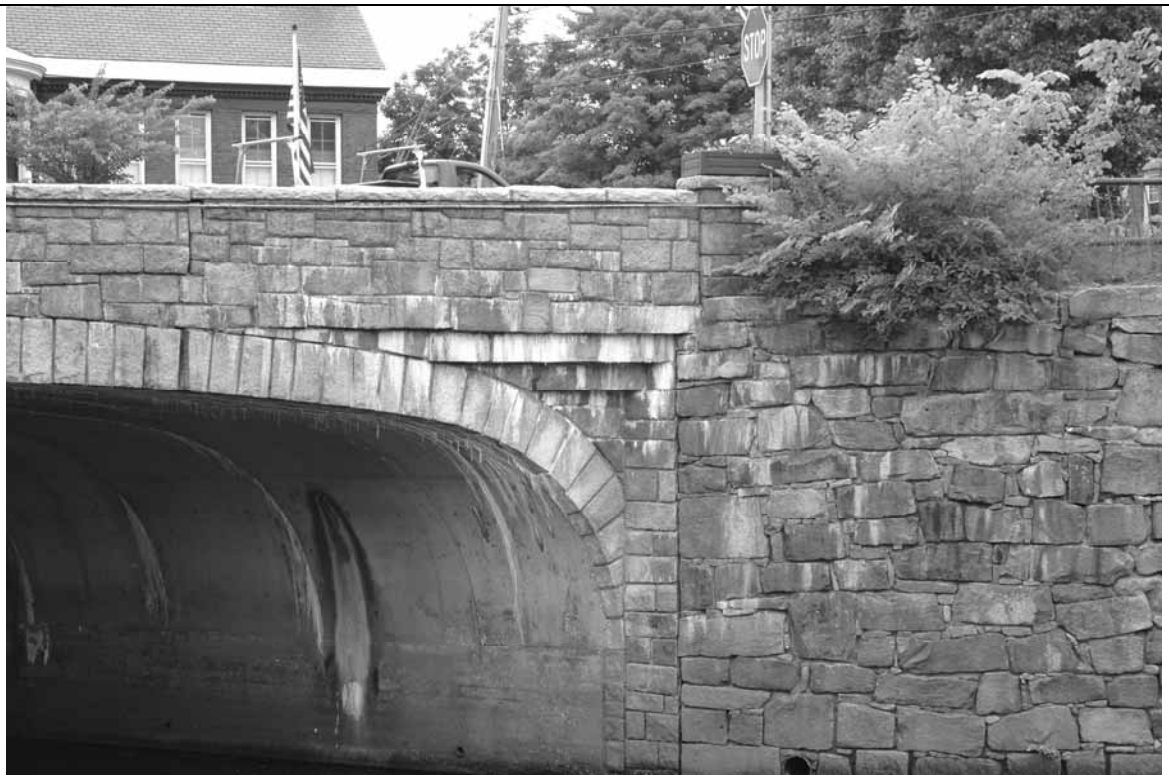

Photo 6: Southeast corner of bridge and southeast wing wall, detail of corbelling at top of leg
Image File: PET0028_06 Direction: NE

Photo 7: Southeast wing wall, detail
Image File: PET0028_07 Direction: E

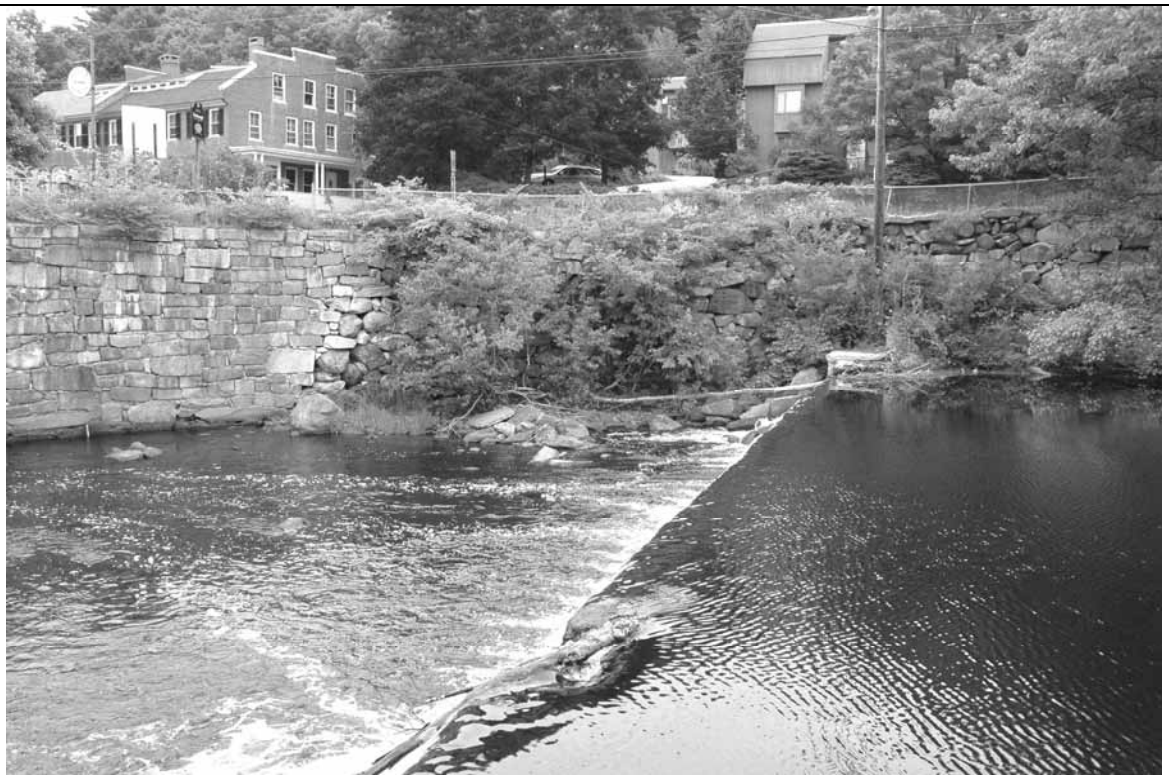

Photo 8: Southeast wing wall and N.H. Route 202 retaining wall and Transcript dam
Image File: PET0028_08 Direction: E

Photo 9: N.H. Route 202 retaining wall
Image File: PET0028_09 Direction: E

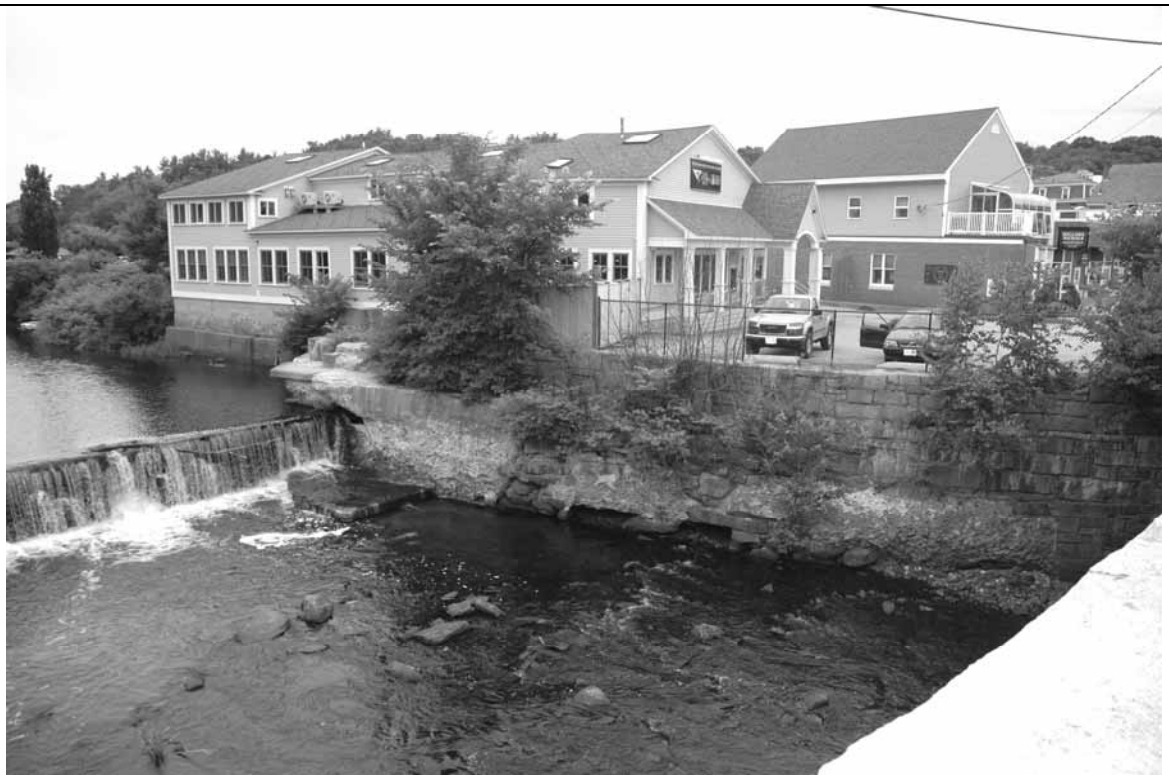

Photo 10: Southwest quadrant-wing wall, older retaining wall, and site of original grist mill
Image File: PET0028_10 Direction: SW

Photo 11: Detail of southwest wing wall and retaining wall with drainage channels from old grist mill
Image File: PET0028_11 Direction: SW

Photo 12: Looking east across bridge from west end with north sidewalk and railing and Brick Block in background
Image File: PET0028_12 Direction: E

Photo 13: Looking east along south sidewalk and stone-faced railing
Image File: PET0028_13 Direction: E

Photo 14: Looking west on Main Street towards town center from east end of bridge
Image File: PET0028_14 Direction: W

Photo 15: North side of bridge at road level with north railing and sidewalk.
Image File: PET0028_15 Direction: NW

Photo 16: Railroad footings north of bridge
Image File: PET0028_16 Direction: SW

Photo 17: Looking southeast from bridge towards Transcript Dam and N.H. Route 202 retaining wall
Image File: PET0028_17 Direction: SE