

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**

**Name, Location, Ownership**

- 1. Historic name General Sullivan Bridge
- 2. District or area N/A
- 3. Street and number Route 16 (Spaulding Turnpike)/  
Route 4 over Little Bay
- 4. City or town Newington and Dover
- 5. County Strafford and Rockingham
- 6. Current owner State of NH

**Function or Use**

- 7. Current use(s) Transportation: Pedestrian-related
- 8. Historic use(s) Transportation: Road-related

**Architectural Information**

- 9. Style N/A
- 10. Architect/builder Engineer: Fay, Spofford &  
Thorndike/ Contractor: Lackawanna Steel Construction  
Co. (superstructure); Crandall Engineering (substructure)
- 11. Source various (see 2004 form)
- 12. Construction date 1934
- 13. Source various (see 2004 form)
- 14. Alterations, with dates (since 2004) 2011: north  
approach and abutment reconstructed, south approach  
removed; 2010: pedestrian fence added
- 15. Moved? no  yes  date: \_\_\_\_\_

**Exterior Features**

- 16. Foundation Concrete
- 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: \_\_\_\_\_

**Site Features**

- 25. Setting Suburban neighborhood; Waterfront
- 26. Outbuildings N/A
- 27. Landscape features Little Bay
- 28. Acreage 0.68 acres



- 35. Photo #1 Direction: SE
- 36. Date July 2018
- 37. Reference (file name or frame#): DOV0158 1

- 29. Tax map/parcel # N/A
- 30. State Plane Feet (NAD83) X: 1,208,717.2  
Y: 226,286.7

- 31. USGS quadrangle and scale Portsmouth 1:24,000

**Form prepared by**

- 32. Name Nicole Benjamin-Ma
- 33. Organization VHB
- 34. Date of survey July 2018

**39. LOCATION MAP:**



**40. PROPERTY MAP:**

(see next page)

**40. PROPERTY MAP:**



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

(updated August 2018)

The 2004 inventory form details the history and significance of three other Fay, Spofford & Thorndike (FST) bridge designs, which with the General Sullivan Bridge, advanced the design of, and encouraged the nation-wide adoption of, long-span continuous truss bridges. These include the Lake Champlain Bridge carrying NY Route 185 and VT Route 17 between Crown Point, NY and Chimney Point, VT (designed 1927), the Sagamore Bridge carrying MA Route 6 over the Cape Cod Canal in Sagamore, MA (completed 1935), and the Bourne Bridge carrying MA Route 28 across the Cape Cod Canal in Bourne, MA (completed 1935) – the latter two are often referred to as the “Cape Cod Canal bridges.” All four bridges exhibit the distinctive and aesthically-pleasing composition of a center arched through truss with deck side trusses. Changes have been made to these bridges since the 2004 inventory form. The Lake Champlain Bridge was demolished in 2009 and replaced with a network tied arch design, which visually references the center through truss design of the earlier bridge. The Cape Cod Canal bridges are still in service, with minor recent alterations related to maintenance, such as roadway deck replacement.

The 2004 form briefly discusses some additional early, 1920s highway continuous bridge designs, including two examples from Portland, OR, and two Midwest examples from Missouri and Illinois. The two Portland bridges – the Ross Island Bridge and the Sellwood Bridge – were designed by Gustav Lindenthal to span the Willamette River, and opened in 1927. The Ross Island Bridge is a cantilevered deck truss bridge of continuous design; the roadway deck and railings were recently replaced and the bridge is extant. The Sellwood Bridge had a main span comprising a four-span continuous Warren deck truss, and was replaced in 2016. The old US 36 Missouri River Bridge carried US 36 between St. Joseph, MO, and Elmwood, KS, and was a continuous through truss bridge completed in 1929 by the firm of Sverdrup and Parcel. It was replaced in 1984. In 1930, the Strauss Engineering Company completed the Quincy Memorial Bridge, carrying US 24 over the Mississippi River in Quincy, IL. An evaluation is underway for the potential replacement of this bridge.

**43. Architectural Description and Comparative Evaluation:**

(updated August 2018)

Alterations since 2004:

As part of the construction of the new Little Bay Bridge, the north and south approaches to the adjacent General Sullivan Bridge were re-routed in 2011. Now often referred to collectively as the Little Bay Bridges, this set of two bridges currently carries the Spaulding Turnpike (Route 16) over the Little Bay, bypassing the General Sullivan Bridge. As noted in the 2004 inventory form, by the 1960s, increased traffic necessitated the construction of the Eastern Turnpike Bridge, which carried southbound turnpike traffic while the General Sullivan Bridge continued to carry northbound traffic. In the 1980s, a second bridge was constructed directly adjacent to the Eastern Turnpike Bridge to carry the northbound traffic, known as the Capt. John Rowe Bridge. Together, the twin bridges carried traffic in both directions, bypassing the General Sullivan Bridge completely for automobile transportation. By the early 1990s, the General Sullivan Bridge was in use as a dedicated crossing for pedestrians and bicycle traffic.

Increasing traffic demands resulted in alterations to the Little Bay crossing once again beginning in 2011, when construction started on a new Little Bay Bridge. Built between the Eastern Turnpike Bridge and the General Sullivan Bridge, the new bridge carries southbound traffic, while the rehabilitated older bridges together carry northbound traffic. To facilitate the construction of the north roadway approach of the adjacent Little Bay Bridge, the north approach to the General Sullivan Bridge was rerouted, and a new pedestrian/bike support structure was constructed to connect the General Sullivan Bridge to Hilton Park and Dover Point Road/Hilton Drive (Photos 2-7, 11).

The new structure begins approximately 155 feet northwest of the bridge, and consists of two sections. The structure begins on the west side of Dover Point Road/Hilton Drive as an elevated ramp, supported on retained fill with a three-sided mechanically stabilized earth (MSE) wall with precast panel facing designed to look like stone blocks (Photos 3 and 11). A 3.5-foot-high metal post railing lines both sides of the ramp. At the south end of the MSE wall portion, a two-span, continuous I-girder bridge ties into the deck of the General Sullivan Bridge (Photos 3-5, 7). The recent bridge structure follows a curved, serpentine shape on the horizontal plane to meet the earlier bridge deck. It is supported on piers comprising single-drilled shafts and cast-in-place reinforced caps (see attached plans, Figures 1-4).

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**

The concrete wingwall and approach embankment on the north side of the General Sullivan Bridge were removed, exposing the back of the original north bridge abutment, which was nearly entirely reconstructed (Photos 6-7). As described in the 2009 inventory form update, the original abutment was a closed end, bin type abutment, consisting of concrete walls that create a container into which fill is added. As part of the 2011 project, the abutment was reconstructed on the original seat and footing (Photo 7). The front of the concrete seat was refaced, and the wingwalls removed. The new abutment is a stub abutment on a spread footing, rising approximately 2.5 to 4 feet above the footing (the shorter height reflecting the water side). It serves as an open end abutment, as it does not retain an embankment or fill behind it. It is somewhat unconventional, as the 2011 pedestrian/bike support structure and the General Sullivan Bridge meet at the abutment, meaning the abutment shares some characteristics with a wall-type pier as well.

Although no reconstruction occurred at the south end of the General Sullivan Bridge, the vehicular approach leading northwest towards the bridge from Shattuck Way was removed. A paved curvilinear path was added southwest of the former approach, to serve pedestrians and bicycles between Shattuck Way and the bridge.

The general condition of the bridge has declined since 2004. Detailed inspections of the bridge determined it was in critical condition, and the exterior portions of the deck exhibit advanced deterioration. In 2015, chain link fencing was added to the center of the bridge along the entire length, as a safety measure to keep pedestrians away from the outside deck extremes (Photos 12-13, 16). Truss members exhibit section loss, pack rust, and corrosion holes, and the underwater piers have damage from sulfates and were in need of repointing (VHB and HDR for NHDOT 2017: 3).

**Comparable Properties:**

The 2004 inventory form noted that the identification of directly comparable bridges within NH is problematic, as there were no other long-span continuous truss bridges built during this era. Based purely on bridge length, the form noted that only four extant bridges (as of 2004) were longer than the General Sullivan Bridge: the Sarah Mildred Long Bridge, carrying the Route 1 Bypass over the Piscataqua River between Portsmouth, NH, and Kittery, ME (1940); the Piscataqua River Bridge, carrying I-95 over the Piscataqua River between Portsmouth and Kittery (1971); the 1966 Eastern Turnpike Bridge; and the 1984 Capt. John Rowe Bridge. Since the 2004 form, the Sarah Mildred Long Bridge closed in 2016 and was replaced in 2018, and the Eastern Turnpike Bridge and Capt. John Rowe Bridge were heavily rehabilitated as the northbound Little Bay Bridge and reopened in 2017.

Other comparable bridges mentioned in the 2004 inventory form were the three earlier FST bridges (see update to #41. Historical Background and Role in the Town or City's Development, above), and a 2005 historic context for the General Sullivan Bridge groups these four FST bridge designs as defining the early development period for continuous truss highway bridge design in the United States (Casella 2005: 2). During this early period, between 1927 and 1937, these canonical four bridges proved the feasibility and potential economy of continuous truss design, influencing its use throughout the 20<sup>th</sup> century. It should be noted that an additional example of a continuous truss bridge, also utilizing an arched main span with flanking suspended deck spans, was later constructed in Amesbury and Newburyport, MA, just 25 miles south of the General Sullivan Bridge. Carrying I-95 over the Merrimack River at a comparably wide crossing at 1,346 feet, the John Greenleaf Whittier Bridge ("Whittier Bridge") was designed by the Massachusetts Department of Public Works and constructed in 1951. Although built outside of the early development period for continuous truss design, the bridge is noted as being based on the Bourne Bridge and Sagamore Bridges over the Cape Cod Canal, with the three main span lengths measuring exactly half that of the earlier canal bridges. The historic bridge inventory form for the bridge suggests that the adaptation resulted in "visual awkwardness," lacking the aesthetic impact of the canal bridges (S.J. Roper and MassDOT, AME.927/NWB.930, 1990). The Whittier Bridge was replaced in 2016.

**44. National or State Register Criteria Statement of Significance:**

(updated August 2018)

A 2005 determination of eligibility (DOE) by DHR, finalized in 2006, determined the property eligible for the National Register under Criteria A and C at the state level; the 2004 inventory form also argues that the bridge conveys national significance under Criterion C as an early and highly-influential example of continuous truss highway design in the United States. The General Sullivan Bridge retains its historic significance, and this significance has been enhanced by the subsequent loss of comparable bridges, namely the Lake Champlain Bridge (Crown Point, NY and Chimney Point, VT), the Sarah Mildred Long Bridge (Portsmouth, NH and Kittery, ME), the Sellwood Bridge (Portland, OR), the US 36 Missouri River Bridge (St. Joseph, MO and Elmwood, KS), and the potential looming replacement of the Quincy Memorial Bridge (Quincy, IL).

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**

**45. Period of Significance:**

(updated August 2018)

The previous DOE used a period of significance of 1934 to 1955, reflecting the date of construction through the 50-year cutoff date. The ending date of the period of significance should be updated to 1968, reflecting the current 50-year cutoff date.

**46. Statement of Integrity:**

(updated August 2018)

Despite the 2011 replacement of the north approach and abutment to the bridge from Dover, and the adjacent construction of the Little Bay Bridge, the General Sullivan Bridge retains a high degree of integrity, comparable to the level discussed in the 2004 form and 2005-2006 DOEs. The losses of the south vehicular approach, north approach, and north abutment impacted two contributing features of the historic structure; however, as the engineering significance of the bridge is associated with its overall continuous truss design, the signature engineering and aesthetic features remain intact. Subsequent deterioration has affected the physical historic integrity of the bridge, but the historically significant features of the structure are still evident. Thus, the bridge retains a high degree of integrity of location, design, materials, workmanship, feeling, and association.

The addition of the Little Bay Bridge in 2011 directly adjacent to the General Sullivan Bridge has affected the setting of the bridge, impeding viewsheds to and from the bridge on the east side. However, the setting on the west side of the bridge, overlooking the Little Bay, Dover Point, and Hilton Park, is largely intact, so while the integrity of setting has been diminished, it has not been eliminated.

**47. Boundary Discussion:**

(updated August 2018)

The eligible boundary of the General Sullivan Bridge includes the footprint of the bridge itself up to its abutments. Since the last DOE was finalized in January 2006, the north approach and north abutment have been rebuilt, and the south approach removed. Therefore, the north approach from Dover Point Road and the south approach from Shattuck Way have been excluded from the boundary of the eligible property in the current evaluation. As the north abutment is integral to the structure, its exclusion from the eligible boundary is not practicable; however, the north abutment is considered non-contributing.

The balance of the previous boundary, as established in a January 2006 addendum to the DOV0158 inventory form and confirmed in a DOE dating from the same month, remains the same.

**48. Bibliography and/or References:**

Casella, Richard M., for Preservation Company and NHDOT, "National Historic Context and Significance of the General Sullivan Bridge," October 2005.

Illinois Department of Transportation, <http://www.quincymemorialbridge.com/>, accessed July 2018.

Jergensen, Kurt, MA Department of Transportation, pers. comm. with N. Benjamin-Ma, VHB, July 5, 2018.

Roper, Stephen J. and MassDOT, "John Greenleaf Whittier Bridge," Massachusetts Historic Bridge Inventory Form (AME.927/NWB.930), revised 1990.

Vanasse Hangen Brustlin, Inc. (VHB) and HDR Engineering, Inc., for NHDOT, "Type, Size and Location Study for the General Sullivan Bridge – Dover 200/023 over the Little Bay: Newington-Dover, 11238S." March 15, 2017.

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**

**Surveyor's Evaluation:**

NR listed: individual \_\_\_\_\_  
within district \_\_\_\_\_

NR eligible: individual   x   \_\_\_\_\_  
within district \_\_\_\_\_  
not eligible \_\_\_\_\_  
more info needed \_\_\_\_\_

NR Criteria: A   x   \_\_\_\_\_  
B \_\_\_\_\_  
C   x   \_\_\_\_\_  
D \_\_\_\_\_  
E \_\_\_\_\_

Integrity: yes   x   \_\_\_\_\_  
no \_\_\_\_\_

INDIVIDUAL INVENTORY FORM

NHDHR INVENTORY # DOV0158

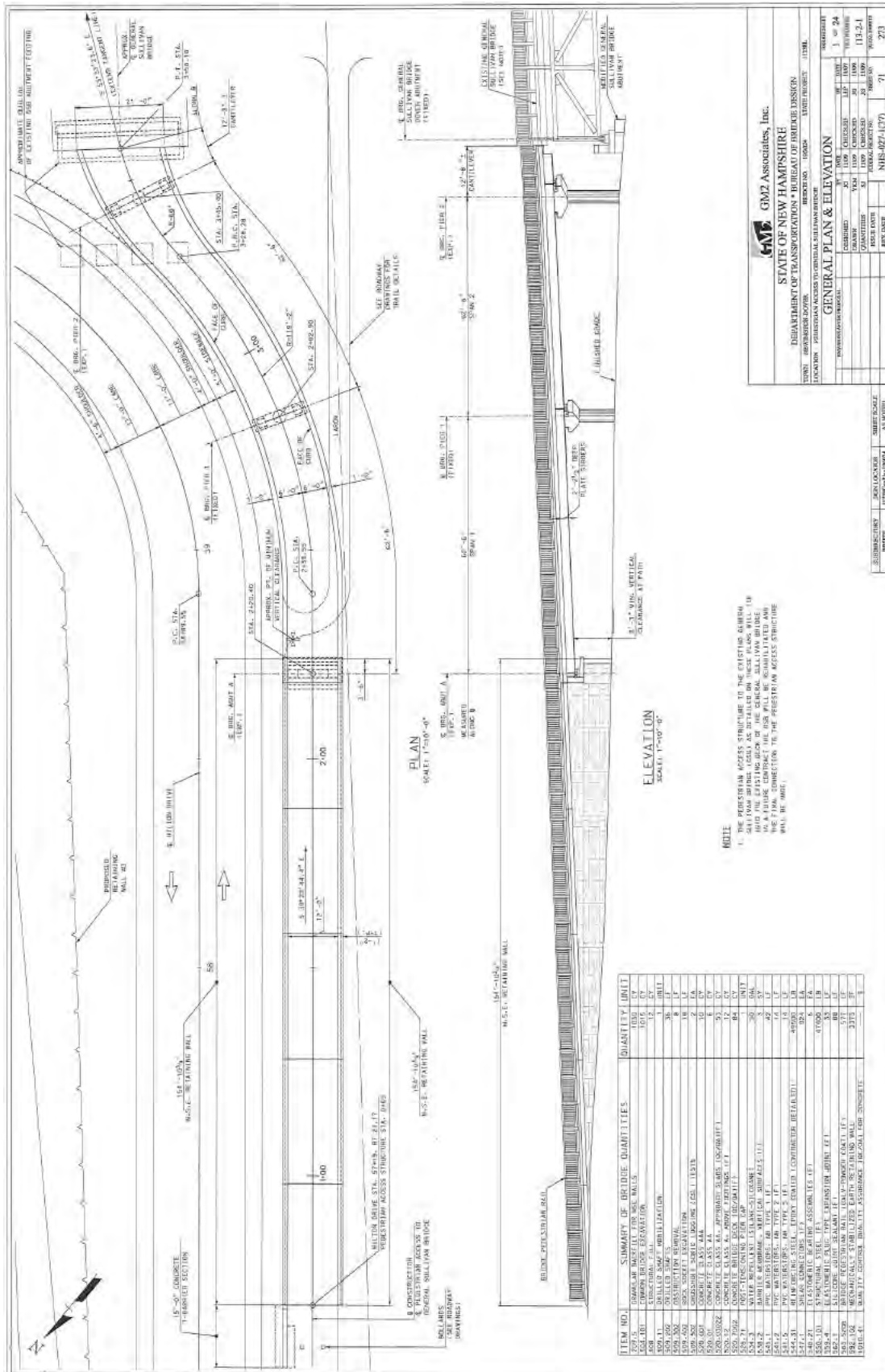


Figure 1. 2009 plans for the new north bridge approach and abutment modification, General Plan and Elevation.



INDIVIDUAL INVENTORY FORM

NHDHR INVENTORY # DOV0158

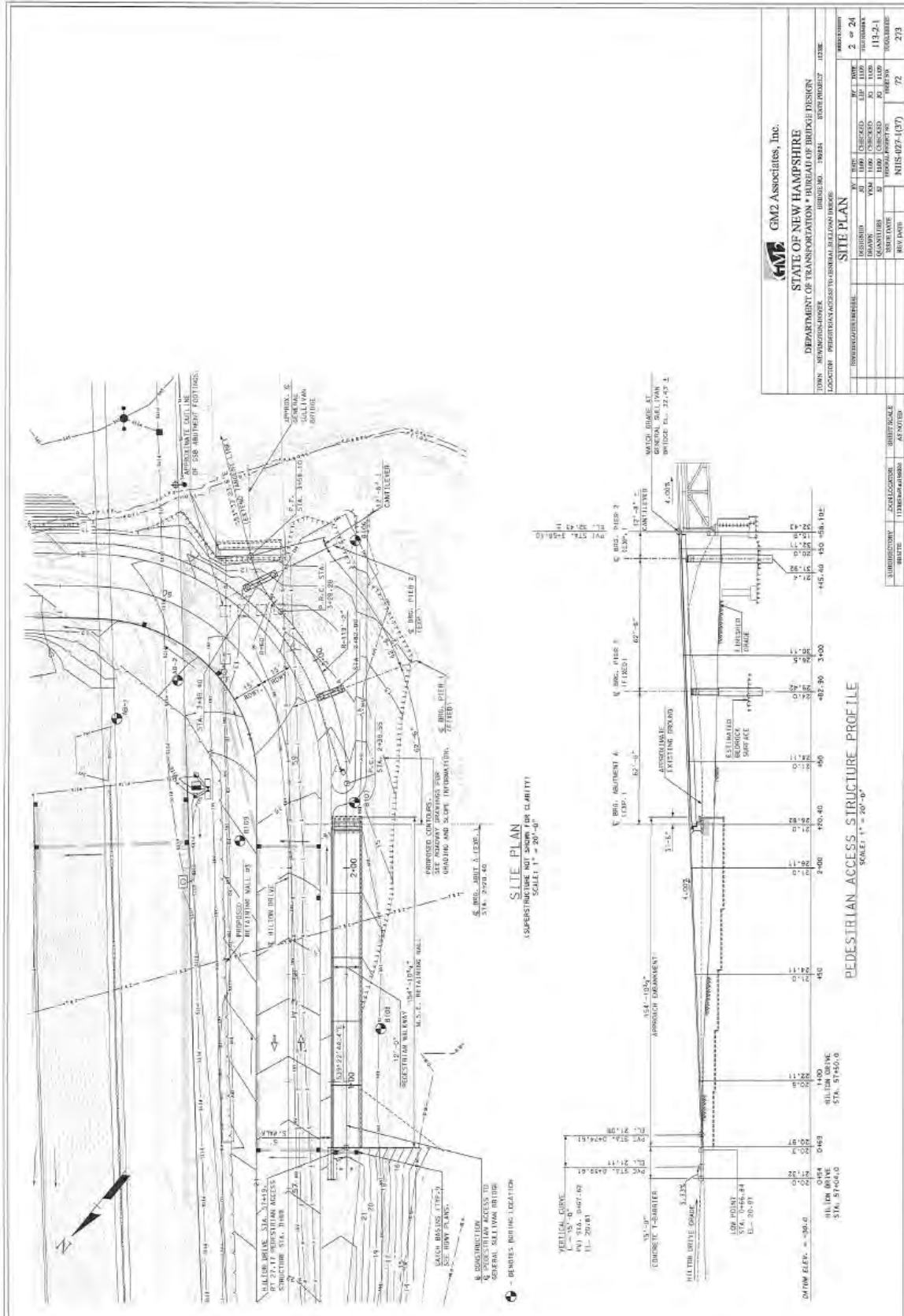


Figure 2. 2009 plans for the new north bridge approach and abutment modification, Site Plan.

# INDIVIDUAL INVENTORY FORM

# NHDHR INVENTORY # DOV0158

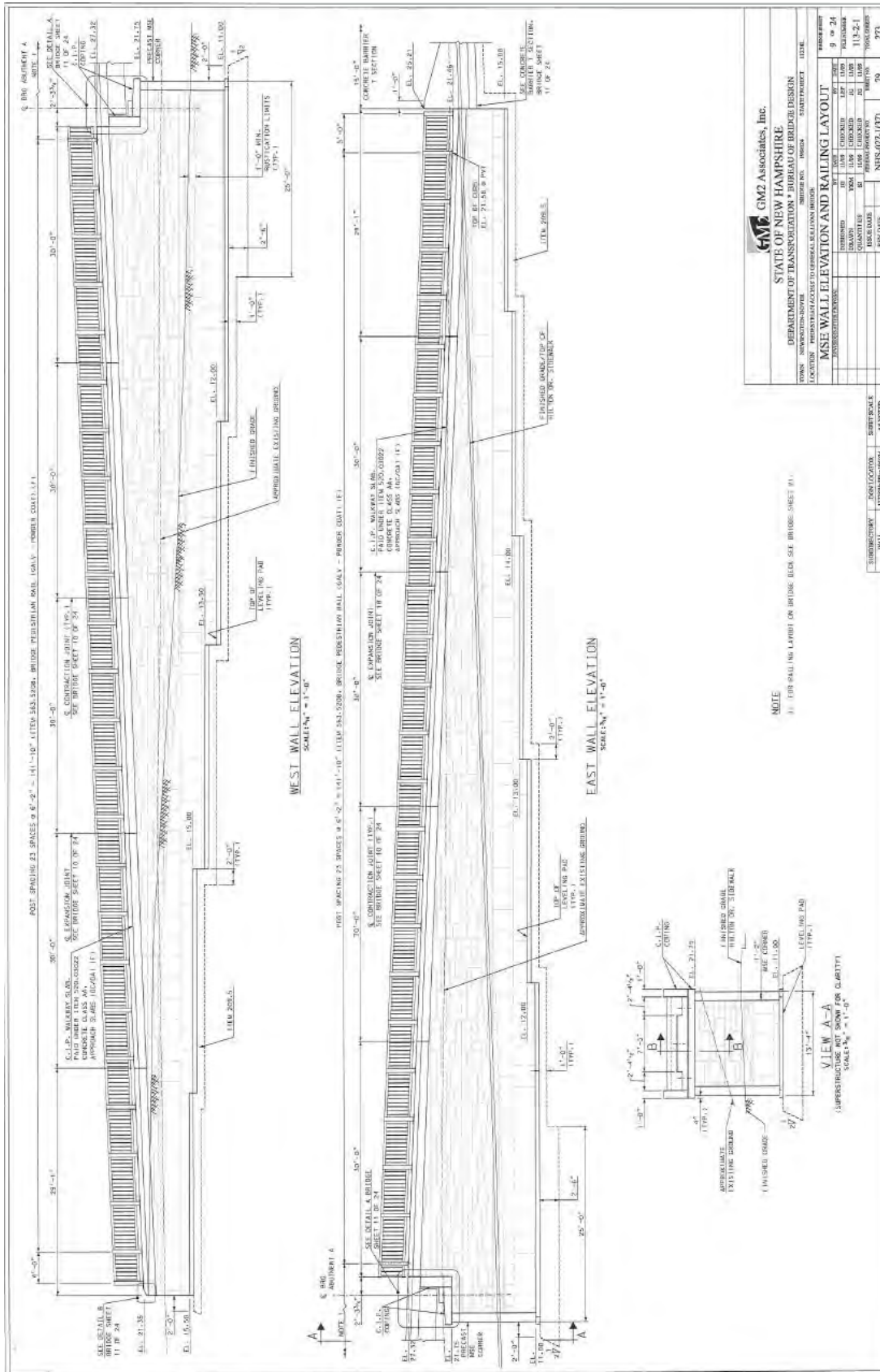


Figure 3. 2009 plans for the new north bridge approach and abutment modification, MSE Wall Elevation and Railing Layout.

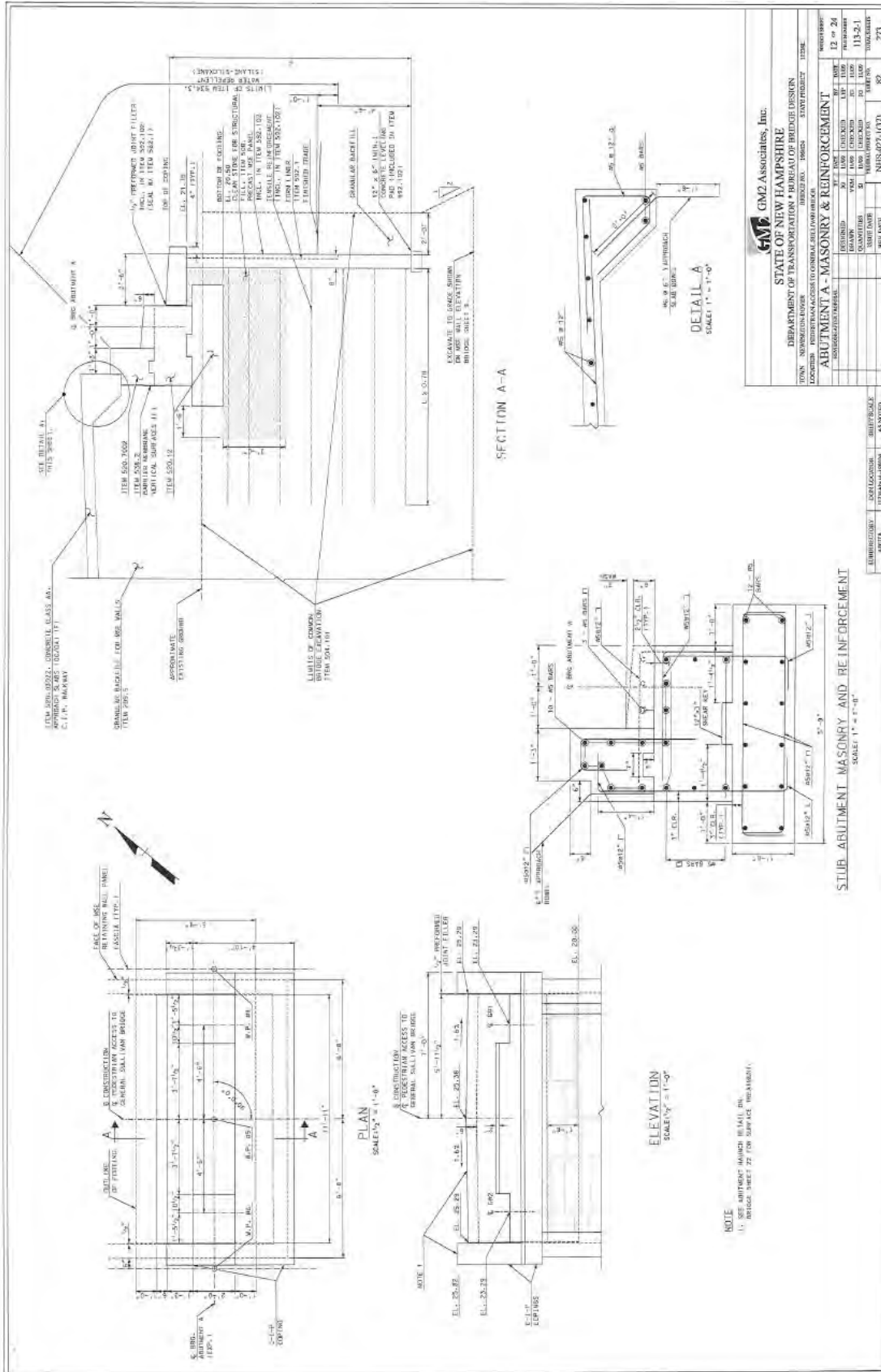


Figure 4. 2009 plans for the new north bridge approach and abutment modification, Abutment A – Masonry & Reinforcement.

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**

**Photograph Index**

Photo #1	DOV0158_1	Overview of GSB, west side, from Hilton Park	Photographer facing SE	July 2018
Photo #2	DOV0158_2	Overview of GSB north approach, replaced 2011	Photographer facing SE	July 2018
Photo #3	DOV0158_3	GSB north approach, elevated ramp on right, I-girder section in center	Photographer facing SE	July 2018
Photo #4	DOV0158_4	GSB north approach, I-girder section as seen from Hilton Drive	Photographer facing W	July 2018
Photo #5	DOV0158_5	GSB north approach, abutment, and deck truss spans	Photographer facing SE	July 2018
Photo #6	DOV0158_6	Back (land side) of north abutment	Photographer facing SE	July 2018
Photo #7	DOV0158_7	Detail of connection between 2011 pedestrian approach and GSB span, north abutment (water side) in center	Photographer facing N	July 2018
Photo #8	DOV0158_8	GSB piers (right) and LBB piers (left)	Photographer facing SE	July 2018
Photo #9	DOV0158_9	Overview of GSB from Hilton Park	Photographer facing SE	July 2018
Photo #10	DOV0158_10	Center arch truss span	Photographer facing SE	July 2018
Photo #11	DOV0158_11	Entrance to north approach, constructed 2011	Photographer facing SE	July 2018
Photo #12	DOV0158_12	Overview of GSB at paved path level, showing safety fencing	Photographer facing SE	July 2018
Photo #13	DOV0158_13	Center arch truss from paved path level	Photographer facing SE	July 2018
Photo #14	DOV0158_14	Closeup of center arch truss from roadway level	Photographer facing SE	July 2018
Photo #15	DOV0158_15	View of Little Bay from GSB, Fox Point in Newington in background	Photographer facing W	July 2018
Photo #16	DOV0158_16	GSB from south approach, note LBB on right	Photographer facing NW	July 2018
Photo #17	DOV0158_17	Continuation of pedestrian path toward Shattuck Way and Nimble Hill Road from south end of GSB	Photographer facing S	July 2018

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**

Date photos taken: July 2018



Photo # 2 Description: Overview of GSB north approach, replaced 2011  
Reference (file name or frame#): DOV0158\_2

Direction: SE



Photo # 3 Description: GSB north approach, elevated ramp on right, I-girder section in center  
Reference (file name or frame#): DOV0158\_3

Direction: SE

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**



Photo # 4 Description: GSB north approach, I-girder section as seen from Hilton Drive  
Reference (file name or frame#): DOV0158\_4 Direction: W



Photo # 5 Description: GSB north approach, abutment, and deck truss spans  
Reference (file name or frame#): DOV0158\_5 Direction: SE

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**



Photo # 6 Description: Back (land side) of north abutment  
Reference (file name or frame#): DOV0158\_6

Direction: SE



Photo # 7 Description: Detail of connection between 2011 pedestrian approach and GSB span, north abutment  
(water side) in center

Reference (file name or frame#): DOV0158\_7

Direction: N

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**



Photo # 8 Description: GSB piers (right) and LBB piers (left)  
Reference (file name or frame#): DOV0158\_8

Direction: SE



Photo # 9 Description: Overview of GSB from Hilton Park  
Reference (file name or frame#): DOV0158\_9

Direction: SE



**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**



Photo # 10 Description: Center arch truss span  
Reference (file name or frame#): DOV0158\_10

Direction: SE



Photo # 11 Description: Entrance to north approach, constructed 2011  
Reference (file name or frame#): DOV0158\_11

Direction: SE

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**



Photo # 12 Description: Overview of GSB at paved path level, showing safety fencing  
Reference (file name or frame#): DOV0158\_12 Direction: SE



Photo # 13 Description: Center arch truss from paved path level  
Reference (file name or frame#): DOV0158\_13 Direction: SE

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**



Photo # 14 Description: Closeup of center arch truss from roadway level

Reference (file name or frame#): DOV0158\_14

Direction: SE



Photo # 15 Description: View of Little Bay from GSB, Fox Point in Newington in background

Reference (file name or frame#): DOV0158\_15

Direction: W

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**



Photo # 16 Description: GSB from south approach, note LBB on right  
Reference (file name or frame#): DOV0158\_16

Direction: NW



Photo # 17 Description: Continuation of pedestrian path toward Shattuck Way and Nimble Hill Road from south end of GSB, partially on former alignment of south vehicular approach.  
Reference (file name or frame#): DOV0158\_17

Direction: S

**INDIVIDUAL INVENTORY FORM**

**NHDHR INVENTORY # DOV0158**

**PHOTO KEY IS LOCATED ON PAGE 3, #40 "Property Map"**

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 Photo Policy. These photos were printed at the following commercial printer OR were printed using the following printer, ink, and paper: Canon Pixma MG7720, Canon Photo Plus Paper Glossy, and Canon CLI-271 inks. (Color photos must be professionally printed.)  
The negatives or digital files are housed at/with: VHB, Watertown, MA.

**SIGNED:**

*Nicole J. Benjamin-Ma*