BRIDGE REPLACEMENTOPTIONS STUDY

SOUTH MAIN STREET OVER ASSONET RIVER
FREETOWN, MASSACHUSETTS

Prepared For:

Town of Freetown

GPI

www.gpinet.com

JANUARY 2024

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Executive Summary

The South Main Street Bridge Study was initiated to assess the options for repairing or replacing the South Main Street stone arch bridge at the Assonet River crossing. The project location is a few hundred feet south of the intersection with Elm Street (Figure 1).

Figure 1: Project Location

The current South Main Street Bridge over the Assonet River is a single span, stone arch bridge constructed in 1886. The bridge provides approximately 24 feet of pavement, along with a single 4-foot sidewalk on the west side of the bridge. Stone parapets line both sides over the structure, with the parapets on the west side having been struck many times by errant vehicles failing to negotiate the roadway curve in the northbound direction. The Massachusetts Department of Transportation (MassDOT) inspects the bridge on a two-year cycle. Prior to the recent bridge rehabilitation in 2019, MassDOT noted a number of missing and cracked stones in the arch. In addition, large voids behind the arch stones were detected, as well as behind the

Photo 1: South Main Street over Assonet River Roadway

wingwalls on the corner of the structure. The voids were particularly pronounced below the tide line, as tidal flows continued to wash away material behind the arch. In addition, a longitudinal crack had formed across the arch from south to north. This crack indicates that the bridge is in the process of splitting in two, resulting in the bridge being inadequate to support vehicle loading adjacent to the crack.

Many of these issues were addressed with the recent bridge rehabilitation project performed in 2019. However, the crack formed during construction, and without removal of the fill over the arch, there was no repair option for the longitudinal crack. The bridge rehabilitation did slow down the process, but the problem exists and will need to be addressed.

Photo 2: Underside of arch after rehabilitation project in 2019

GPI performed field visits during the rehabilitation project in 2019. Based on the fieldwork, review of the MassDOT Inspection Reports, and discussion with the Town of Freetown, GPI developed conceptual designs for three preliminary options to replace the South Main Street Bridge over the Assonet River. Options 1 and 2 are replacement options. Option 3 is for rehabilitation.

- Option 1 is to replace the stone arch with a precast concrete arch. Three (3) different roadway/sidewalk options have been considered: a) match the 24-foot roadway width of the existing bridge and provide a minimum 5-foot sidewalk on the west side, along with minor revisions to the alignment; b) widen the bridge to 26 feet of roadway to provide 2-foot shoulders on each side, along with a 5-foot sidewalk; and c) widen the bridge to provide 26 feet of roadway and add a second sidewalk.

- Option 2 also involves replacing the stone arch with a precast concrete arch; however, the project would be constructed under the state's Transportation Improvement Program (TIP), utilizing state and federal funding sources. As such, the design of the

bridge would be required to meet MassDOT Complete Streets requirements to the maximum extent possible. This would mean that the bridge and both roadway approaches would be widened significantly.

- Option 3 is to rehabilitate the existing stone arch with the addition of a concrete saddle and relieving slab to help mitigate the cracking in the existing stone arch. This option would allow for a lower construction cost and shorter construction duration but would not provide as long a term solution as replacement.

For conceptual and cost estimate purposes, GPI assumed a standard precast arch size, however, other structure types can be considered. The following sections of the report go into all options in more detail. Conceptual sketches for all options can be found in Appendix A: Conceptual Plans, and preliminary construction cost estimates are in Appendix B: Cost Estimates.

Bridge Options

Option 1: Replacement of the Arch with a Precast Concrete Arch (Locally Funded)

In this option, a precast reinforced concrete arch is installed to replace the stone arch. The original stone fasciae are retained and reinstalled on both sides to maintain the historic look of the bridge. This will allow for long-term solution with a modern structure while replicating the historic appearance of the bridge. Appendix A includes plan, elevation and section views of this option.

There are three sub-options for the precast arch bridge replacement: a) maintaining the existing bridge width and roadway geometry, b) slightly widen the bridge to match the existing roadway width on either side or c) widen the bridge to provide sidewalks on both sides.

a) Maintaining the existing 24-foot roadway width of the bridge will leave the two 11-foot travel lanes, two 1-foot shoulders and a 5-foot sidewalk. The existing horizontal alignment of the roadway across the bridge will be slightly improved, while the vertical alignment would be maintained. A minimal land taking of the 14 South Main Street property on the southwest side of the bridge will be required.

b) Widening the bridge by 2 feet to 26 feet will provide an additional foot of shoulder width on each side, along with a 5-foot sidewalk on the west side. The existing alignment of the roadway across the bridge will again be slightly improved, with a minimal taking of the 14 South Main Street property. No significant changes in the vertical alignment would be made.

a) Widening the bridge to provide two 11-foot travel lanes, two 2-foot shoulders and a 5-foot sidewalk on both sides. This would allow for a sidewalk along the east side of South Main Street to Nottingham Way. Residents would be able to walk from Nottingham Way to points north of the bridge, eliminating the need for pedestrians to cross South Main Street. The alignment of the roadway across the bridge will be improved, however this option would require the relocation of 2 utility poles, and the potential removal of the trees adjacent to the northeast and southeast corners of the bridge. Land takings would be required to varying degrees on all 4 quadrants of the intersection.

All three of the sub-options include extensive excavation and significant work in the roadway to replace the arch. The closure of South Main Street will be required and the impact to traffic will include a detour for the duration of construction.

The environmental impacts of this option will involve removing and replacing the existing foundations in the river and will require temporary cofferdams to protect the sensitive water resource areas during construction.

Right-of-Way (ROW) acquisition is expected to vary for each of the sub-options and will range from limited to significant. Additionally, temporary easements (or rights of entry) are anticipated to accommodate construction staging and tying back into the existing wingwalls and sidewalk at the limits of construction.

The matrix provided in Appendix C provides a summary of the costs, property impacts, design and construction schedule and environmental permitting required for the project.

Option 2: Replacement of the Arch with a Precast Concrete Arch (State Funded)

This option is similar to Option 1, however, the design requirements for a project on the state's Transportation Improvement Program (TIP) are significantly different. A project on the TIP is generally funded by a combination of state and federal monies. These funding sources require permitting and reviews by numerous state and federal agencies that would not normally be required of a town-funded project. In addition, the review process takes place over several design submissions, increasing both the costs and schedule by 3 to 4 times the local process.

In addition, to be eligible for state and federal funding, MassDOT requires the design to meet Complete Streets guidelines. Complete Streets typically require that 5-foot shoulders be incorporated into the design for bicyclists, as well as requiring a sidewalk on both sides of the roadway and bridge. This will involve widening the bridge to 44 feet to provide two 11-foot travel lanes, two 5-foot shoulders and two 6-foot sidewalks. The stone facade would be replaced on each side of the arch in accordance with anticipated historical requirements. Appendix A includes plan, elevation and section views of this option.

Property impacts may be significant on three of the four bridge quadrants, depending on the final alignment. As shown on the roadway plan in Appendix A, the alignment would place the proposed sidewalk up to the house corner of #10 South Main Street (northwest quadrant). On the northeast side, the proposed alignment would place the edge of pavement very close to the concrete pad that surrounds the gas pumps at #9 South Main Street (Grandpa's Place). On the southwest side, the sidewalk would be approximately 4 feet closer to #14 South Main Street than the existing sidewalk.

Realistically, it is very unlikely that the sidewalk on the west side can be constructed as shown on the plan, however, shifting the alignment to the east is likely to require relocation of the gas pumps as well as the underground storage tanks. A waiver for either reduced shoulder widths and/or a sidewalk on one side is possible but would require the approval of both MassDOT and the Federal Highway Administration (FHWA).

This option also requires extensive excavation and significant work in the roadway to replace the arch. The closure of South Main Street will be required and the impact to traffic will include a detour for the duration of construction.

The environmental impacts of this option will involve removing and replacing the existing foundations in the river and will require temporary cofferdams to protect the sensitive wetland area during construction. There will be some areas of proposed permanent impacts to the riverfront, where the bridge needs to be widened.

Right-of-Way (ROW) acquisition for this option is anticipated to be significant. The increased width of the roadway and sidewalks will require the relocation of utility poles, removal of trees and the taking of property from the adjacent owners. The required roadway width would also require the relocation of the private driveway as well as the roadway and sidewalk being closer

to the home at #14 South Main Street. As noted above, the impacts on the northwest corner are significant, and could potentially require the taking of the home and property at #10 South Main Street. If the roadway alignment were to be shifted to the east, the gas pumps and storage tanks could possibly require relocation.

Additionally, temporary easements (or rights of entry) are anticipated to accommodate construction staging and construction access for tying back into the existing wingwalls and sidewalks at the limits of construction.

It should be noted that although construction would be with state and federal monies, design costs may not be eligible. It may be up to the town to pay for all costs relative to design, permitting and right-of-way acquisitions. This is not a certainty and there are numerous instances where MassDOT pays for all design-related costs, particularly for bridges. However, this question should be addressed as the project moves forward.

The matrix provided in Appendix C provides a summary of the costs, property impacts, design and construction schedule and environmental permitting required for the project.

Option 3: Rehabilitation of the Existing Stone Arch Bridge (Locally Funded)

This option consists of rehabilitation of the existing stone arch bridge. The rehabilitation would involve repairs to the stone arch, installing a reinforced concrete saddle and/or a reinforced concrete relieving slab. The saddle would help prevent the two sides of the arch from spreading and the slab would assist with evenly distributing loads on the stone arch. The approximate width of the existing roadway and sidewalk shall be retained and minor improvements to the alignment are proposed. The South approach roadway will require widening on the West to accommodate the improvements to the roadway alignment and to maintain consistent lane widths. Due to the geometry changes, the Southwest wall will need to be widened to the West, all other walls will remain in place.

There are three sub-options for rehabilitation of the stone arch bridge:

a) constructing a concrete relieving above the existing stone arch

b) constructing a concrete relieving slab and concrete saddle above the existing stone arch

c) construct a concrete saddle above the existing stone arch. Moment slabs will likely be required to accommodate crash tested railings.

During design the existing stone arch will be further evaluated to determine the required level of repairs. The level of repair will determine which of these sub-options is the most applicable.

Similar to Options 1 and 2, this option includes excavation and significant work in the roadway to reveal the arch. The closure of South Main Street will be required and the impact to traffic will include a detour for the duration of construction.

While Options 1 and 2 will not require a significant adjustment of the roadway vertically, Option 3 will require the raising of the roadway surface to accommodate construction of the concrete relieving slab and concrete saddle. Option 3b would be the worst-case condition, where both the slab and saddle are placed. Under this option, the roadway grade over the center of the arch would need to be raised by approximately 1' 2". In order to meet existing grades at both Grandpa's Place and the house across the street, the grade of South Main Street would need to be increased to approximately 5% from its current 3% grade. (For comparison, the existing grade of South Main Street south of the bridge is also 5%). Because there is only a short distance between Grandpa's Place and the center of the bridge, the 5% grade may result in a slight "rollercoaster" effect, but should not be readily noticeable to the motorist.

The environmental impacts of this option are minimal as there is no proposed work in environmental resource areas. The work is anticipated to be limited to above the structure.

Right-of-Way (ROW) acquisition for this option is anticipated to be limited. The minimal increase in roadway width will require the relocation of a utility pole. Removal of trees and property line

adjustments are not required for Option 3. Additionally, temporary easements (or rights of entry) are anticipated to accommodate contract staging and to tie back into the existing wingwalls and sidewalk at the limits of construction.

The matrix provided in Appendix C provides a summary of the costs, property impacts, design and construction schedule and environmental permitting required for the project.

Options Summary

Option 1: The replacement of the stone arch with a precast concrete arch presents significant benefits in terms of longevity and flexibility in improving the alignment of South Main Street. The three sub-options allow the town to balance improvements to the roadway and the project cost. The cost to the town is higher than Options 2 and 3, but the lifespan of the bridge and roadway will be significantly improved. Additionally, with the project funded by the town, control of the design and construction schedule is maintained by the Town. The bridge replacement in this option and Option 2 will require significant construction impacts and the duration of the impacts will be longer than Option 3. The environmental impacts of this option depend on the sub-option chosen by the town.

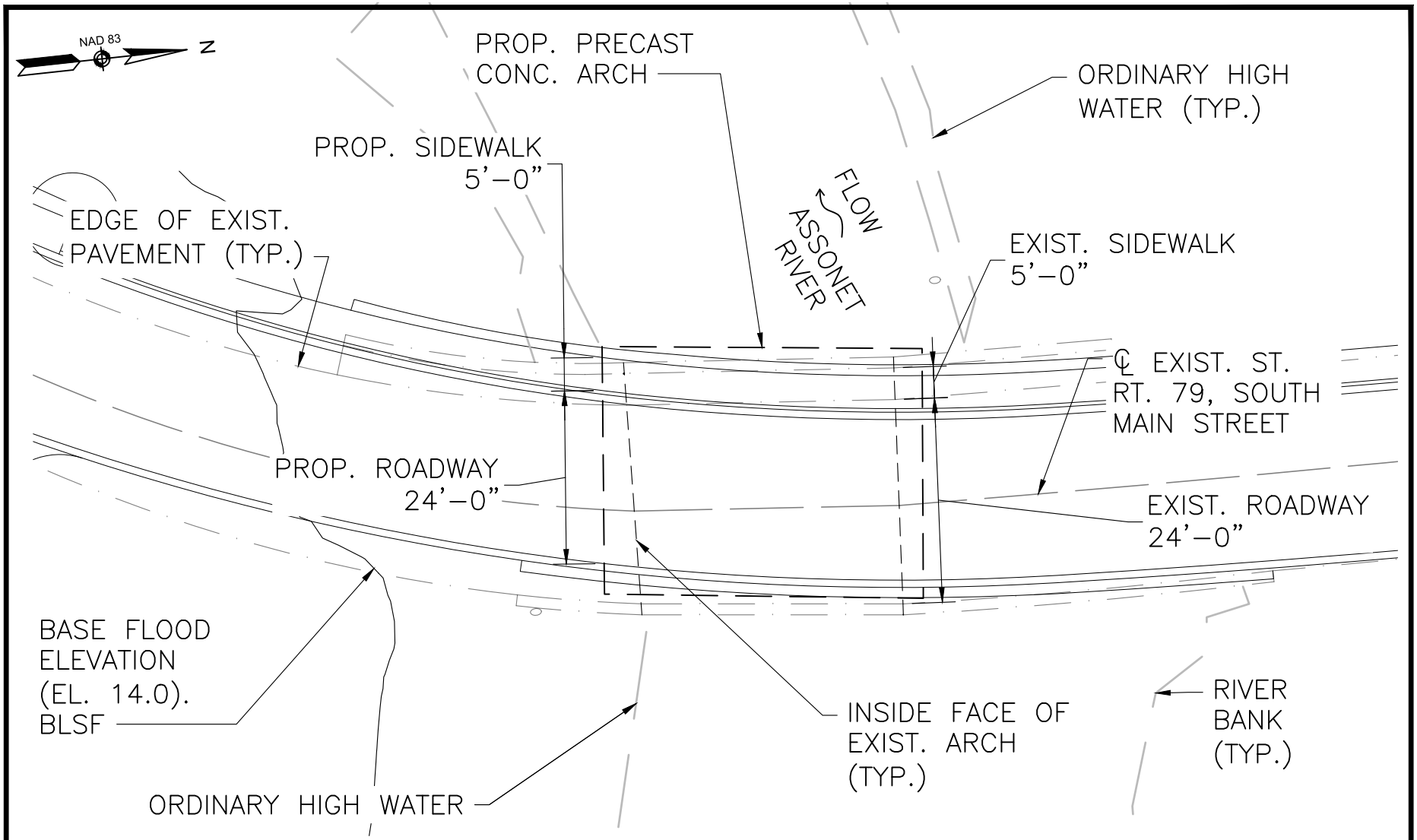
Option 2: The structural and roadway benefits of this option are similar to Option 1. The cost to the town is reduced through the use of MassDOT state funding, however the design requires a much wider roadway that will increase the environmental impact and the need to acquire adjacent properties for the ROW. The construction impacts to traffic and the construction duration are greater than Option 1. The environmental impacts of this option are higher than Option 1. Additionally, the project would be on the TIP program and the Town would then cede significant control of the design elements to the State.

Option 3: The rehabilitation of the existing stone arch is the lowest cost option, however there are some drawbacks to this option. The repairs made to the structure will stabilize the bridge, but the lifespan of the repairs is less than Options 1 and 2. The construction impacts to the roadway are similar to Options 1 and 2 and will result in significant impacts to traffic. Minimal improvements to the roadway alignment and sidewalk are possible under this option. There are temporary environmental impacts during construction and there are no anticipated permanent impacts.

The advantages and disadvantages of the three options are unique to each one. The Town of Freetown will need to carefully evaluate these options and determine which one best aligns with their goals, objectives, and budget.

In terms of cost, ease of permitting, and minimizing environmental impacts, Option 3 appears to be the best suited to the site. It is more expensive than the state funded option (assuming that the state takes over the design), but will be a long-term solution and provide an incremental improvement to the roadway alignment. This option will also minimize the impact to the adjacent properties and require less intensive permitting, and the environmental impact is minimized.

Appendix A: Conceptual Plans



PLAN

SCALE: 1" = 20'–0"

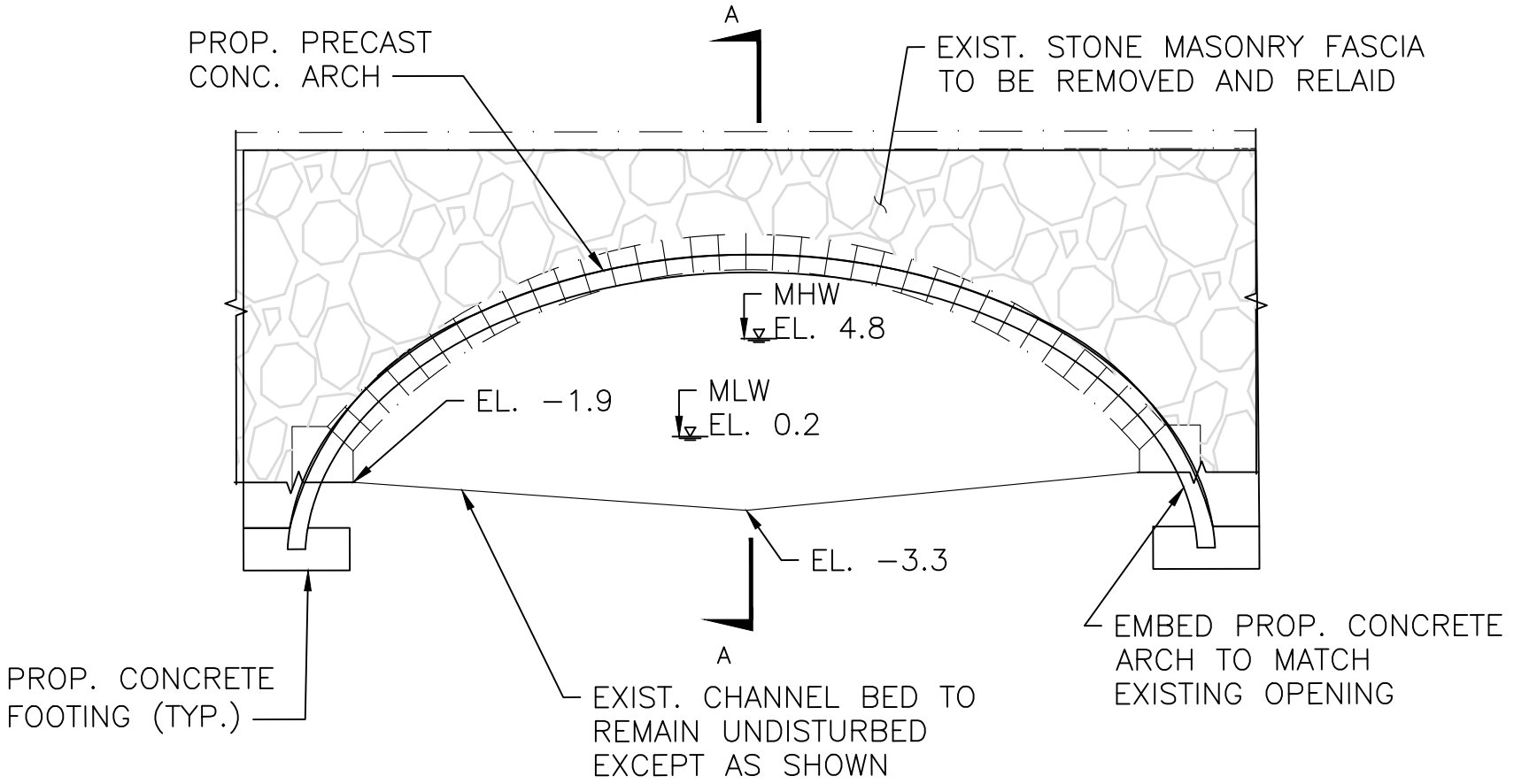
STONE ARCH REPLACEMENT
OPTION 1A

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

Greenman-Pedersen, Inc.
GPI
181 Ballardvale Street, Suite 202, Wilmington, MA 01887

PROP. BRIDGE REPLACEMENT

JANUARY 2024
FIGURE 1 OF 3



ELEVATION

SCALE: 1−½" = 1'−0"

STONE ARCH REPLACEMENT
OPTION 1A

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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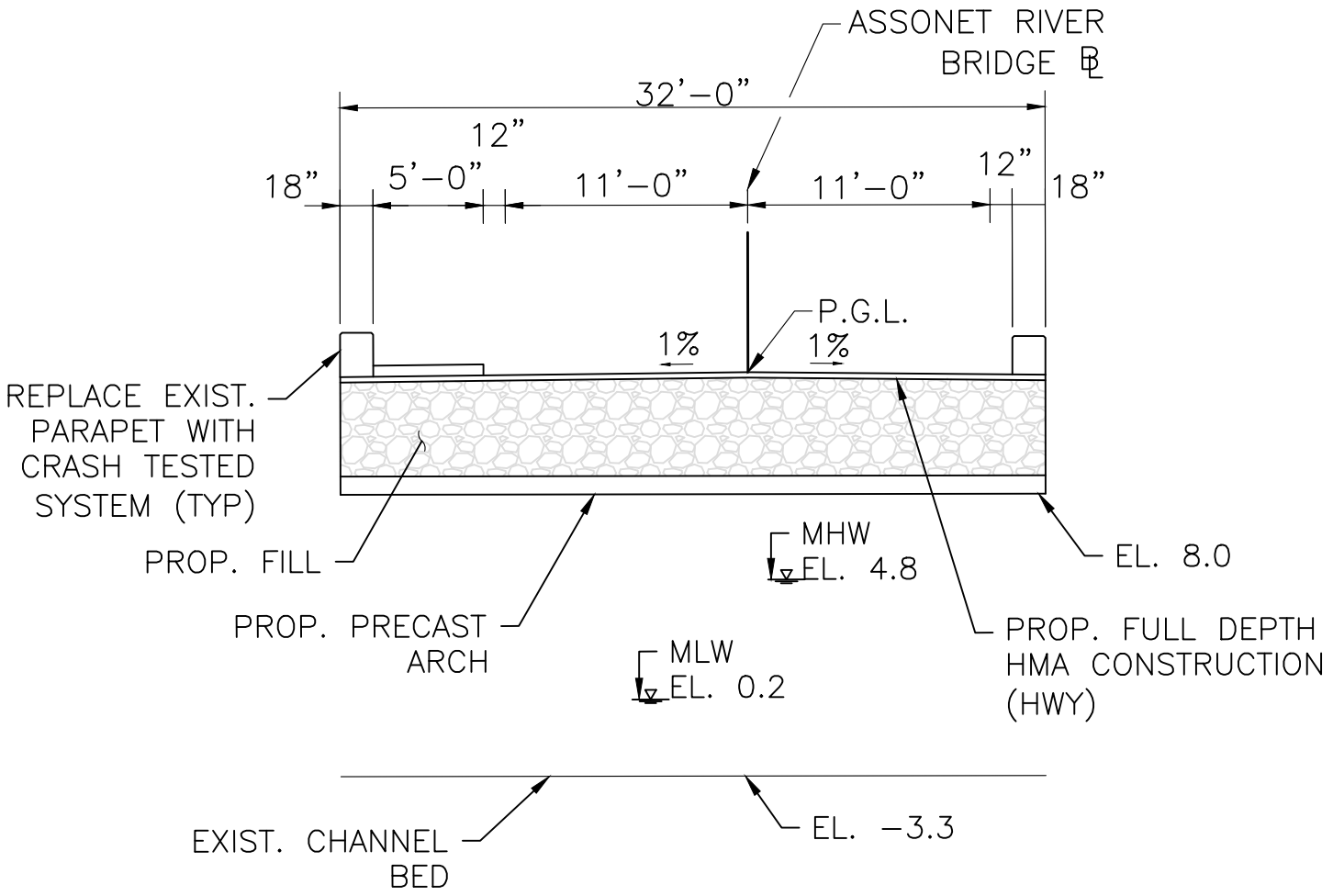
PROP. BRIDGE REPLACEMENT

JANUARY 2024
FIGURE 2 OF 3



SECTION A–A

SCALE: 1–½" = 1'–0"

STONE ARCH REPLACEMENT
OPTION 1A

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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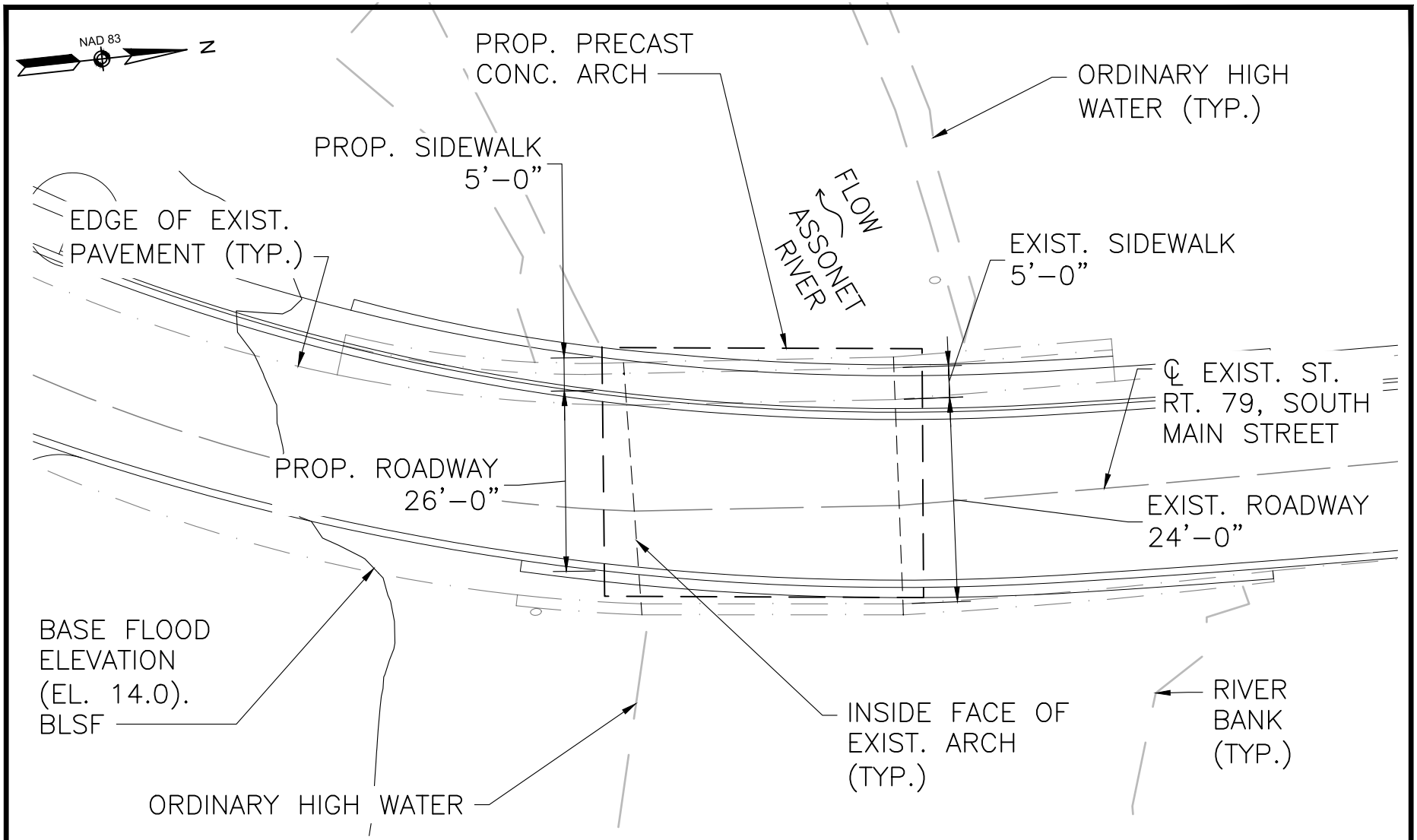
PROP. BRIDGE REPLACEMENT

JANUARY 2024
FIGURE 3 OF 3



PLAN

SCALE: 1" = 20'–0"

STONE ARCH REPLACEMENT
OPTION 1B

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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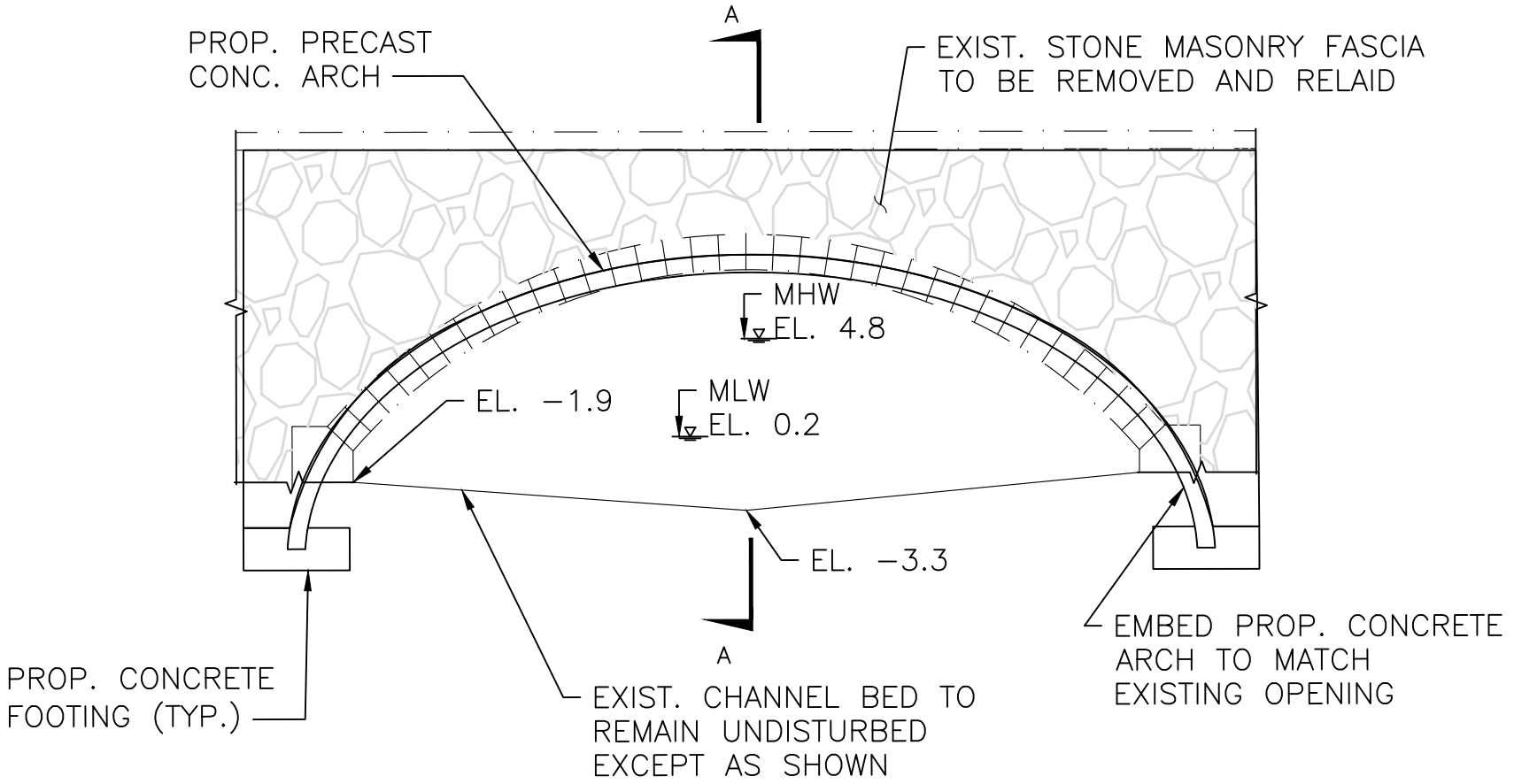
PROP. BRIDGE REPLACEMENT

JANUARY 2024
FIGURE 1 OF 3



ELEVATION

SCALE: $1-\frac{1}{2}" = 1'-0"$

JANUARY 2024
FIGURE 2 OF 3

STONE ARCH REPLACEMENT
OPTION 1B

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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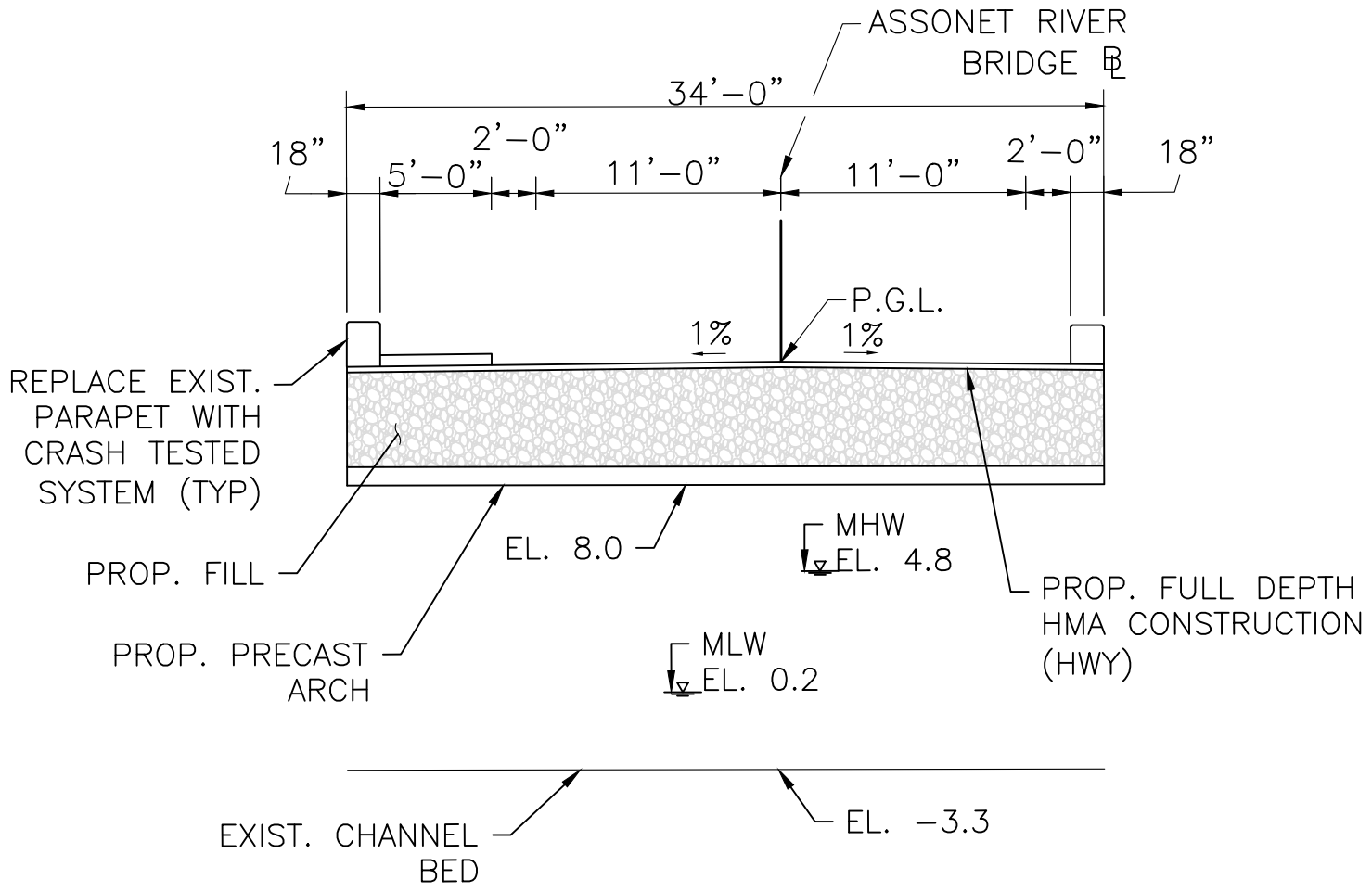
PROP. BRIDGE REPLACEMENT



SECTION A–A

SCALE: 1–½" = 1'–0"

JANUARY 2024
FIGURE 3 OF 3

STONE ARCH REPLACEMENT
OPTION 1B

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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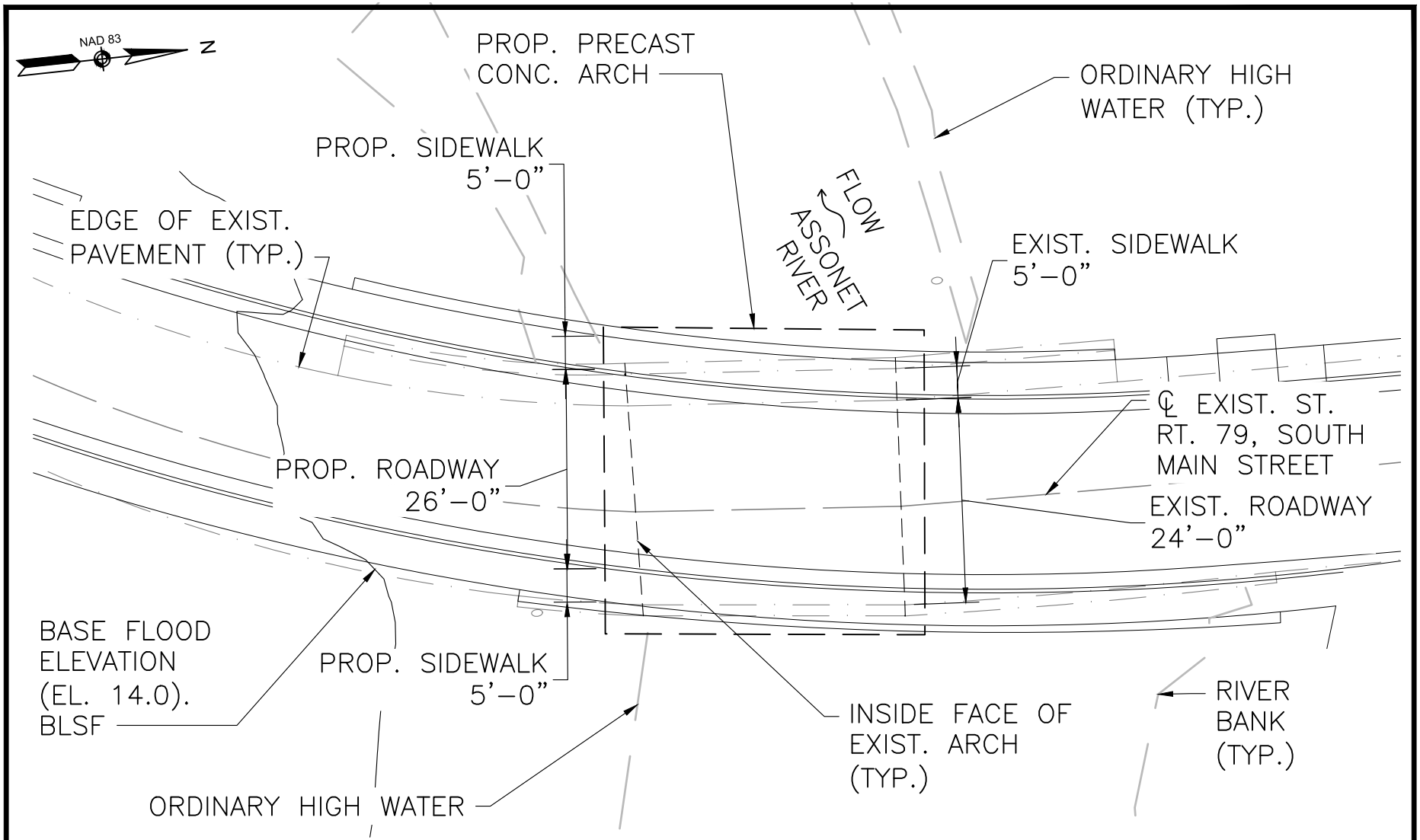
PROP. BRIDGE REPLACEMENT



PLAN

SCALE: 1" = 20'–0"

STONE ARCH REPLACEMENT
OPTION 1C

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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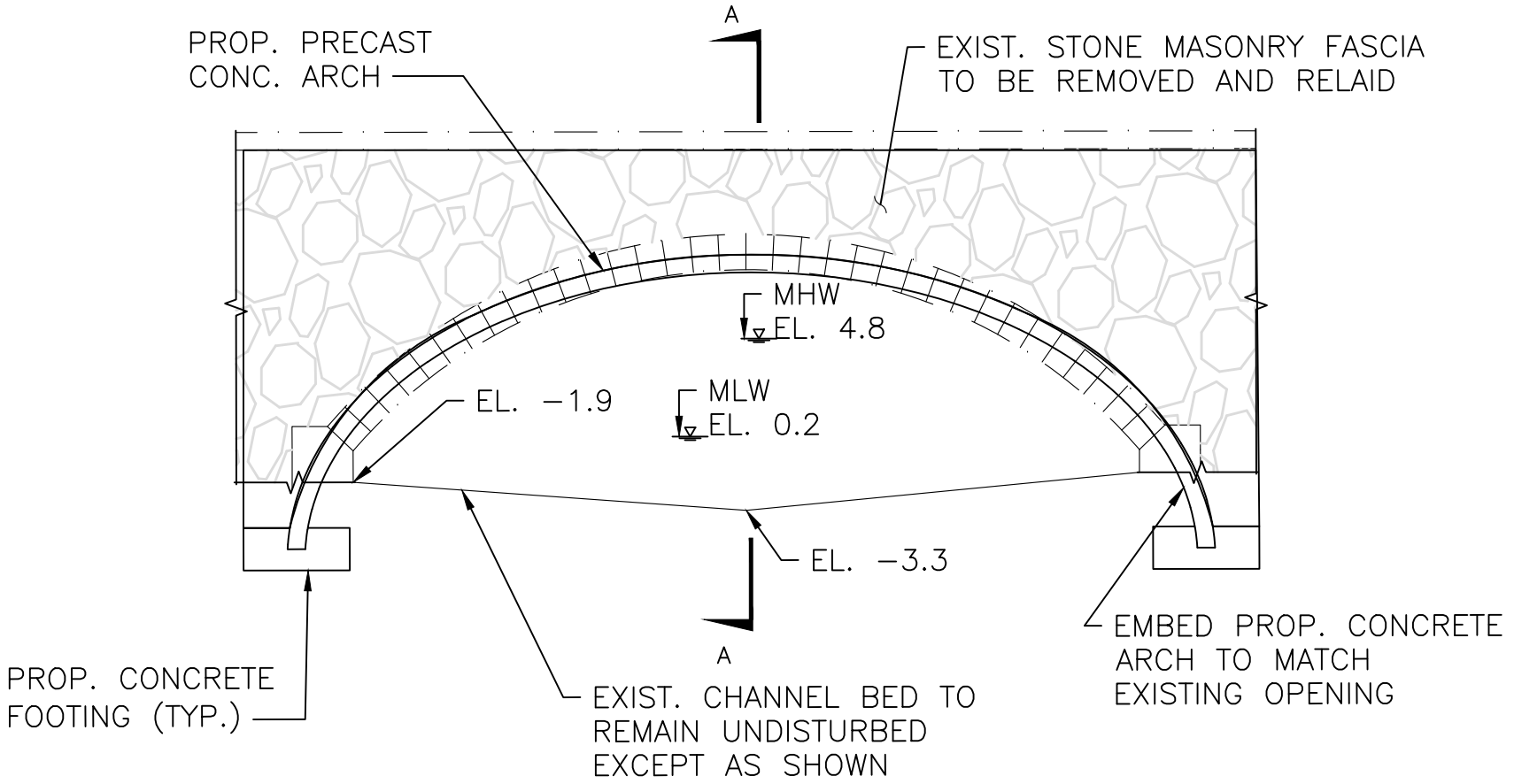
PROP. BRIDGE REPLACEMENT

JANUARY 2024
FIGURE 1 OF 3



ELEVATION

SCALE: 1−½" = 1'−0"

STONE ARCH REPLACEMENT
OPTION 1C

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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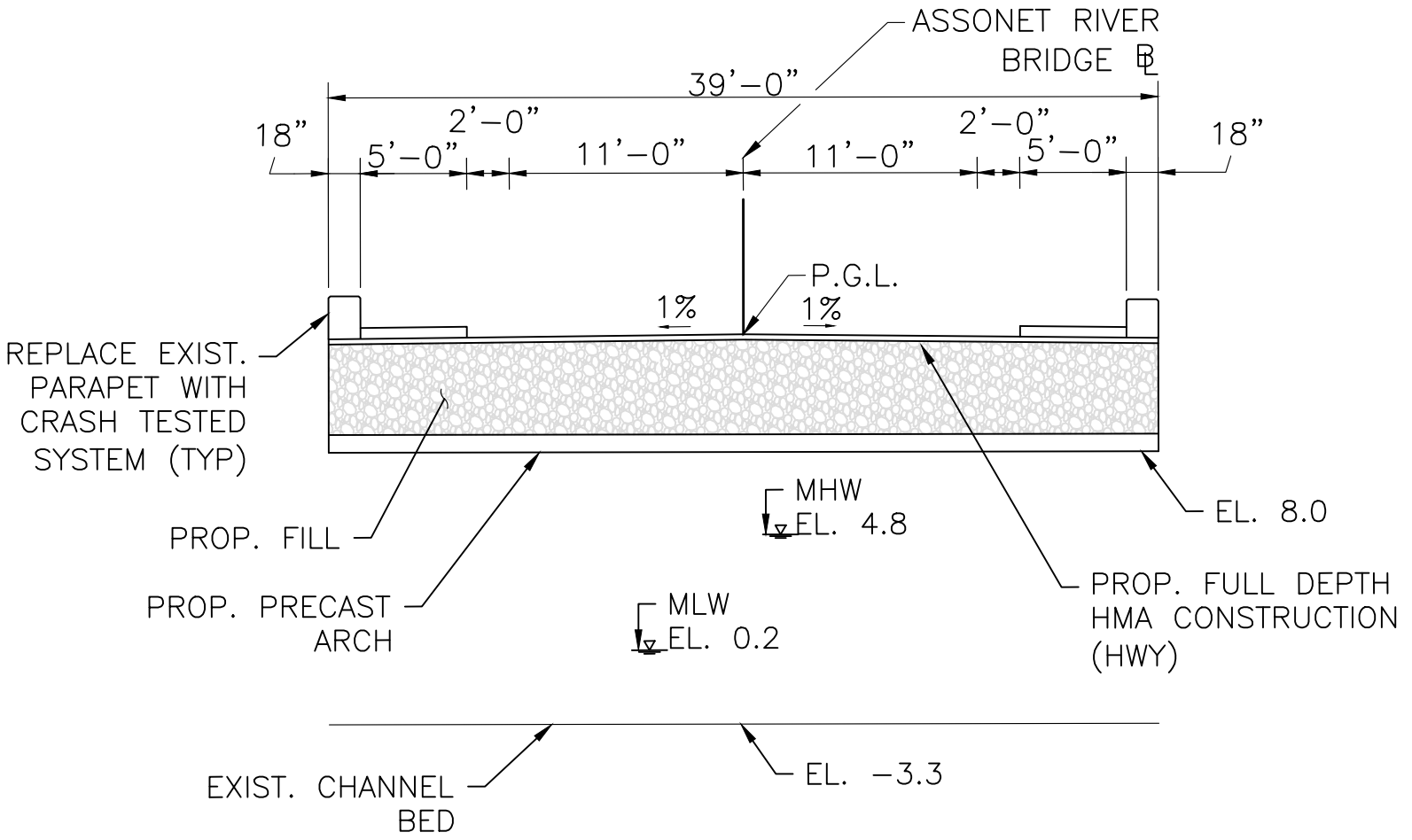
PROP. BRIDGE REPLACEMENT

JANUARY 2024
FIGURE 2 OF 3



SECTION A–A

SCALE: 1–½" = 1'–0"

STONE ARCH REPLACEMENT
OPTION 1C

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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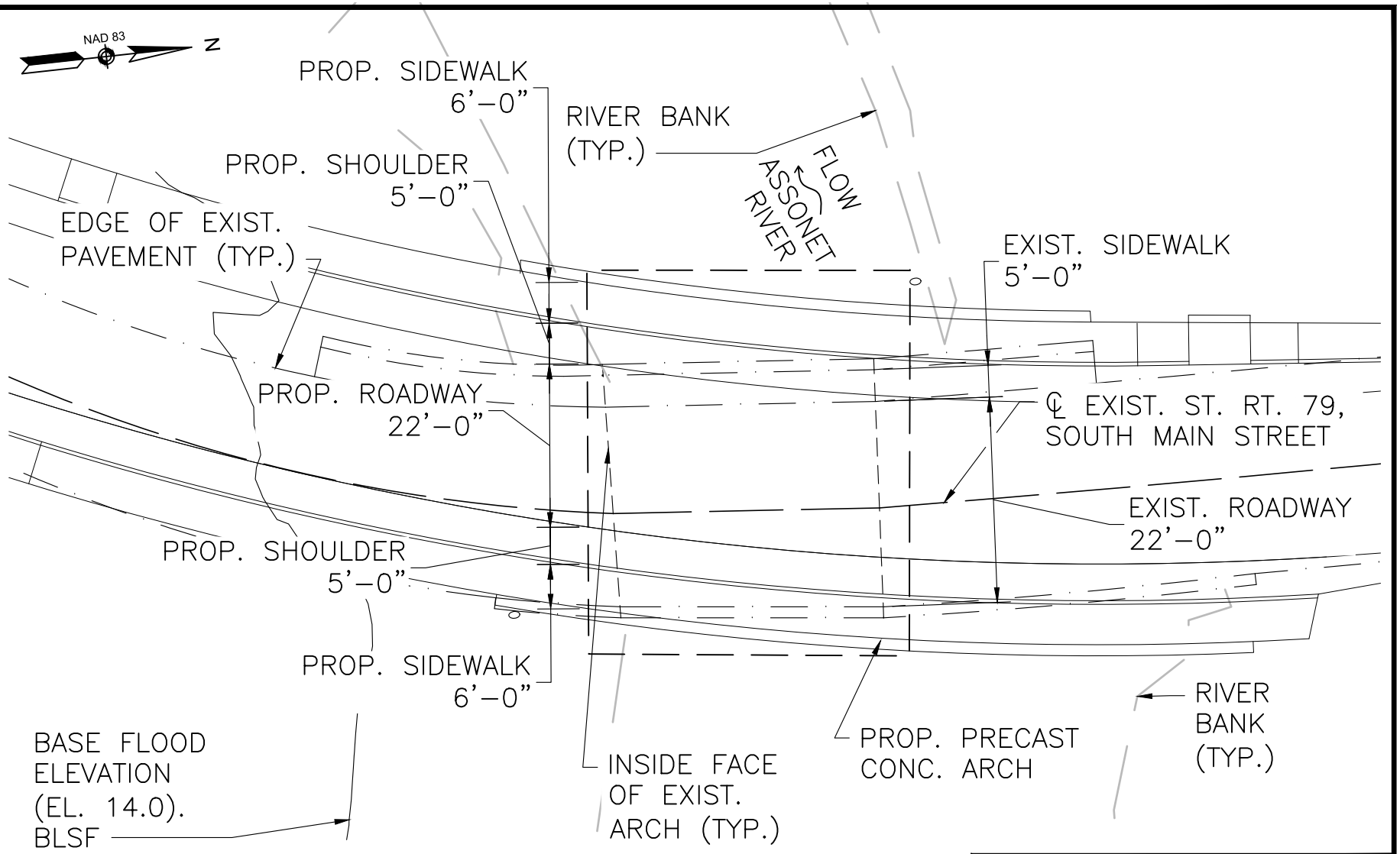
PROP. BRIDGE REPLACEMENT

JANUARY 2024
FIGURE 3 OF 3



PLAN

SCALE: 1" = 20'-0"

STONE ARCH REPLACEMENT
OPTION 2

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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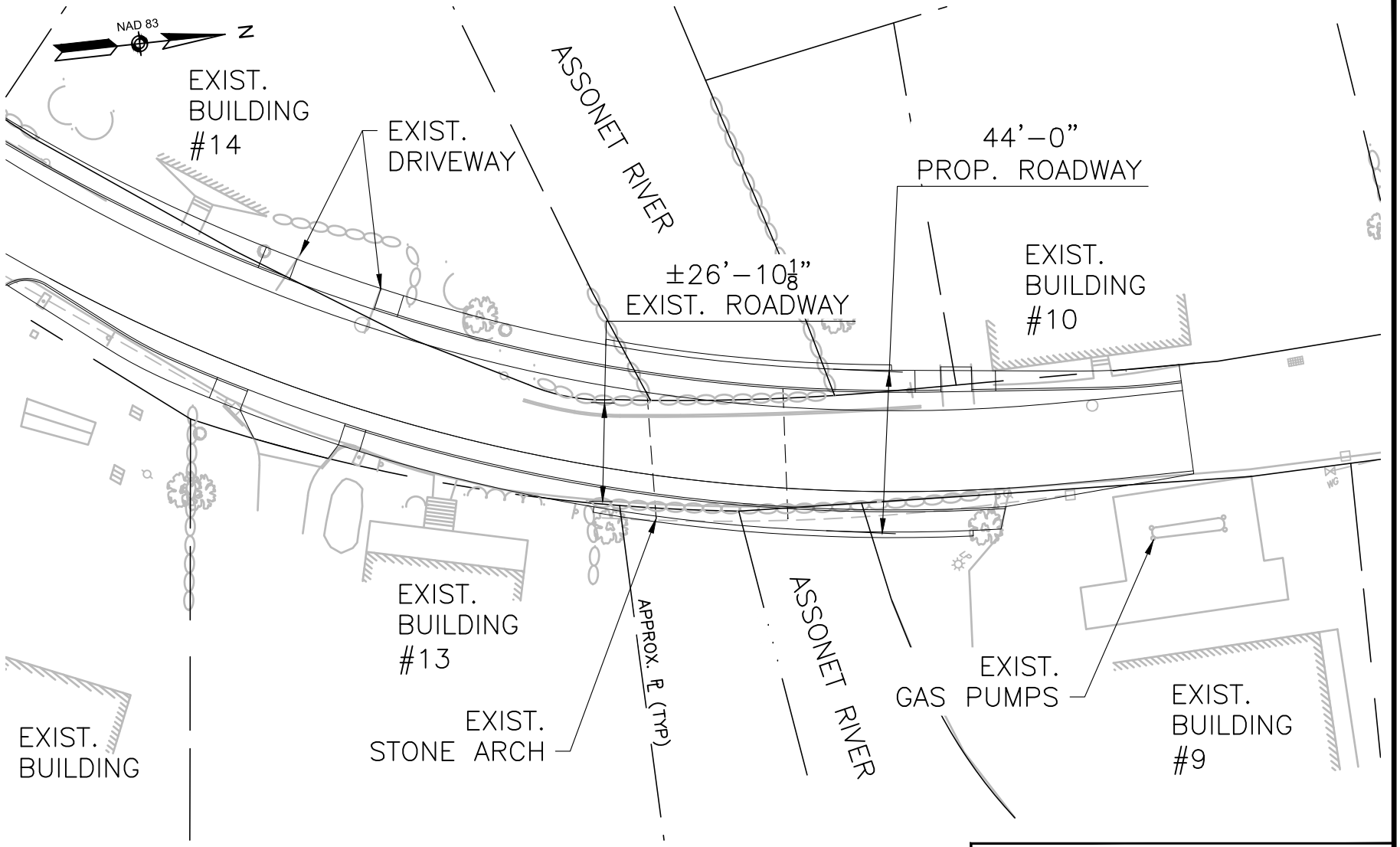
PROP. BRIDGE REPLACEMENT

JANUARY 2024
FIGURE 1 OF 4



PROPERTY IMPACTS PLAN

SCALE: 1" = 30'–0"

JANUARY 2024
FIGURE 2 OF 4

STONE ARCH REPLACEMENT
OPTION 2

SOUTH MAIN STREET OVER
ASSONET RIVER
FREETOWN, MASSACHUSETTS

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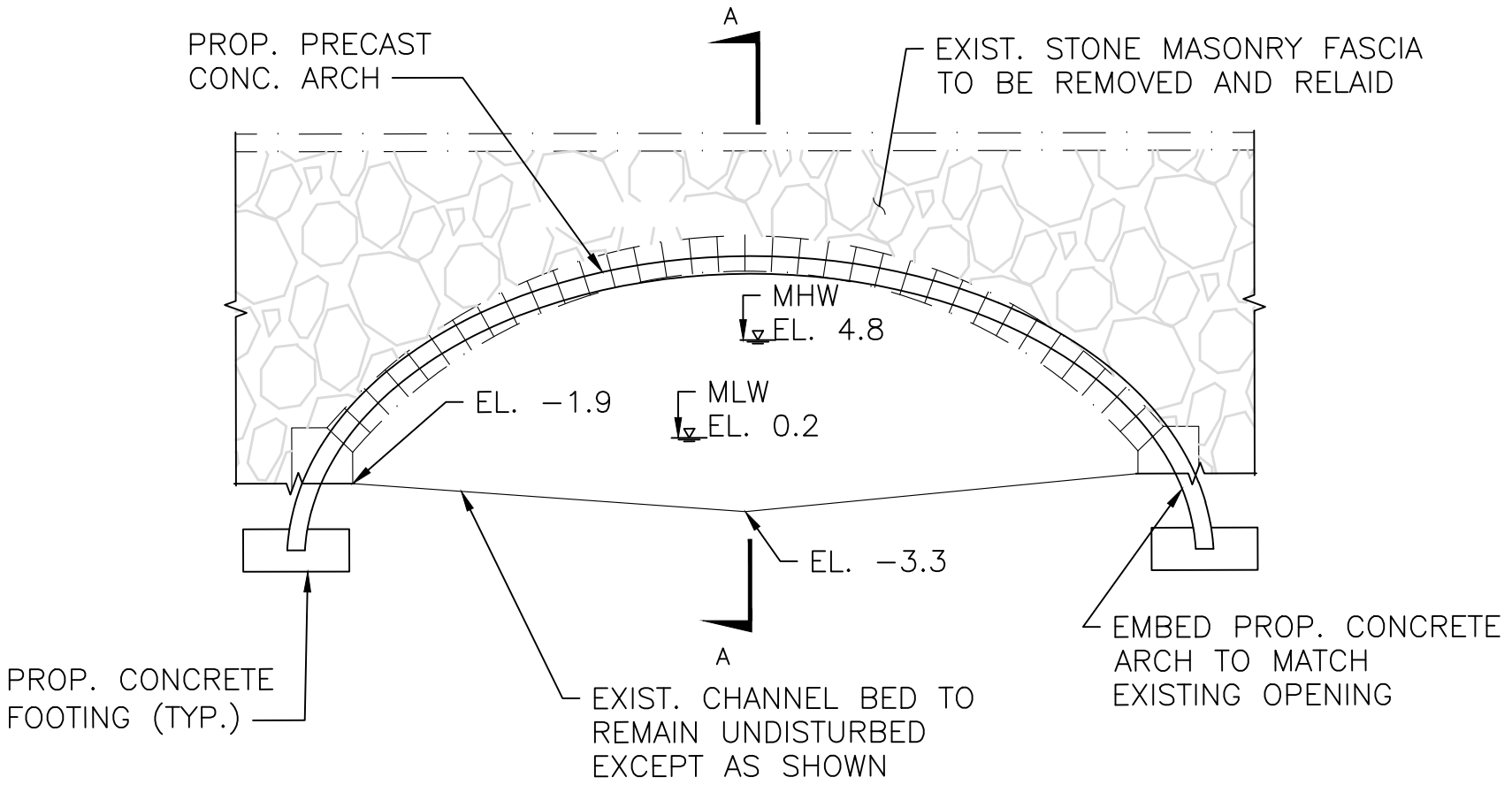
PROP. BRIDGE REPLACEMENT



ELEVATION

SCALE: 1−½" = 1'−0"

STONE ARCH REPLACEMENT
OPTION 2

SOUTH MAIN STREET OVER
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FREETOWN, MASSACHUSETTS

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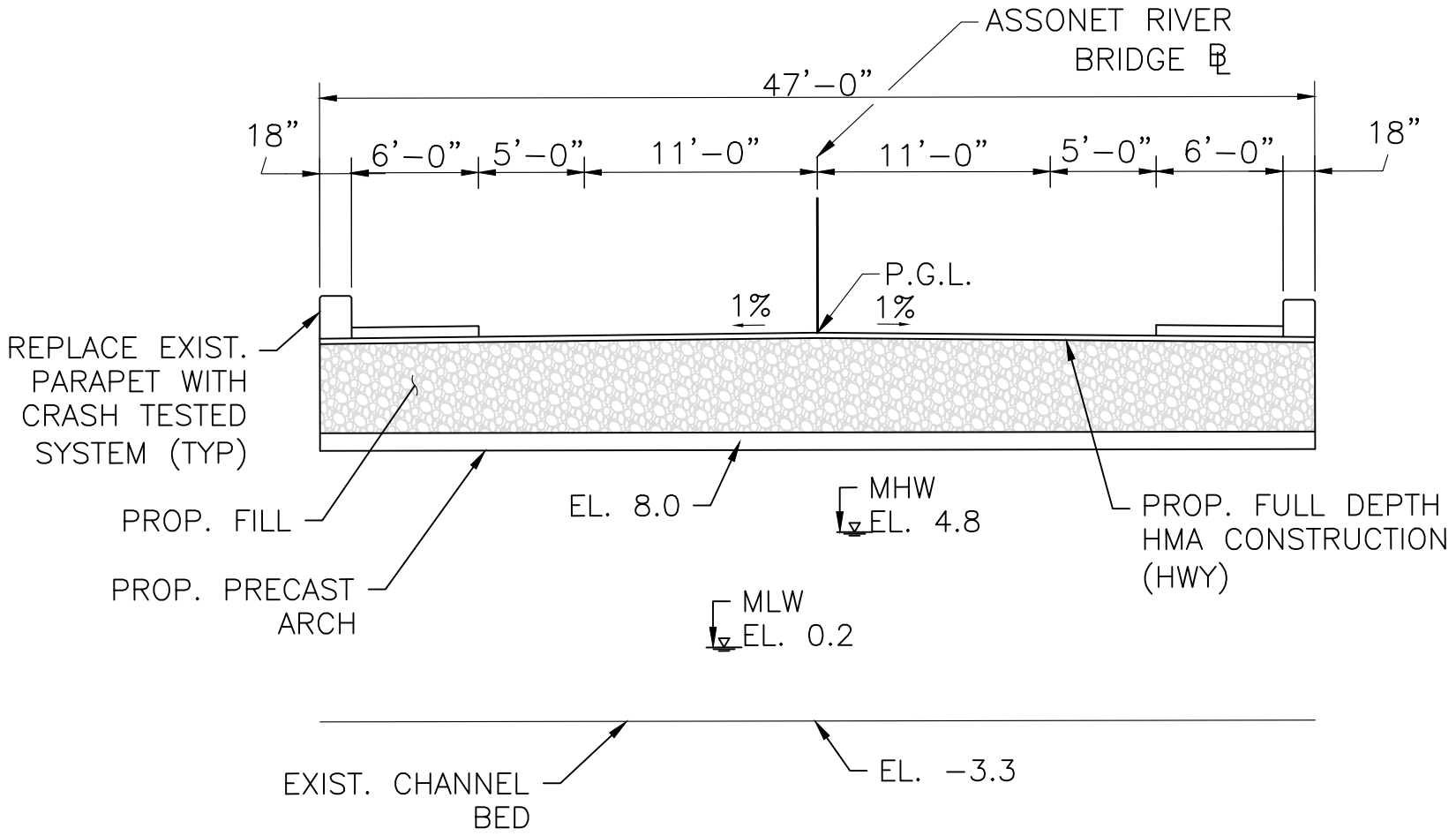
PROP. BRIDGE REPLACEMENT

JANUARY 2024
FIGURE 3 OF 4



SECTION A–A

SCALE: 1–½" = 1'–0"

STONE ARCH REPLACEMENT
OPTION 2

SOUTH MAIN STREET OVER
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PROP. BRIDGE REPLACEMENT

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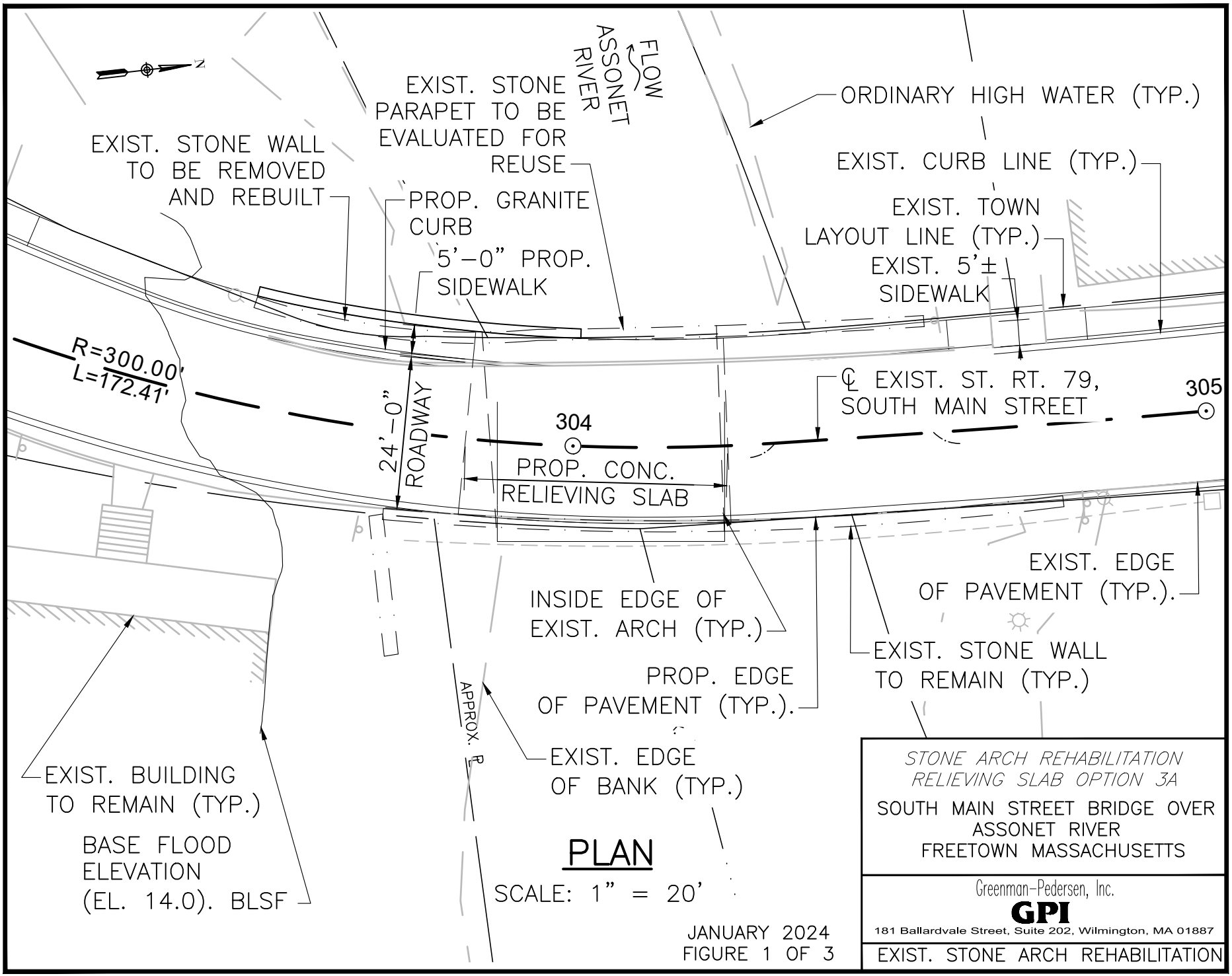
FIGURE 4 OF 4



PLAN

SCALE: 1" = 20'

JANUARY 2024
FIGURE 1 OF 3

STONE ARCH REHABILITATION
RELIEVING SLAB OPTION 3A

SOUTH MAIN STREET BRIDGE OVER
ASSONET RIVER
FREETOWN MASSACHUSETTS

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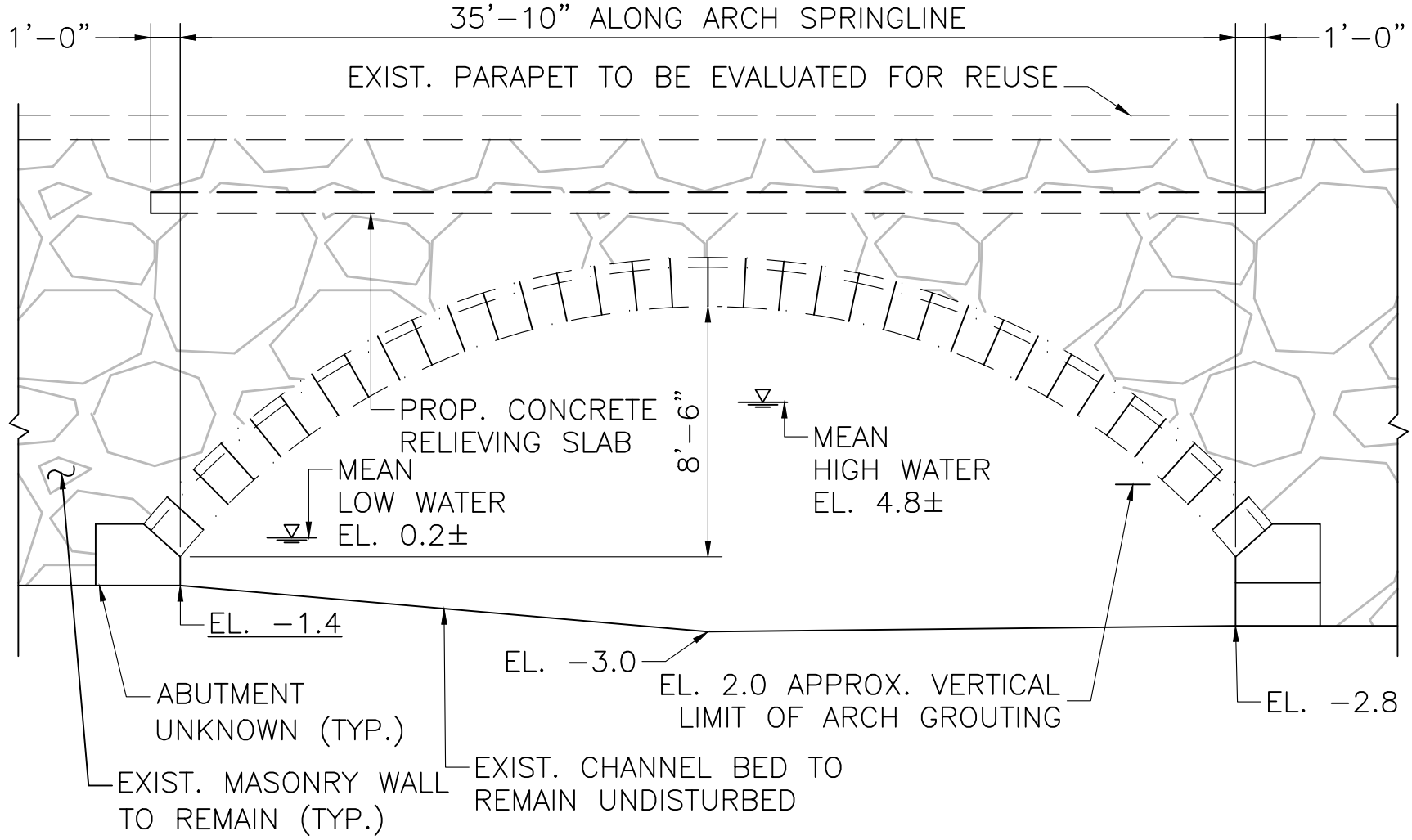
EXIST. STONE ARCH REHABILITATION



EAST ELEVATION

SCALE: $\frac{1}{4}$" = 1'–0"

JANUARY 2024
FIGURE 2 OF 3

STONE ARCH REHABILITATION
RELIEVING SLAB OPTION 3A

SOUTH MAIN STREET BRIDGE OVER
ASSONET RIVER
FREETOWN MASSACHUSETTS

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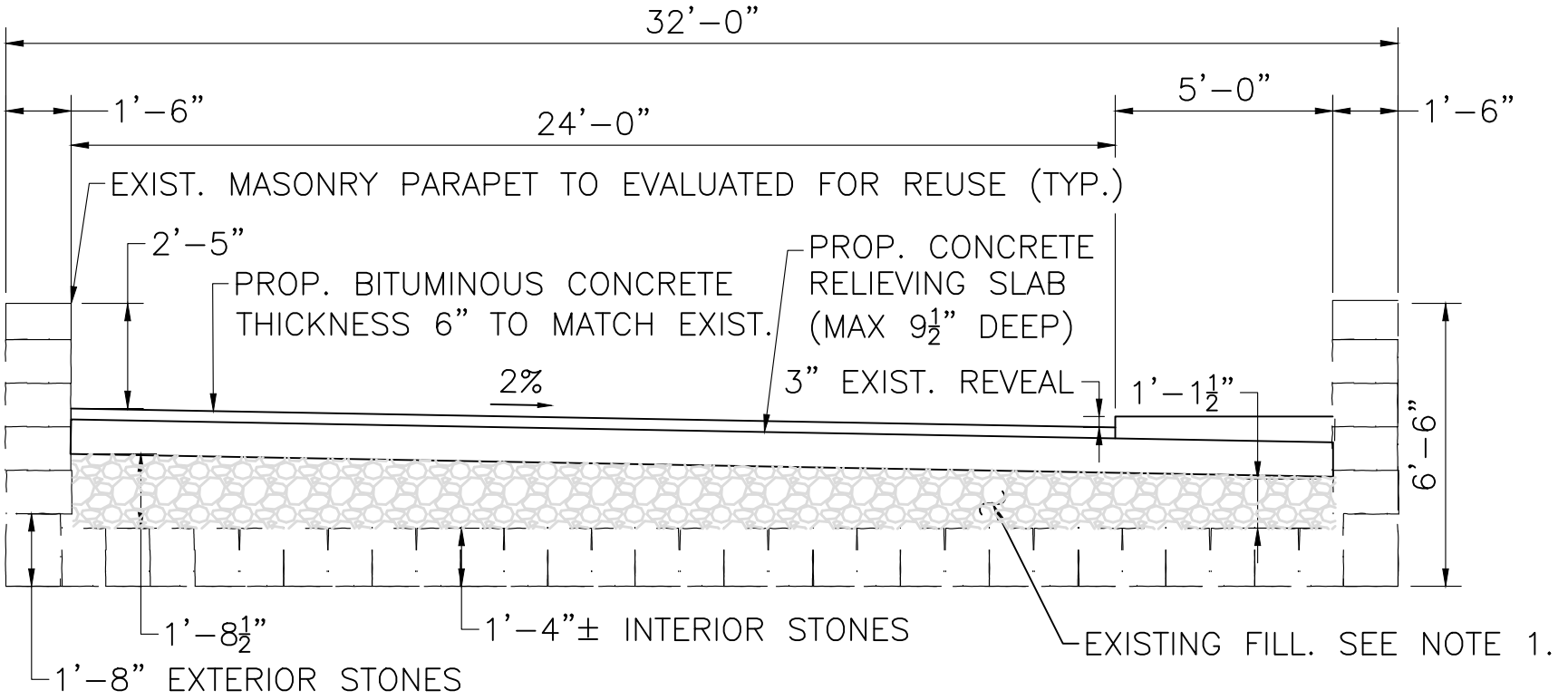
EXIST. STONE ARCH REHABILITATION



CROSS SECTION AT ℄ ARCH

SCALE: ¼" = 1'–0"

NOTE:

1. EXISTING FILL TO BE REMOVED AT THE CRACK, CONTRACTOR TO REPAIR CRACK AND REPLACE WITH GRAVEL.

JANUARY 2024
FIGURE 3 OF 3

STONE ARCH REHABILITATION
RELIEVING SLAB OPTION 3A

SOUTH MAIN STREET BRIDGE OVER
ASSONET RIVER
FREETOWN MASSACHUSETTS

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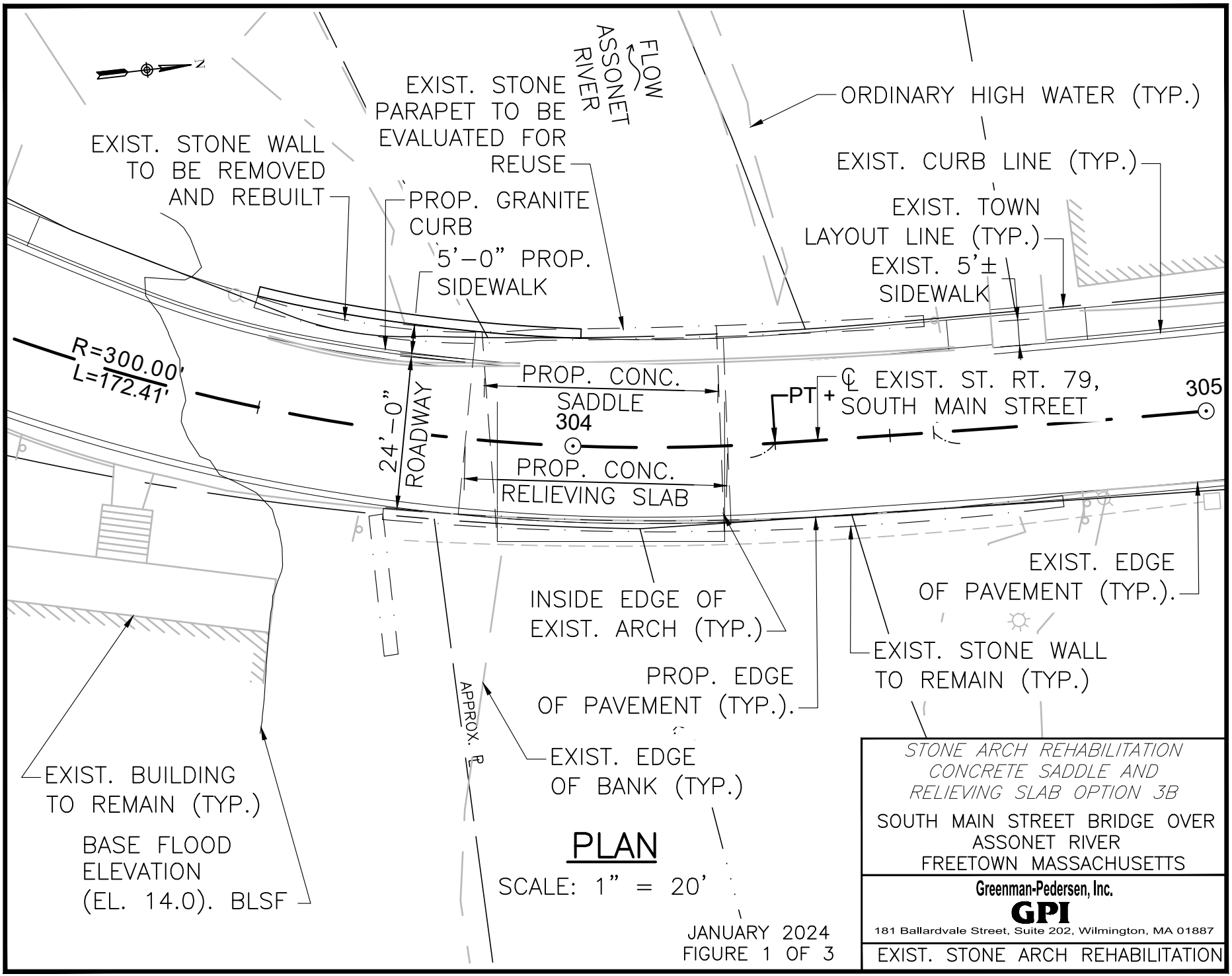
EXIST. STONE ARCH REHABILITATION



PLAN

SCALE: 1" = 20'

JANUARY 2024
FIGURE 1 OF 3

STONE ARCH REHABILITATION
CONCRETE SADDLE AND
RELIEVING SLAB OPTION 3B

SOUTH MAIN STREET BRIDGE OVER
ASSONET RIVER
FREETOWN MASSACHUSETTS

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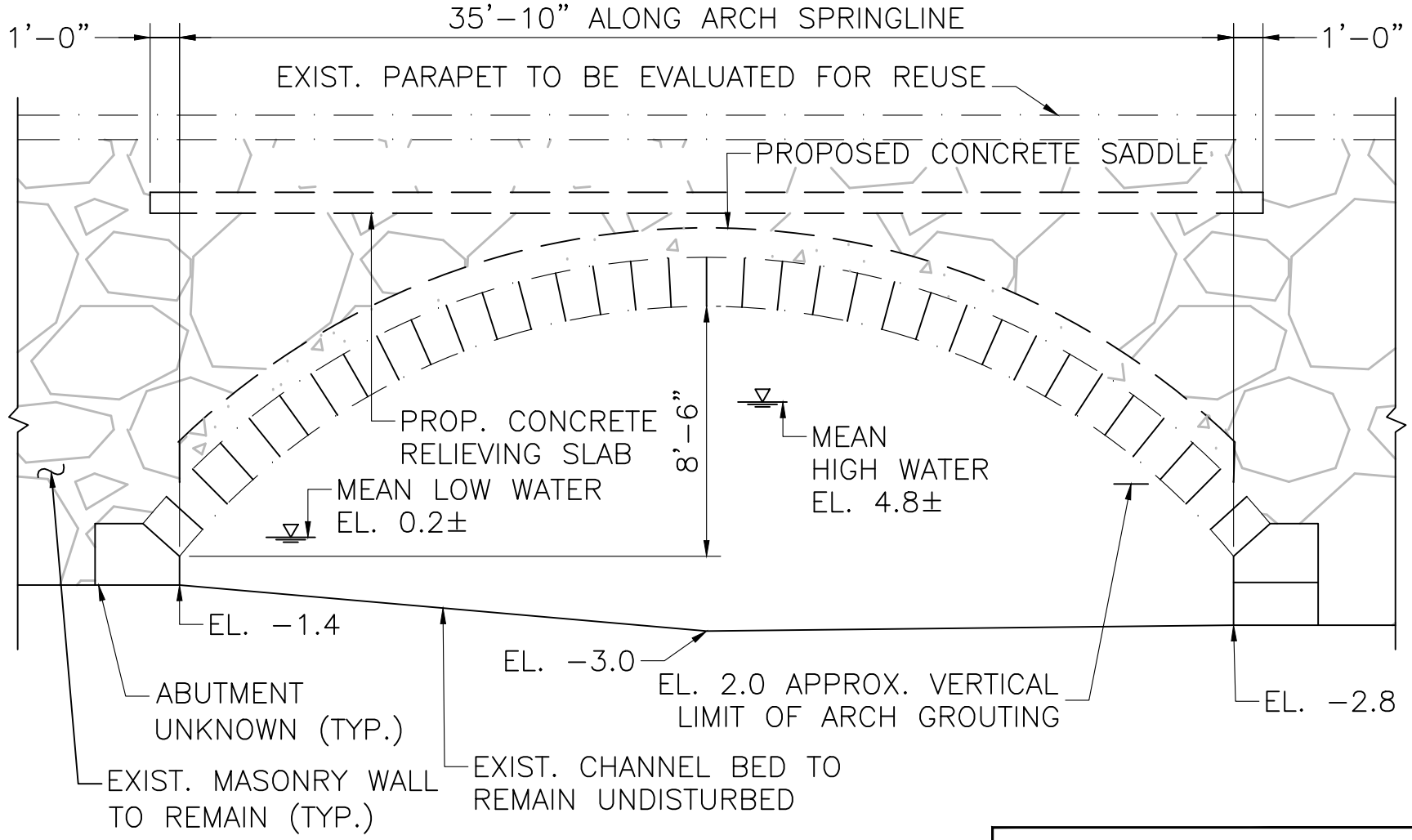
EXIST. STONE ARCH REHABILITATION



EAST ELEVATION

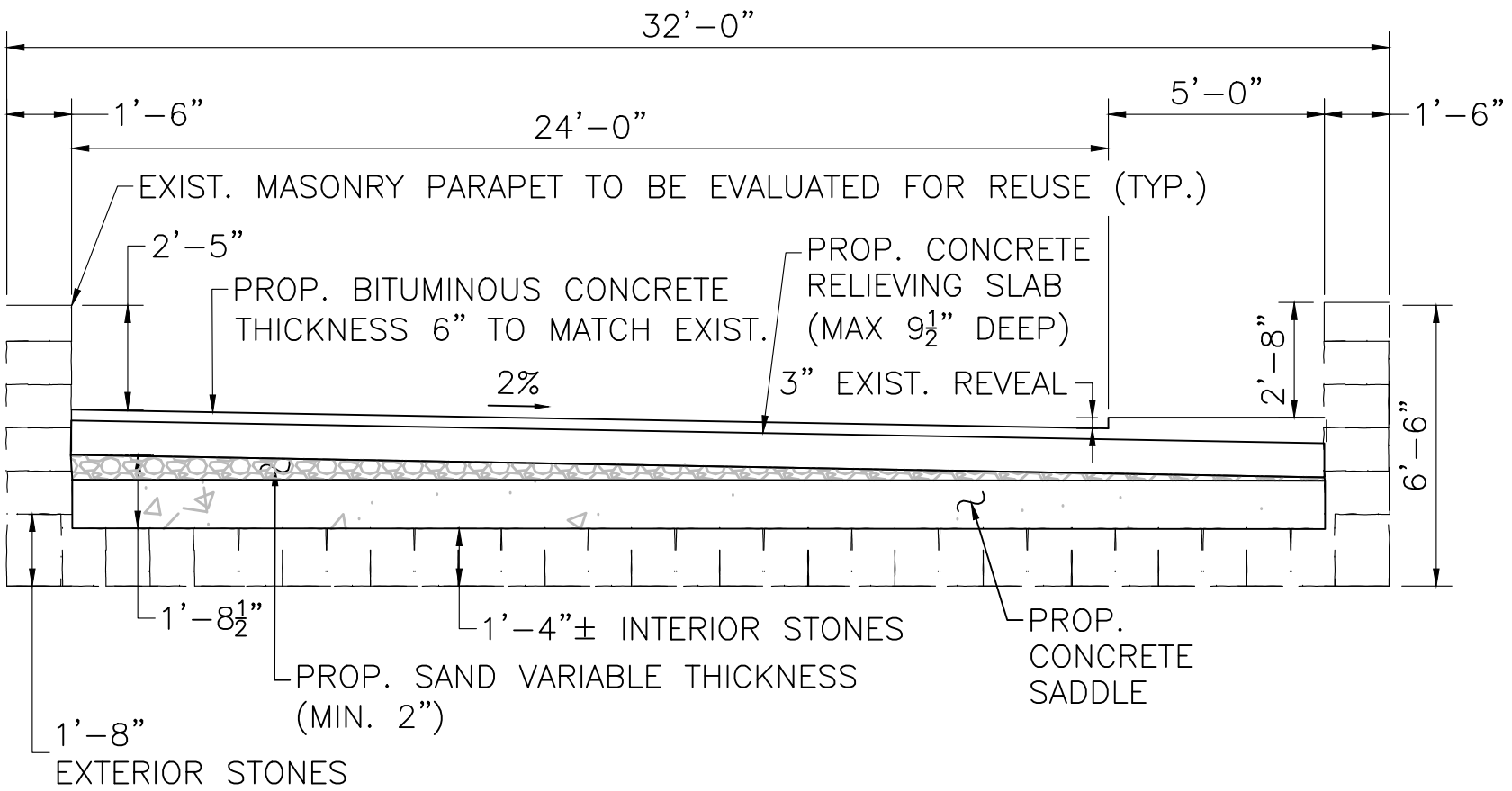
SCALE: $\frac{1}{4}$" = 1'–0"

JANUARY 2024
FIGURE 2 OF 3

STONE ARCH REHABILITATION
CONCRETE SADDLE AND
RELIEVING SLAB OPTION 3B
SOUTH MAIN STREET BRIDGE OVER
ASSONET RIVER
FREETOWN MASSACHUSETTS

Greenman-Pedersen, Inc.
GPI
181 Ballardvale Street, Suite 202, Wilmington, MA 01887

EXIST. STONE ARCH REHABILITATION



CROSS SECTION AT ℄ ARCH

SCALE: ¼" = 1'–0"

STONE ARCH REHABILITATION
CONCRETE SADDLE AND
RELIEVING SLAB OPTION 3B

SOUTH MAIN STREET BRIDGE OVER
ASSONET RIVER
FREETOWN MASSACHUSETTS

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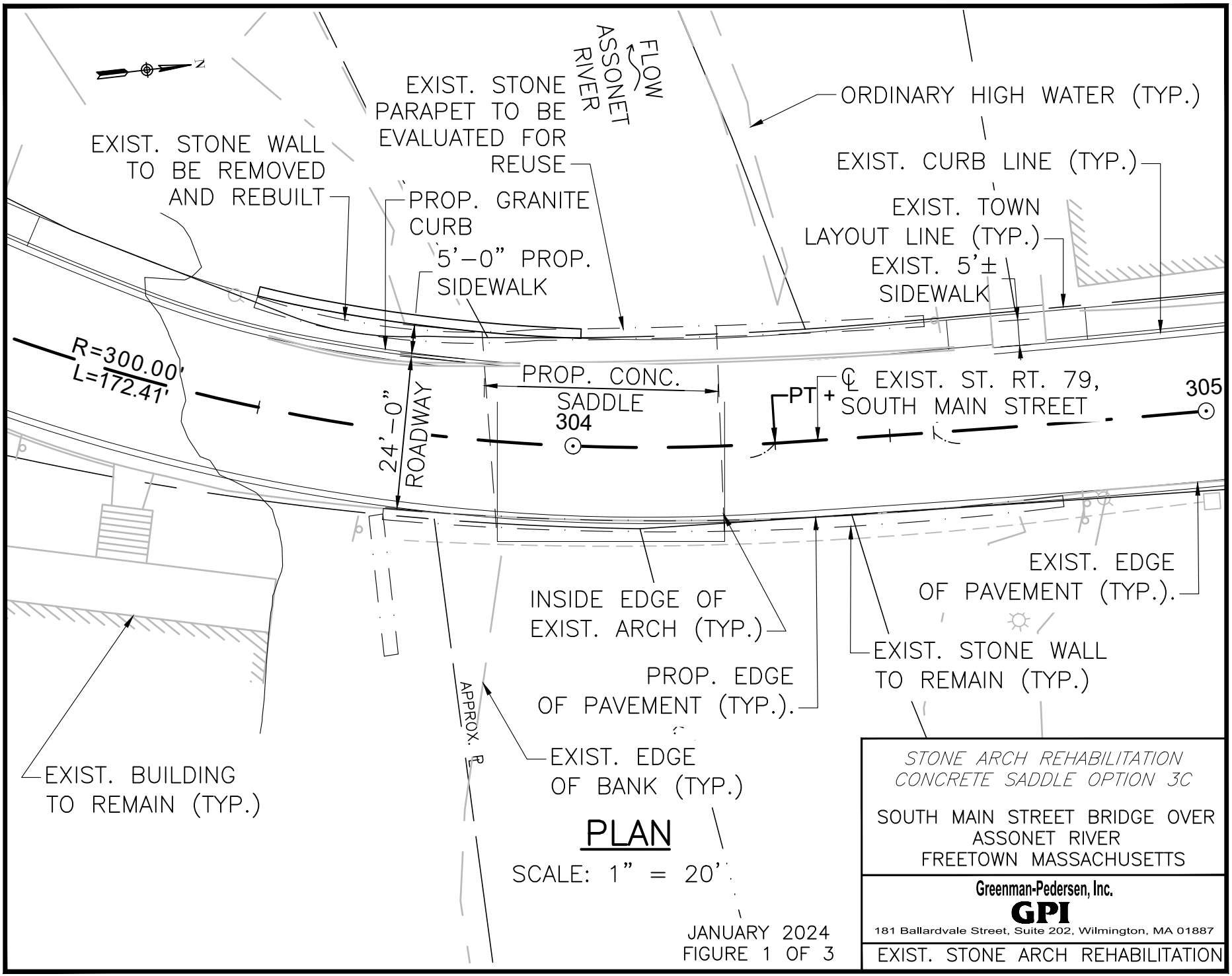
JANUARY 2024
FIGURE 3 OF 3

EXIST. STONE ARCH REHABILITATION



PLAN

SCALE: 1" = 20'

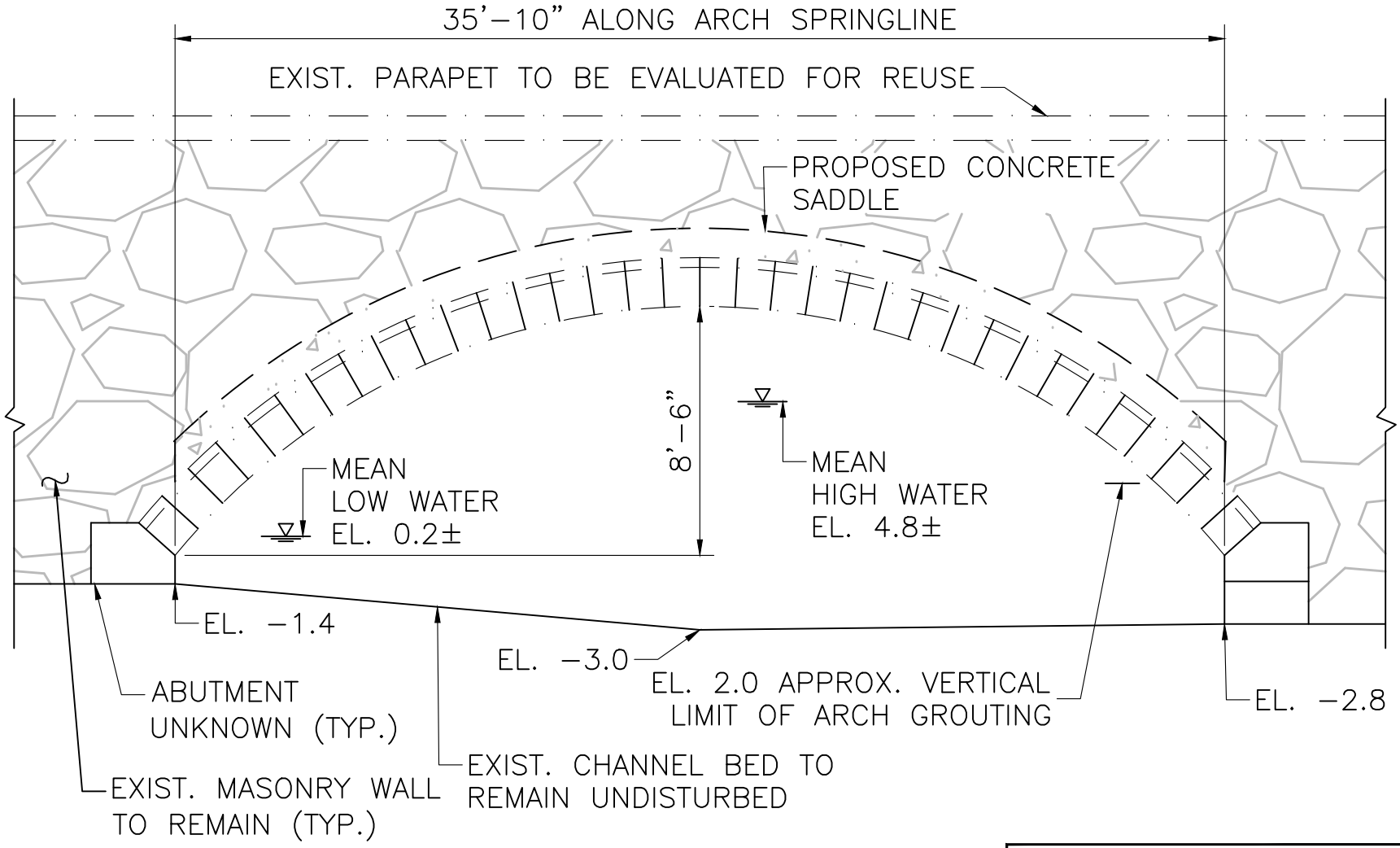
JANUARY 2024
FIGURE 1 OF 3

STONE ARCH REHABILITATION
CONCRETE SADDLE OPTION 3C

SOUTH MAIN STREET BRIDGE OVER
ASSONET RIVER
FREETOWN MASSACHUSETTS

Greenman-Pedersen, Inc.
GPI
181 Ballardvale Street, Suite 202, Wilmington, MA 01887

EXIST. STONE ARCH REHABILITATION



EAST ELEVATION

SCALE: $\frac{1}{4}$" = 1'–0"

JANUARY 2024
FIGURE 2 OF 3

STONE ARCH REHABILITATION
CONCRETE SADDLE OPTION 3C

SOUTH MAIN STREET BRIDGE OVER
ASSONET RIVER
FREETOWN MASSACHUSETTS

Greenman-Pedersen, Inc.
GPI
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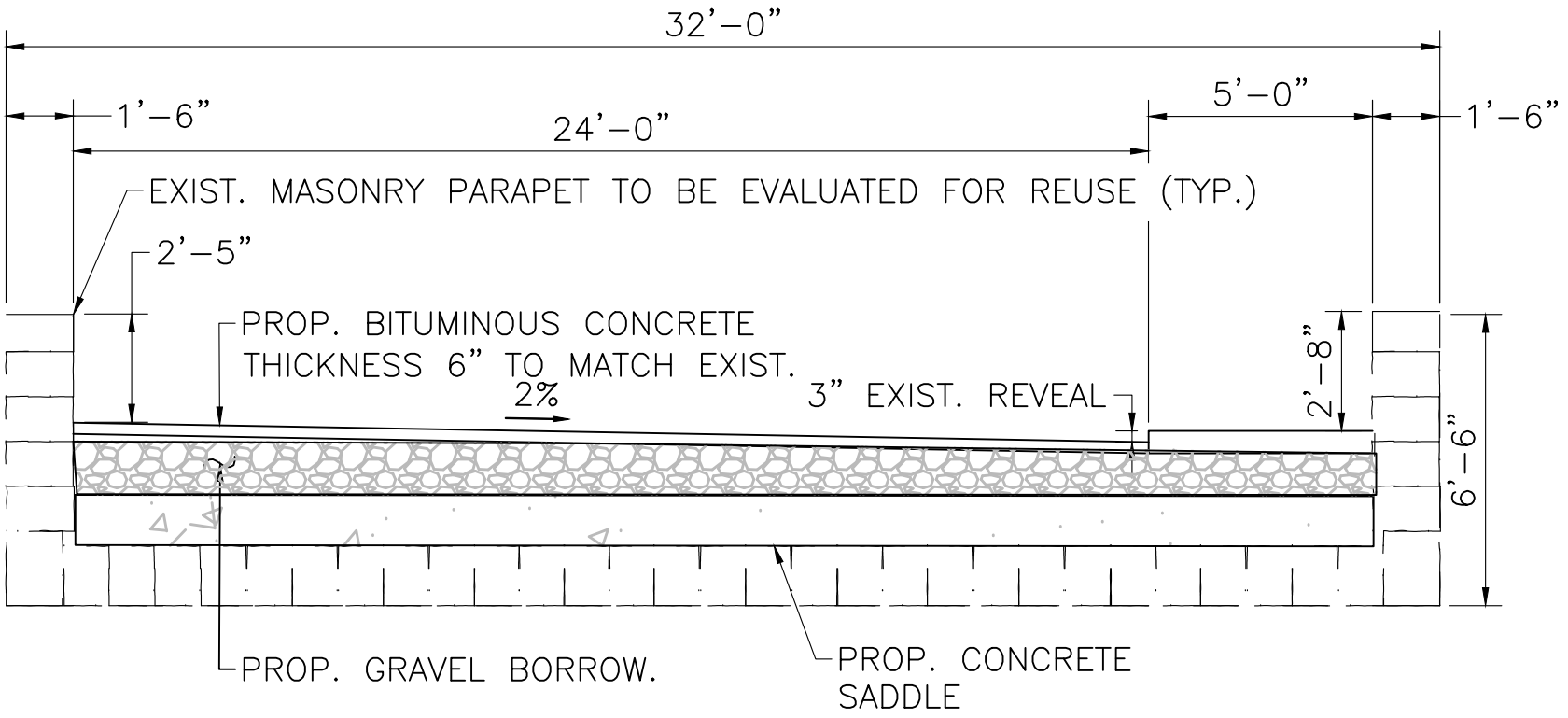
EXIST. STONE ARCH REHABILITATION



CROSS SECTION AT ℄ ARCH

SCALE: $\frac{1}{4}$" = 1'–0"

STONE ARCH REHABILITATION
CONCRETE SADDLE OPTION 3C

SOUTH MAIN STREET BRIDGE OVER
ASSONET RIVER
FREETOWN MASSACHUSETTS

Greenman-Pedersen, Inc.
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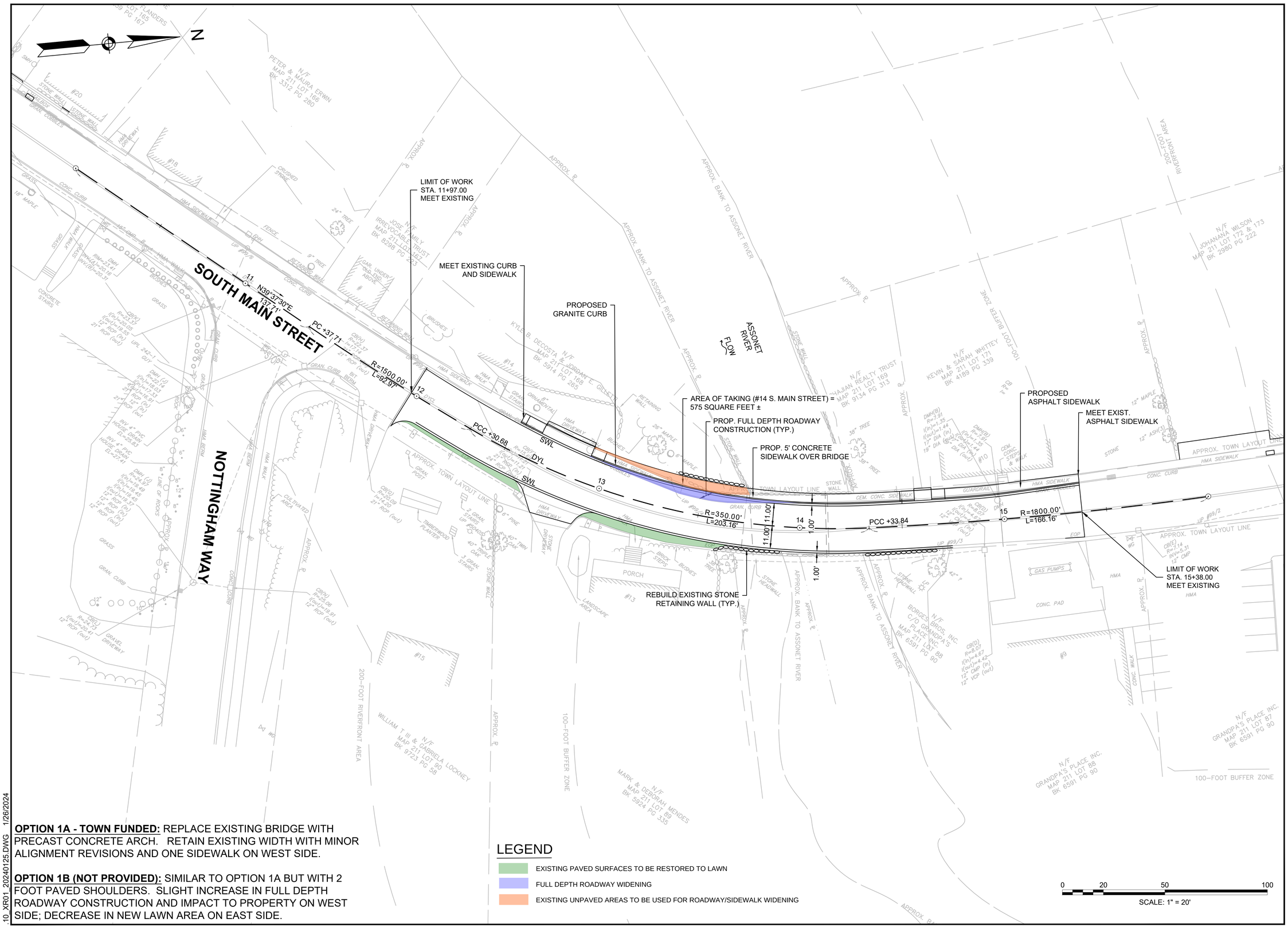
181 Ballardvale Street, Suite 202, Wilmington, MA 01887

JANUARY 2024
FIGURE 3 OF 3

EXIST. STONE ARCH REHABILITATION



OPTION 1A - TOWN FUNDED: REPLACE EXISTING BRIDGE WITH PRECAST CONCRETE ARCH. RETAIN EXISTING WIDTH WITH MINOR ALIGNMENT REVISIONS AND ONE SIDEWALK ON WEST SIDE.

OPTION 1B (NOT PROVIDED): SIMILAR TO OPTION 1A BUT WITH 2 FOOT PAVED SHOULDERS. SLIGHT INCREASE IN FULL DEPTH ROADWAY CONSTRUCTION AND IMPACT TO PROPERTY ON WEST SIDE; DECREASE IN NEW LAWN AREA ON EAST SIDE.

LEGEND

- EXISTING PAVED SURFACES TO BE RESTORED TO LAWN
- FULL DEPTH ROADWAY WIDENING
- EXISTING UNPAVED AREAS TO BE USED FOR ROADWAY/SIDEWALK WIDENING

0 20 50 100

SCALE: 1" = 20'

10_XR01_20240125.DWG 1/26/2024

GPI Engineering Design Planning Construction Management
978.570.2999 GPINET.COM
Greenman-Pedersen, Inc.
181 Ballardvale Street, Suite 202
Wilmington, MA 01887

PREPARED FOR

TOWN OF FREETOWN

BRIDGE OPTIONS STUDY
SOUTH MAIN STREET (ROUTE 79)
FREETOWN, MASSACHUSETTS

REVISIONS

NO.	REVISION	DATE

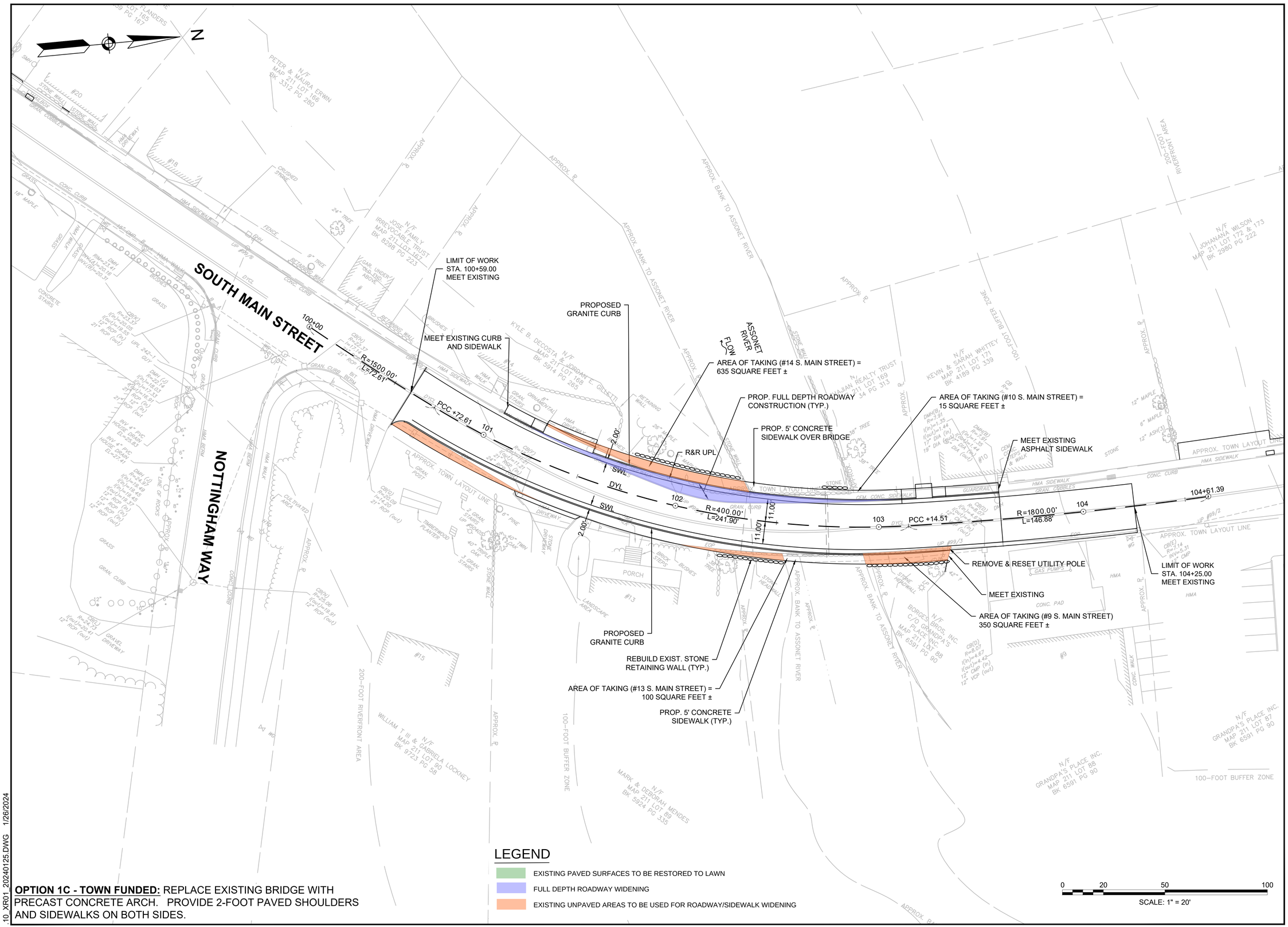
1/25/2024

DRAWN/DESIGN BY	CHECKED BY
NHG	JRN

OPTION 1A
CONCEPTUAL
PLAN

SCALE: 1"=20'

MAX-2015034.10



OPTION 1C - TOWN FUNDED: REPLACE EXISTING BRIDGE WITH PRECAST CONCRETE ARCH. PROVIDE 2-FOOT PAVED SHOULDERS AND SIDEWALKS ON BOTH SIDES.

10_XR01_20240125.DWG 1/26/2024

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PREPARED FOR

TOWN OF FREETOWN

BRIDGE OPTIONS STUDY
SOUTH MAIN STREET (ROUTE 79)
FREETOWN, MASSACHUSETTS

REVISIONS		
NO.	REVISION	DATE

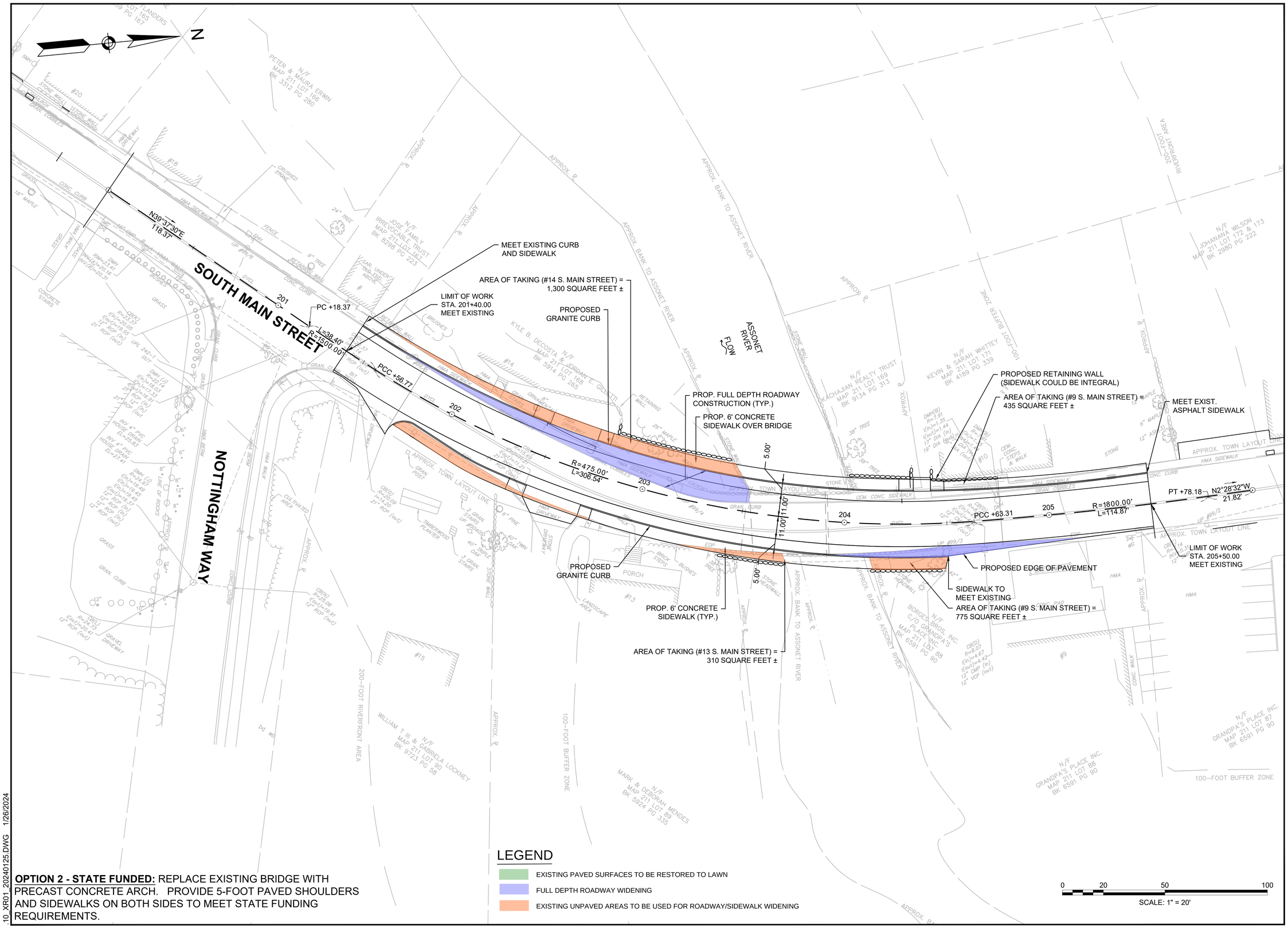
1/25/2024

DRAWN/DESIGN BY	CHECKED BY
NHG	JRN

OPTION 1C CONCEPTUAL PLAN

SCALE: 1"=20'

MAX-2015034.10



OPTION 2 - STATE FUNDED: REPLACE EXISTING BRIDGE WITH PRECAST CONCRETE ARCH. PROVIDE 5-FOOT PAVED SHOULDERS AND SIDEWALKS ON BOTH SIDES TO MEET STATE FUNDING REQUIREMENTS.

10_XR01_20240125.DWG 1/26/2024

GPI Engineering Design Planning Construction Management
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181 Ballardvale Street, Suite 202
Wilmington, MA 01887

PREPARED FOR

TOWN OF FREETOWN

BRIDGE REPLACEMENT
SOUTH MAIN STREET (ROUTE 79)
FREETOWN, MASSACHUSETTS

REVISIONS		
NO.	REVISION	DATE

1/25/2024

DRAWN/DESIGN BY	CHECKED BY
NHG	JRN

OPTION 2 CONCEPTUAL PLAN

SCALE: 1"=20'

MAX-2015034.10

3 OF 3

Appendix B: Cost Estimates

GPI

Greenman-Pedersen, Inc.

Engineers, Architects, Planners, Construction Engineers & Inspectors

PRELIMINARY COST ESTIMATE

South Main Street
Freetown, MA

Project Name: South Main Street Bridge Replacement - **Option 1A** **Date:** 1/26/2024 **Computed By:** EMD

Location: South Main Street Bridge over the Assonet River, Freetown MA **Job No:** - **Checked By:** JN

Based On: GPI Construction Documents dated

Prices From: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	Unit Cost	COST	QUANTITY	COST
See Pg. A-1	FULL DEPTH ROADWAY CONSTRUCTION	SY	$105.00	$105.00	135	$14,175
See Pg. A-1	PAVEMENT MILLING AND OVERLAY	SY	$24.40	$24.40	765	$18,666
See Pg. A-1	HOT MIX ASPHALT WALK	SY	$88.00	$88.00	115	$10,120
See Pg. A-2	HOT MIX ASPHALT DRIVEWAY	SY	$106.00	$106.00	40	$4,240
220	DRAINAGE STRUCTURE ADJUSTED	EA	$573.22	$573	3	$1,720
506	GRANITE CURB TYPE VB - STRAIGHT	FT	$78.99	$79	280	$22,117
866.106	6 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)	FT	$1.90	$2	675	$1,283
867.106	6 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)	FT	$1.92	$2	810	$1,555
899	POLICE DETAILS	HR	$70.00	$70	400	$28,000
	Misc. Items not included above to complete roadway work (say 50%)	LS				$50,938
					Subtotal	$152,813
					Utility Pole Relocation	$20,000
					Inflation (2 Years@7.5%) =	$22,922
					Total =	$195,735

Say **$200,000**

GPI

Greenman-Pedersen, Inc.

Engineers, Architects, Planners, Construction Engineers & Inspectors

PRELIMINARY COST ESTIMATE

South Main Street
Freetown, MA

Project Name: South Main Street Bridge Replacement - **Option 1B** **Date:** 1/26/2024 **Computed By:** EMD

Location: South Main Street Bridge over the Assonet River, Freetown MA **Job No:** - **Checked By:** JN

Based On: GPI Construction Documents dated

Prices From: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	Unit Cost	COST	QUANTITY	COST
See Pg. A-1	FULL DEPTH ROADWAY CONSTRUCTION	SY	$105.00	$105.00	145	$15,225
See Pg. A-1	PAVEMENT MILLING AND OVERLAY	SY	$24.40	$24.40	750	$18,300
See Pg. A-1	HOT MIX ASPHALT WALK	SY	$88.00	$88.00	115	$10,120
See Pg. A-2	HOT MIX ASPHALT DRIVEWAY	SY	$106.00	$106.00	40	$4,240
220	DRAINAGE STRUCTURE ADJUSTED	EA	$573.22	$573	3	$1,720
506	GRANITE CURB TYPE VB - STRAIGHT	FT	$78.99	$79	280	$22,117
866.106	6 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)	FT	$1.90	$2	675	$1,283
867.106	6 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)	FT	$1.92	$2	810	$1,555
899	POLICE DETAILS	HR	$70.00	$70	400	$28,000
	Misc. Items not included above to complete roadway work (say 50%)	LS				$51,280
					Subtotal	$153,839
					Utility Pole Relocation	$20,000
					Inflation (2 Years@7.5%) =	$23,076
					Total =	$196,915

Say **$200,000**

GPI

Greenman-Pedersen, Inc.

Engineers, Architects, Planners, Construction Engineers & Inspectors

PRELIMINARY COST ESTIMATE

South Main Street
Freetown, MA

Project Name: South Main Street Bridge Replacement - **Option 1C** **Date:** 1/26/2024 **Computed By:** EMD

Location: South Main Street Bridge over the Assonet River, Freetown MA **Job No:** - **Checked By:** JN

Based On: GPI Construction Documents dated

Prices From: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	Unit Cost	COST	QUANTITY	COST
See Pg. A-1	FULL DEPTH ROADWAY CONSTRUCTION	SY	$105.00	$105.00	145	$15,225
See Pg. A-1	PAVEMENT MILLING AND OVERLAY	SY	$24.40	$24.40	750	$18,300
See Pg. A-1	HOT MIX ASPHALT WALK	SY	$88.00	$88.00	225	$19,800
See Pg. A-2	HOT MIX ASPHALT DRIVEWAY	SY	$106.00	$106.00	65	$6,890
220	DRAINAGE STRUCTURE ADJUSTED	EA	$573.22	$573	3	$1,720
506	GRANITE CURB TYPE VB - STRAIGHT	FT	$78.99	$79	280	$22,117
866.106	6 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)	FT	$1.90	$2	675	$1,283
867.106	6 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)	FT	$1.92	$2	810	$1,555
899	POLICE DETAILS	HR	$70.00	$70	400	$28,000
	Misc. Items not included above to complete roadway work (say 50%)	LS				$57,445
					Subtotal	$172,334
					Utility Pole Relocation	$40,000
					Inflation (2 Years@7.5%) =	$25,850
					Total =	$238,184
					Say	**$240,000**

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Greenman-Pedersen, Inc.

Engineers, Architects, Planners, Construction Engineers & Inspectors

PRELIMINARY COST ESTIMATE

South Main Street
Freetown, MA

Project Name: South Main Street Bridge Replacement - **Option 2** **Date:** 1/26/2024 **Computed By:** EMD

Location: South Main Street Bridge over the Assonet River, Freetown MA **Job No:** - **Checked By:** JN

Based On: GPI Construction Documents dated

Prices From: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	Unit Cost	COST	QUANTITY	COST
See Pg. A-1	FULL DEPTH ROADWAY CONSTRUCTION	SY	$105.00	$105.00	220	$23,100
See Pg. A-1	PAVEMENT MILLING AND OVERLAY	SY	$24.40	$24.40	1,015	$24,766
See Pg. A-1	HOT MIX ASPHALT WALK	SY	$88.00	$88.00	225	$19,800
See Pg. A-2	HOT MIX ASPHALT DRIVEWAY	SY	$106.00	$106.00	65	$6,890
100	SCHEDULE OF OPERATIONS - FIXED PRICE $	LS	$32,500.00	$32,500	1	$32,500
220	DRAINAGE STRUCTURE ADJUSTED	EA	$573.22	$573	3	$1,720
506	GRANITE CURB TYPE VB - STRAIGHT	FT	$78.99	$79	575	$45,419
740	ENGINEERS FIELD OFFICE AND EQUIPMENT (TYPE A)	MO	$3,500.00	$3,500	36	$126,000
866.106	6 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)	FT	$1.90	$2	725	$1,378
867.106	6 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)	FT	$1.92	$2	920	$1,766
899	POLICE DETAILS	HR	$70.00	$70	600	$42,000
	Misc. Items not included above to complete roadway work (say 50%)	LS				$162,669
					Subtotal	$488,008
					Utility Pole Relocation	$80,000
					Inflation (4 Years@7.5%) =	$146,402
					Total =	$714,411

Say **$720,000**

GPI

Greenman-Pedersen, Inc.

Engineers, Architects, Planners, Construction Engineers & Inspectors

PRELIMINARY COST ESTIMATE

South Main Street
Freetown, MA

Project Name: South Main Street Bridge Replacement - **Option 3** **Date:** 1/26/2024 **Computed By:** EMD

Location: South Main Street Bridge over the Assonet River, Freetown MA **Job No:** - **Checked By:** JN

Based On: GPI Construction Documents dated

Prices From: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	Unit Cost	COST	QUANTITY	COST
See Pg. A-1	FULL DEPTH ROADWAY CONSTRUCTION	SY	$105.00	$105.00	825	$86,625
See Pg. A-1	HOT MIX ASPHALT WALK	SY	$88.00	$88.00	125	$11,000
See Pg. A-2	HOT MIX ASPHALT DRIVEWAY	SY	$106.00	$106.00	40	$4,240
220	DRAINAGE STRUCTURE ADJUSTED	EA	$573.22	$573	3	$1,720
506	GRANITE CURB TYPE VB - STRAIGHT	FT	$78.99	$79	230	$18,168
866.106	6 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)	FT	$1.90	$2	670	$1,273
867.106	6 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)	FT	$1.92	$2	670	$1,286
899	POLICE DETAILS	HR	$70.00	$70	400	$28,000
	Misc. Items not included above to complete roadway work (say 50%)	LS				$76,156
					Subtotal	$228,468
					Utility Pole Relocation	$20,000
					Inflation (2 Years@7.5%) =	$34,270
					Total =	$282,738

Say **$290,000**

APPENDIX TO
CONSTRUCTION COST ESTIMATE

FULL DEPTH ROADWAY CONSTRUCTION - Cost Per Square Yard

Source: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	UNIT COST	Depth In.	Unit /SY	COST PER SY
120	EARTH EXCAVATION	CY	$48.86	18	0.50	$24.43
151	GRAVEL BORROW	CY	$59.68	8	0.22	$13.26
170	FINE GRADING AND COMPACTING - SUBGRADE AREA	SY	$9.35		1.00	$9.35
402	DENSE GRADED CRUSHED STONE FOR SUB-BASE	CY	$97.25	4	0.11	$10.81
460.23	SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5)	TON	$140.00	1.5	0.08	$11.76
460.32	SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0)	TON	$140.00	4.5	0.25	$35.28
460.42	SUPERPAVE BASE COURSE - 37.5 (SBC - 37.5)	TON	$140.00	0	0.00	$0.00
					TOTAL:	$104.89
					SAY	**$105.00**

PAVEMENT MILLING AND OVERLAY - Cost Per Square Yard

Source: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	UNIT COST	Depth In.	Unit /SY	COST PER SY
415.1	PAVEMENT STANDARD MILLING	SY	$8.61		1.00	$8.61
460.23	SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5)	TON	$140.00	2	0.11	$15.68
					TOTAL:	$24.29
					SAY:	**$24.40**

HOT MIX ASPHALT WALK OR ISLAND SURFACE - Cost Per Square Yard

Source: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	UNIT COST	Depth In.	Unit /SY	COST PER SY
120	EARTH EXCAVATION	CY	$48.86	10.5	0.29	$14.25
151	GRAVEL BORROW	CY	$59.68	8	0.22	$13.26
170	FINE GRADING AND COMPACTING - SUBGRADE AREA	SY	$9.35		1.00	$9.35
702	HOT MIX ASPHALT SIDEWALK OR DRIVEWAY	TON	$299.51	3	0.17	$50.32
					TOTAL:	$87.18
					SAY:	**$88.00**

CEMENT CONCRETE WALK OR ISLAND SURFACE - Cost Per Square Yard

Source: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	UNIT COST	Depth In.	Unit /SY	COST PER SY
120	EARTH EXCAVATION	CY	$48.86	12	0.33	$16.29
151	GRAVEL BORROW	CY	$59.68	8	0.22	$13.26
170	FINE GRADING AND COMPACTING - SUBGRADE AREA	SY	$9.35		1.00	$9.35
701	CEMENT CONCRETE SIDEWALK	SY	$101.93		1.00	$101.93
					TOTAL:	$140.83
					SAY	**$140.90**

APPENDIX TO
CONSTRUCTION COST ESTIMATE

HOT MIX ASPHALT DRIVEWAY - Cost Per Square Yard

Source: MHD Average Unit Prices 01/2024

ITEM NO.	DESCRIPTION	UNIT	UNIT COST	Depth In.	Unit /SY	COST PER SY
120.1	UNCLASSIFIED EXCAVATION	CY	$48.86	12	0.33	$16.29
151	GRAVEL BORROW	CY	$59.68	8	0.22	$13.26
170	FINE GRADING AND COMPACTING - SUBGRADE AREA	SY	$9.35		1.00	$9.35
702	HOT MIX ASPHALT SIDEWALK OR DRIVEWAY	TON	$299.51	4	0.22	$67.09
					TOTAL:	$105.99
					SAY:	**$106.00**

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
BRIDGE SECTION

BRIDGE NO.
F-09-002 (3KP)

TOWN	FREETOWN			CLASS	HL-93
STA.		ROAD	SOUTH MAIN STREET	OVER	ASSONET
TYPE	PRECAST ARCH	ROADWAY	22'-0"	SIDEWALKS	5'-0"
SPANS	N/A	LENGTH	37'-0"	VERTICAL CL.	N/A

< PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF BRIDGE REPLACEMENT >
OPTION 1a - PRECAST CONCRETE ARCH

ITEM	QUANTITY	UNITS	DESCRIPTION	UNIT PRICE	AMOUNT
115.	1	LS	DEMOLITION OF BRIDGE NO. F-09-002 (3KP)	$ 110,000.00	$ 110,000.00
140.	180	CY	BRIDGE EXCAVATION	$ 90.00	$ 16,200.00
144.0	20	CY	CLASS B ROCK EXCAVATION	$ 500.00	$ 10,000.00
151.1	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$ 100.00	$ 1,500.00
151.2	574	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$ 100.00	$ 57,425.93
690.0	65	CY	STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR	$ 1,500.00	$ 97,500.00
904.3	45	CY	5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE	$ 4,000.00	$ 180,000.00
910.1	7,000	LB	STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED	$ 4.50	$ 31,500.00
991.1	1	LS	CONTROL OF WATER - STRUCTURE NO. F-09-002	$ 300,000.00	$ 300,000.00
995.01	1	LS	BRIDGE STRUCTURE, BRIDGE NO. F-09-002	$ 640,000.00	$ 640,000.00

SUBTOTAL =	$ 1,444,125.93
ADD 50% CONTINGENCY =	$ 722,062.96
TOTAL =	$ 2,166,188.89
SAY =	$ 2,170,000.00

Notes:

ESTIMATED BY: CMP 11/30/2023 CHECKED BY: MAH 1/29/24 APPROVED BY:

GPI Greenman-Pedersen, Inc. 181 Ballardvale Street | Suite 202 | Wilmington, MA 01887

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 115.1 DEMOLITION OF BRIDGE NO. F-09-002 (3KP) LS

Existing Superstructure

Length	37.00 ft.	
Width	35.00 ft.	(Average width)
Total	1295.00 SF	Surface area
	143.89 SY	

$ per Square Yard = $ 500

143.89 SY x 500 $/SY = $ 71944

Existing Substructure

Length	35.00 ft.	(Average width)
Height	2.00 ft.	(assumed)
Width	5.00 ft.	(assumed)
Total	700.00 CF	Volume (x2 to include both abutments)
	25.93 CY	

$ per Cubic Yard = $ 750

25.93 CY x 750 $/CY = $ 19444

Removal of Stone Fascia and Parapets

Contingency for removal of stones for reuse 10%

TOTAL **$110,000**

1 LS

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 140. BRIDGE EXCAVATION **CY**

Items

- Prop. Bridge Footings
- Prop. Wingwall Footing

Prop. Bridge Footings

Prop. BOF El. =	-6.10	(say)
Abutment Footing Plan Area =	238.00 SF	(32'L x 5'W plus 1' on edges)
Exist. Ground El. =	0.60	(approx.)
Excavation Depth =	7.20 ft	(assume additional 6" for crushed stone under footing)
No. Abutments =	2	
Gross Volume of Excavation =	3420.01 CF	
Volume of Excavation =	126.67 CY	

Prop. Wingwall Footing

Prop. BOF El. =	-6.10	(say)
Abutment Footing Plan Area =	175.00 SF	(AutoCAD SW wingwall expanded)
Exist. Ground El. =	0.60	(approx.)
Excavation Depth =	7.20 ft	(assume additional 6" for crushed stone under footing)
No. Wingwalls =	1	
Gross Volume of Excavation =	1260.00 CF	
Volume of Excavation =	46.67 CY	

BRIDGE EXCAVATION = 173 CY

180 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 144. CLASS B ROCK EXCAVATION **CY**

Items

- Contingency Item for rock encountered during bridge excavation

Volume from Item 140. =	180	CY
% Rock Assumed =	10%	
Volume =	18	CY

20 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 151. GRAVEL BORROW FOR BRIDGE FOUNDATION **CY**

Items

- Prop. Bridge Footings
- Prop. Wingwall Footing

Footing Width =	5.00 ft
Footing Length =	34.00 ft
Footing Plan Area =	170.00 SF
Gravel Borrow Plan Area =	252.00 SF
Gravel Borrow Depth =	0.50 ft
No. Abutments =	2
Gravel Borrow Volume =	252.00 CF
	9.33 CY

Footing Width =	5.00 ft
Footing Length =	35.00 ft
Footing Plan Area =	175.00 SF
Gravel Borrow Plan Area =	259.00 SF
Gravel Borrow Depth =	0.50 ft
No. Wingwalls =	1
Gravel Borrow Volume =	129.50 CF
	4.80 CY

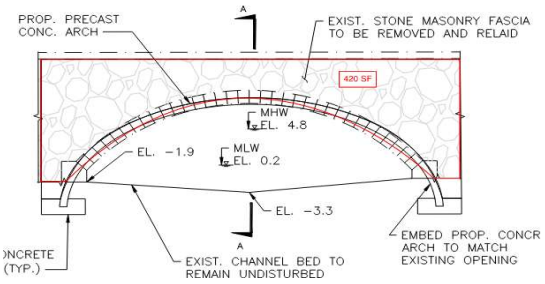
15 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/2023
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 151.2 GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES CY

Items

- Backfill over precast arch
- Backfill behind wingwall



Backfill over precast arch

Gravel Borrow Section =	420.00 SF	(Over Arch)
Gravel Borrow width =	34.00 FT	(Width of Arch)

Backfill behind wingwall

Gravel Borrow Section =	35.00 SF	(Assumed 5' W x 7'H area behind WW)
Gravel Borrow width =	35.00 FT	(Measured Length of all WW to be expanded)

Gravel Borrow Volume = 15505.00 CF

574.26 CY

574 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 690. STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR CY

Stone Facias

Depth =	1.00	FT	(assumed 1 ft for facia covering)
Cross Section Area =	420	SF	(assumed)
Number of Faces =	2		
Volume =	840	CF	
	31.11	CY	

SW Wingall

Area =	280	SF	(AutoCAD)
Width =	3	FT	(assume existing wall width)
Volume =	840	CF	
	31.11	CY	

65 CY

PROJECT:	FREETOWN		SHEET		of
JOB NO.	MAX-2015134.10		CALC. BY:	CMP	DATE: 11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER		CHECK BY:	MAH	DATE: 1/29/24

ITEM 904.3 5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE **CY**

Description

- Bridge Footings
- Wingwall Footing

Bridge Footings

Footing Width =	5.00	FT	(Assumed)
Footing Length =	34.00	FT	(Assumed)
Depth =	2.00	FT	(Assumed)
Number of Footings	2.00		
Total Volume =	680.00	CF	

Wingwall Footing

Footing Width =	5.00	FT	(Assumed)
Footing Length =	35.00	FT	(Assumed)
Depth =	2.00	FT	(Assumed)
Number of Footings	1.00		
Total Volume =	350.00	CF	

Increase by 10% for miscellaneous	103.00	CF

5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE = 45.00 CY

45 CY

PROJECT:	FREETOWN	SHEET	1	of	1
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 910.1 STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED LB

Substructure Units

Volume of Footings =	38.15	CY
	175	LB/CY
Subtotal =	6676	LB

STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED = 6,676 LB

7,000 LB

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/2023
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 991.1 CONTROL OF WATER - STRUCTURE NO. F-09-002 LS

Items

- Water Control Lump Sum

Total Length Required =	65.00	FT	(Assumed)
Approx. Cost per LF =	2000	$/FT	
Number of Stages =	2		
Lump Sum =	$300,000		

Say:	**$300,000**	
Say:	**1**	**LS**

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PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/2023
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 995.01 BRIDGE STRUCTURE, BRIDGE NO. F-09-002 LS

Items

- Prescast Arch Lump Sum

Total Width Required =	32.00	FT	(AutoCAD)
Approx. Cost per LF =	10000	$/FT	
Installation Costs =	10000	$/FT	
Lump Sum =	$640,000		

Say:	**$640,000**	
Say:	**1**	**LS**

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
BRIDGE SECTION

BRIDGE NO.
F-09-002 (3KP)

TOWN	FREETOWN			CLASS	HL-93
STA.		ROAD	SOUTH MAIN STREET	OVER	ASSONET
TYPE	PRECAST ARCH	ROADWAY	24'-0"	SIDEWALKS	5'-0"
SPANS	N/A	LENGTH	37'-0"	VERTICAL CL.	N/A

< PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF BRIDGE REPLACEMENT >
OPTION 1b - PRECAST CONCRETE ARCH

ITEM	QUANTITY	UNITS	DESCRIPTION	UNIT PRICE	AMOUNT
115.	1	LS	DEMOLITION OF BRIDGE NO. F-09-002 (3KP)	$ 110,000.00	$ 110,000.00
140.	190	CY	BRIDGE EXCAVATION	$ 90.00	$ 17,100.00
144.0	20	CY	CLASS B ROCK EXCAVATION	$ 500.00	$ 10,000.00
151.1	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$ 100.00	$ 1,500.00
151.2	605	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$ 100.00	$ 60,537.04
690.0	65	CY	STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR	$ 1,500.00	$ 97,500.00
904.3	45	CY	5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE	$ 4,000.00	$ 180,000.00
910.1	7,000	LB	STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED	$ 4.50	$ 31,500.00
991.1	1	LS	CONTROL OF WATER - STRUCTURE NO. F-09-002	$ 300,000.00	$ 300,000.00
995.01	1	LS	BRIDGE STRUCTURE, BRIDGE NO. F-09-002	$ 650,000.00	$ 650,000.00

SUBTOTAL =	$ 1,458,137.04
ADD 50% CONTINGENCY =	$ 729,068.52
TOTAL =	$ 2,187,205.56
SAY =	$ 2,190,000.00

Notes:

ESTIMATED BY: CMP 11/30/2023 CHECKED BY: MAH 1/29/24 APPROVED BY:

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 115.1 DEMOLITION OF BRIDGE NO. F-09-002 (3KP) LS

Existing Superstructure

Length	37.00 ft.	
Width	35.00 ft.	(Average width)
Total	1295.00 SF	Surface area
	143.89 SY	

$ per Square Yard = $ 500

143.89 SY x 500 $/SY = $ 71944

Existing Substructure

Length	35.00 ft.	(Average width)
Height	2.00 ft.	(assumed)
Width	5.00 ft.	(assumed)
Total	700.00 CF	Volume (x2 to include both abutments)
	25.93 CY	

$ per Cubic Yard = $ 750

25.93 CY x 750 $/CY = $ 19444

Removal of Stone Fascia and Parapets

Contingency for removal of stones for reuse 10%

TOTAL **$110,000**

1 LS

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 140. BRIDGE EXCAVATION **CY**

Items

- Prop. Bridge Footings
- Prop. Wingwall Footing

Prop. Bridge Footings

Prop. BOF El. =	-6.10	(say)
Abutment Footing Plan Area =	252.00 SF	(Avg. 34'L x 5'W plus 1' on edges)
Exist. Ground El. =	0.60	(approx.)
Excavation Depth =	7.20 ft	(assume additional 6" for crushed stone under footing)
No. Abutments =	2	
Gross Volume of Excavation =	3621.61 CF	
Volume of Excavation =	134.13 CY	

Prop. Wingwall Footing

Prop. BOF El. =	-6.10	(say)
Abutment Footing Plan Area =	175.00 SF	(AutoCAD SW wingwall expanded)
Exist. Ground El. =	0.60	(approx.)
Excavation Depth =	7.20 ft	(assume additional 6" for crushed stone under footing)
No. Wingwalls =	1	
Gross Volume of Excavation =	1260.00 CF	
Volume of Excavation =	46.67 CY	

BRIDGE EXCAVATION = 181 CY

190 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 144. CLASS B ROCK EXCAVATION **CY**

Items

- Contingency Item for rock encountered during bridge excavation

Volume from Item 140. =	190	CY
% Rock Assumed =	10%	
Volume =	19	CY

20 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 151. GRAVEL BORROW FOR BRIDGE FOUNDATION CY

Items

- Prop. Bridge Footings
- Prop. Wingwall Footing

Footing Width =	5.00 ft
Footing Length =	36.00 ft
Footing Plan Area =	180.00 SF
Gravel Borrow Plan Area =	266.00 SF
Gravel Borrow Depth =	0.50 ft
No. Abutments =	2
Gravel Borrow Volume =	266.00 CF
	9.85 CY

Footing Width =	5.00 ft
Footing Length =	35.00 ft
Footing Plan Area =	175.00 SF
Gravel Borrow Plan Area =	259.00 SF
Gravel Borrow Depth =	0.50 ft
No. Wingwalls =	1
Gravel Borrow Volume =	129.50 CF
	4.80 CY

15 CY

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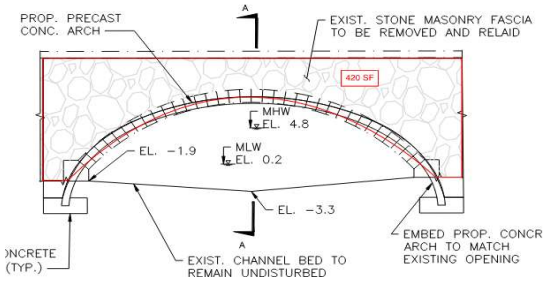
PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 151.2 GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES CY



Items

- Backfill over precast arch
- Backfill behind wingwall

Backfill over precast arch

Gravel Borrow Section =	420.00 SF	(Over Arch)
Gravel Borrow width =	36.00 FT	(Width of Arch)

Backfill behind wingwall

Gravel Borrow Section =	35.00 SF	(Assumed 5' W x 7'H area behind WW)
Gravel Borrow width =	35.00 FT	(Measured Length of all WW to be expanded)

Gravel Borrow Volume = 16345.00 CF

605.37 CY

605 CY

PROJECT: FREETOWN SHEET of
JOB NO. MAX-2015134.10 CALC. BY: CMP DATE: 11/30/23
DESCRIPTION: SOUTH MAIN STREET OVER ASSONET RIVER CHECK BY: MAH DATE: 1/29/24

ITEM 690. STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR CY

Stone Facias

Depth =	1.00	FT	(assumed 1 ft for facia covering)
Cross Section Area =	420	SF	(AutoCAD)
Number of Faces =	2		
Volume =	840	CF	
	31.11	CY	

SW Wingwall

Area =	280	SF	(total for all 4 walls, assume sloped back at 1:1)
Width =	3	FT	(assume existing wall width)
Volume =	840	CF	
	31.11	CY	

65 CY

PROJECT:	FREETOWN		SHEET		of
JOB NO.	MAX-2015134.10		CALC. BY:	CMP	DATE: 11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER		CHECK BY:	MAH	DATE: 1/29/24

ITEM 904.3 5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE **CY**

Description

- Bridge Footings
- Wingwall Footing

Bridge Footings

Footing Width =	5.00	FT	(Assumed)
Footing Length =	36.00	FT	(Assumed)
Depth =	2.00	FT	(Assumed)
Number of Footings	2.00		
Total Volume =	720.00	CF	

Wingwall Footing

Footing Width =	5.00	FT	(Assumed)
Footing Length =	35.00	FT	(Assumed)
Depth =	2.00	FT	(Assumed)
Number of Footings	1.00		
Total Volume =	350.00	CF	

Increase by 10% for miscellaneous	107.00	CF

5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE = 45.00 CY

45 CY

PROJECT:	FREETOWN	SHEET	1	of	1
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/1/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 910.1 STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED LB

Substructure Units

Volume of Abutment Footings = 39.63 CY

175 LB/CY

Subtotal = 6935 LB

STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED = 6,935 LB

7,000 LB

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/2023
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 991.1 CONTROL OF WATER - STRUCTURE NO. F-09-002 LS

Items

- Water Control Lump Sum

Total Length Required =	75.00	FT	(Assumed)
Approx. Cost per LF =	2000	$/FT	
Number of Stages =	2		
Lump Sum =	$300,000		

Say:	**$300,000**	
Say:	**1**	**LS**

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/2023
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 995.01 BRIDGE STRUCTURE, BRIDGE NO. F-09-002 LS

Items

- Prescast Arch Lump Sum

Total Width Required =	34.00	FT	(AutoCAD)
Approx. Cost per LF =	9500	$/FT	
Installation Costs =	9500	$/FT	
Lump Sum =	$650,000		

Say:	**$650,000**	
Say:	**1**	**LS**

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
BRIDGE SECTION

BRIDGE NO.
F-09-002 (3KP)

TOWN	FREETOWN			CLASS	HL-93
STA.		ROAD	SOUTH MAIN STREET	OVER	ASSONET
TYPE	PRECAST ARCH	ROADWAY	24'-0"	SIDEWALKS	5'-0"
SPANS	N/A	LENGTH	37'-0"	VERTICAL CL.	N/A

< PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF BRIDGE REPLACEMENT >
OPTION 1c - PRECAST CONCRETE ARCH

ITEM	QUANTITY	UNITS	DESCRIPTION	UNIT PRICE	AMOUNT
115.	1	LS	DEMOLITION OF BRIDGE NO. F-09-002 (3KP)	$ 110,000.00	$ 110,000.00
140.	270	CY	BRIDGE EXCAVATION	$ 90.00	$ 24,300.00
144.0	30	CY	CLASS B ROCK EXCAVATION	$ 500.00	$ 15,000.00
151.1	25	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$ 100.00	$ 2,500.00
151.2	717	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$ 100.00	$ 71,685.19
690.0	110	CY	STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR	$ 1,500.00	$ 165,000.00
904.3	70	CY	5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE	$ 4,000.00	$ 280,000.00
910.1	11,000	LB	STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED	$ 4.50	$ 49,500.00
991.1	1	LS	CONTROL OF WATER - STRUCTURE NO. F-09-002	$ 400,000.00	$ 400,000.00
995.01	1	LS	BRIDGE STRUCTURE, BRIDGE NO. F-09-002	$ 740,000.00	$ 740,000.00

SUBTOTAL =	$ 1,857,985.19
ADD 50% CONTINGENCY =	$ 928,992.59
TOTAL =	$ 2,786,977.78
SAY =	$ 2,790,000.00

Notes:

ESTIMATED BY: CMP 11/30/2023 CHECKED BY: MAH 1/29/24 APPROVED BY:

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PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 115.1 DEMOLITION OF BRIDGE NO. F-09-002 (3KP) LS

Existing Superstructure

Length	37.00 ft.	
Width	35.00 ft.	(Average width)
Total	1295.00 SF	Surface area
	143.89 SY	

$ per Square Yard = $ 500

143.89 SY x 500 $/SY = $ 71944

Existing Substructure

Length	35.00 ft.	(Average width)
Height	2.00 ft.	(assumed)
Width	5.00 ft.	(assumed)
Total	700.00 CF	Volume (x2 to include both abutments)
	25.93 CY	

$ per Cubic Yard = $ 750

25.93 CY x 750 $/CY = $ 19444

Removal of Stone Fascia and Parapets

Contingency for removal of stones for reuse 10%

TOTAL **$110,000**

1 LS

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 140. BRIDGE EXCAVATION **CY**

Items

- Prop. Bridge Footings
- Prop. Wingwall Footings

Prop. Bridge Footings

Prop. BOF El. =	-6.10	(say)
Abutment Footing Plan Area =	287.00 SF	(Avg. 39'L x 5'W plus 1' on edges)
Exist. Ground El. =	0.60	(approx.)
Excavation Depth =	7.20 ft	(assume additional 6" for crushed stone under footing)
No. Abutments =	2	
Gross Volume of Excavation =	4125.61 CF	
Volume of Excavation =	152.80 CY	

Prop. Wingwall Footings

Prop. BOF El. =	-6.10
Abutment Footing Plan Area =	425.00 SF
Exist. Ground El. =	0.60
Excavation Depth =	7.20 ft
No. Wingwalls =	1
Gross Volume of Excavation =	3060.00 CF
Volume of Excavation =	113.33 CY

BRIDGE EXCAVATION = 266 CY

270 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 144. CLASS B ROCK EXCAVATION **CY**

Items

- Contingency Item for rock encountered during bridge excavation

Volume from Item 140. =	270	CY
% Rock Assumed =	10%	
Volume =	27	CY

30 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 151. GRAVEL BORROW FOR BRIDGE FOUNDATION **CY**

Items

- Prop. Bridge Footings
- Prop. Wingwall Footings

Footing Width =	5.00 ft
Footing Length =	39.00 ft
Footing Plan Area =	195.00 SF
Gravel Borrow Plan Area =	287.00 SF
Gravel Borrow Depth =	0.50 ft
No. Abutments =	2
Gravel Borrow Volume =	287.00 CF
	10.63 CY

Footing Width =	5.00 ft
Footing Length =	85.00 ft
Footing Plan Area =	425.00 SF
Gravel Borrow Plan Area =	609.00 SF
Gravel Borrow Depth =	0.50 ft
No. Wingwalls =	1
Gravel Borrow Volume =	304.50 CF
	11.28 CY

25 CY

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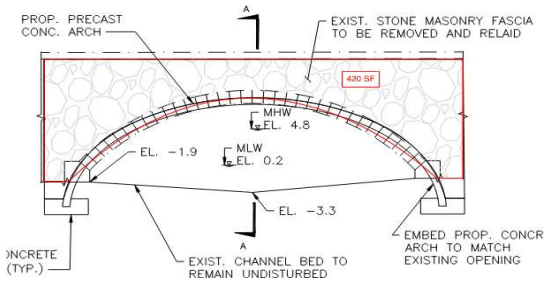
PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 151.2 GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES CY

Items

- Backfill over precast arch
- Backfill behind wingwalls



Backfill over precast arch

Gravel Borrow Section =	420.00 SF	(Over Arch)
Gravel Borrow width =	39.00 FT	(Width of Arch)

Backfill behind wingwalls

Gravel Borrow Section =	35.00 SF	(Assumed 5' W x 7'H area behind WW)
Gravel Borrow length =	85.00 FT	(Measured Length of all WW to be expanded)

Gravel Borrow Volume = 19355.00 CF

716.85 CY

717 CY

PROJECT:	FREETOWN		SHEET		of
JOB NO.	MAX-2015134.10		CALC. BY:	CMP	DATE: 11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER		CHECK BY:	MAH	DATE: 1/29/24

ITEM 690. STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR CY

Stone Facias

Depth =	1.00	FT	(assumed 1 ft for facia covering)
Cross Section Area =	420	SF	(assumed)
Number of Faces =	2		
Volume =	840	CF	
	31.11	CY	

SW and NE Wingwalls

Area =	680	SF	(total for all 4 walls, assume sloped back at 1:1)
Width =	3	FT	(assume existing wall width)
Volume =	2040	CF	
	75.56	CY	

110 CY

PROJECT:	FREETOWN		SHEET		of
JOB NO.	MAX-2015134.10		CALC. BY:	CMP	DATE: 11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER		CHECK BY:	MAH	DATE: 1/29/24

ITEM 904.3 5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE **CY**

Description

- Bridge Footings
- Wingwall Footings

Bridge Footings

Footing Width =	5.00	FT	(Assumed)
Footing Length =	39.00	FT	(Assumed)
Depth =	2.00	FT	(Assumed)
Number of Footings	2.00		
Total Volume =	780.00	CF	

Wingwall Footings

Footing Width =	5.00	FT	(Assumed)
Footing Length =	85.00	FT	(Assumed)
Depth =	2.00	FT	(Assumed)
Number of Footings	1.00		
Total Volume =	850.00	CF	

Increase by 10% for miscellaneous	163.00	CF

5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE = 70.00 CY

70 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 910.1 STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED LB

Substructure Units

Volume of Footings =	60.37	CY
	175	LB/CY
Subtotal =	10565	LB

STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED = 10,565 LB

11,000 LB

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/2023
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 991.1 CONTROL OF WATER - STRUCTURE NO. F-09-002 LS

Items

- Water Control Lump Sum

Total Length Required =	85.00	FT	(Assumed)
Approx. Cost per LF =	2000	$/FT	
Number of Stages =	2		
Lump Sum =	$400,000		

Say:	**$400,000**	
Say:	**1**	**LS**

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/2023
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 995.01 BRIDGE STRUCTURE, BRIDGE NO. F-09-002 LS

Items

- Prescast Arch Lump Sum

Total Width Required =	39.00	FT	(AutoCAD)
Approx. Cost per LF =	9400	$/FT	
Installation Costs =	9400	$/FT	
Lump Sum =	$740,000		

Say:	**$740,000**	
Say:	**1**	**LS**

TOWN	FREETOWN			CLASS	HL-93
STA.		ROAD	SOUTH MAIN STREET	OVER	ASSONET
TYPE	PRECAST ARCH	ROADWAY	24'-0"	SIDEWALKS	5'-0"
SPANS	N/A	LENGTH	37'-0"	VERTICAL CL.	N/A

< PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF BRIDGE REPLACEMENT >
OPTION 2 - PRECAST CONCRETE ARCH

ITEM	QUANTITY	UNITS	DESCRIPTION	UNIT PRICE	AMOUNT
115.	1	LS	DEMOLITION OF BRIDGE NO.	$ 110,000.00	$ 110,000.00
140.	370	CY	BRIDGE EXCAVATION	$ 90.00	$ 33,300.00
144.0	40	CY	CLASS B ROCK EXCAVATION	$ 500.00	$ 20,000.00
151.1	35	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$ 100.00	$ 3,500.00
151.2	1,039	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$ 100.00	$ 103,898.15
690.0	160	CY	STONE MASONRY WALL REMOVED AND REBUILT I	$ 1,500.00	$ 240,000.00
904.3	30	CY	5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE	$ 4,000.00	$ 120,000.00
910.1	14,000	LB	STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED	$ 4.50	$ 63,000.00
991.1	1	LS	CONTROL OF WATER - STRUCTURE NO. F-09-002	$ 400,000.00	$ 400,000.00
995.01	1	LS	BRIDGE STRUCTURE, BRIDGE NO. F-09-002	$ 840,000.00	$ 840,000.00

SUBTOTAL =	$ 1,933,698.15
ADD 50% CONTINGENCY =	$ 966,849.07
TOTAL =	$ 2,900,547.22
SAY =	$ 2,910,000.00

Notes:

ESTIMATED BY: CMP 11/30/2023 CHECKED BY: MAH 1/29/24 APPROVED BY:

GPI Greenman-Pedersen, Inc. 181 Ballardvale Street | Suite 202 | Wilmington, MA 01887

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 115.1 DEMOLITION OF BRIDGE NO. F-09-002 (3KP) LS

Existing Superstructure

Length	37.00 ft.	
Width	35.00 ft.	(Average width)
Total	1295.00 SF	Surface area
	143.89 SY	

$ per Square Yard = $ 500

143.89 SY x 500 $/SY = $ 71944

Existing Substructure

Length	35.00 ft.	(Average width)
Height	2.00 ft.	(assumed)
Width	5.00 ft.	(assumed)
Total	700.00 CF	Volume (x2 to include both abutments)
	25.93 CY	

$ per Cubic Yard = $ 750

25.93 CY x 750 $/CY = $ 19444

Removal of Stone Fascia and Parapets

Contingency for removal of stones for reuse 10%

TOTAL **$110,000**

1 LS

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PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 140. BRIDGE EXCAVATION **CY**

Items

- Prop. Bridge Footings
- Prop. Wingwall Footings

Prop. Bridge Footings

Prop. BOF El. =	-6.10	(say)
Abutment Footing Plan Area =	322.00 SF	(44'L x 5'W plus 1' on edges)
Exist. Ground El. =	0.60	(approx.)
Excavation Depth =	7.20 ft	(assume additional 6" for crushed stone under footing)
No. Abutments =	2	
Gross Volume of Excavation =	4629.61 CF	
Volume of Excavation =	171.47 CY	

Prop. Wingwall Footings

Prop. BOF El. =	-6.10	(say)
Abutment Footing Plan Area =	725.00 SF	(AutoCAD SW wingwall expanded)
Exist. Ground El. =	0.60	(approx.)
Excavation Depth =	7.20 ft	(assume additional 6" for crushed stone under footing)
No. Wingwalls =	1	
Gross Volume of Excavation =	5220.00 CF	
Volume of Excavation =	193.33 CY	

BRIDGE EXCAVATION = 365 CY

370 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 144. CLASS B ROCK EXCAVATION **CY**

Items

- Contingency Item for rock encountered during bridge excavation

Volume from Item 140. =	370	CY
% Rock Assumed =	10%	
Volume =	37	CY

40 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 151. GRAVEL BORROW FOR BRIDGE FOUNDATION CY

Items

- Prop. Bridge Footings
- Prop. Wingwall Footing

Footing Width =	5.00 ft
Footing Length =	44.00 ft
Footing Plan Area =	220.00 SF
Gravel Borrow Plan Area =	322.00 SF
Gravel Borrow Depth =	0.50 ft
No. Abutments =	2
Gravel Borrow Volume =	322.00 CF
	11.93 CY

Average of 3 sub-options

Footing Width =	5.00 ft
Footing Length =	145.00 ft
Footing Plan Area =	725.00 SF
Gravel Borrow Plan Area =	1029.00 SF
Gravel Borrow Depth =	0.50 ft
No. Wingwalls =	1
Gravel Borrow Volume =	514.50 CF
	19.06 CY

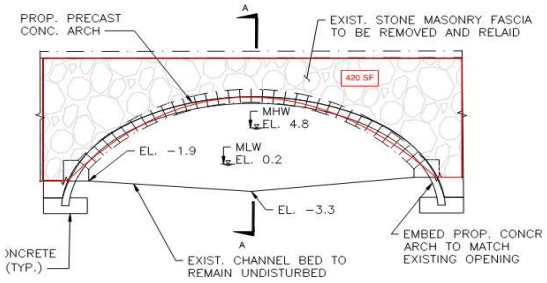
35 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 151.2 GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES CY

Items

- Backfill over precast arch
- Backfill behind wingwall



Backfill over precast arch

Gravel Borrow Section =	420.00 SF	(Over Arch)
Gravel Borrow width =	44.00 FT	(Width of Arch)

Backfill behind wingwall

Gravel Borrow Section =	84.00 SF	(Assumed 5' W x 7'H area behind WW)
Gravel Borrow length =	65.00 FT	(Measured Length of all WW to be expanded)

Backfill behind wingwall

Gravel Borrow Section =	49.00 SF	(Assumed 5' W x 7'H area behind WW)
Gravel Borrow length =	25.00 FT	(Measured Length of all WW to be expanded)

Backfill behind wingwall

Gravel Borrow Section =	52.50 SF	(Assumed 5' W x 7'H area behind WW)
Gravel Borrow length =	55.00 FT	(Measured Length of all WW to be expanded)

Gravel Borrow Volume = 28052.50 CF

1038.98 CY

1039 CY

PROJECT: FREETOWN SHEET of
JOB NO. MAX-2015134.10 CALC. BY: CMP DATE: 11/30/23
DESCRIPTION: SOUTH MAIN STREET OVER ASSONET RIVER CHECK BY: MAH DATE: 1/29/24

ITEM 690. STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR CY

Stone Facias

Depth =	1.00	FT	(assumed 1 ft for facia covering)
Cross Section Area =	420	SF	(assumed)
Number of Faces =	2		
Volume =	840	CF	
	31.11	CY	

SW Wingwall

Area =	520	SF	(AutoCAD)
Length =	3	FT	(assume existing wall width)
Volume =	1560	CF	
	57.78	CY	

NW Wingwall

Area =	200	SF	(AutoCAD)
Length =	3	FT	(assume existing wall width)
Volume =	600	CF	
	22.22	CY	

NE Wingwall

Area =	440	SF	(AutoCAD)
Length =	3	FT	(assume existing wall width)
Volume =	1320	CF	
	48.89	CY	

160 CY

PROJECT:	FREETOWN		SHEET		of
JOB NO.	MAX-2015134.10		CALC. BY:	CMP	DATE: 11/29/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER		CHECK BY:	MAH	DATE: 1/29/24

ITEM 904.3 5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE **CY**

Description

- Bridge Footings
- Wingwall Footings

Bridge Footings

Footing Width =	5.00	FT	(Assumed)
Footing Length =	35.00	FT	(Assumed)
Depth =	2.00	FT	(Assumed)
Number of Footings	2.00		
Total Volume =	700.00	CF	

Wingwall Footings

Footing Width =	5.00	FT	(Assumed)
Footing Length =	145.00	FT	(Assumed)
Depth =	2.00	FT	(Assumed)
Number of Footings	1.00		
Total Volume =	1450.00	CF	

Increase by 10% for miscellaneous	70.10	CF

5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE = 30.00 CY

30 CY

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PROJECT:	FREETOWN	SHEET	1	of	1
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/23
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 910.1 STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED LB

Substructure Units

Volume of Abutment Footings = 79.63 CY

175 LB/CY

Subtotal = 13935 LB

STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED = 13,935 LB

14,000 LB

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	CMP	DATE:	11/30/2023
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	MAH	DATE:	1/29/24

ITEM 991.1 CONTROL OF WATER - STRUCTURE NO. F-09-002 LS

Items

- Water Control Lump Sum

Total Length Required =	85.00	FT	(Assumed)
Approx. Cost per LF =	2000	$/FT	
Number of Stages =	2		
Lump Sum =	$400,000		

Say:	**$400,000**	
Say:	**1**	**LS**

PROJECT:	FREETOWN		SHEET		of
JOB NO.	MAX-2015134.10		CALC. BY:	CMP	DATE: 11/30/2023
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER		CHECK BY:	MAH	DATE: 1/29/24

ITEM 995.01 BRIDGE STRUCTURE, BRIDGE NO. F-09-002 LS

Items

- Water Control Lump Sum

Total Width Required =	42.00	FT	(AutoCAD)
Approx. Cost per LF =	10000	$/FT	
Installation Cost per LF =	10000	$/FT	
Lump Sum =	$840,000		

Say:	**$840,000**	
Say:	**1**	**LS**

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
BRIDGE SECTION

BRIDGE NO.
X-XX-XXX (XXX)

TOWN	FREETOWN			CLASS	HL-93
STA.		ROAD	SOUTH MAIN STREET	OVER	ASSONET
TYPE	Relieving slab	ROADWAY	24'-0"	SIDEWALKS	5'-0"
SPANS	N/A	LENGTH	37'-0"	VERTICAL CL.	N/A

< PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF BRIDGE REPAIR >
OPTION 3 - CONCRETE RELIEVING SLAB

ITEM	QUANTITY	UNITS	DESCRIPTION	UNIT PRICE	AMOUNT
140.	250	CY	BRIDGE EXCAVATION	$ 90.00	$ 22,500.00
144.0	25	CY	CLASS B ROCK EXCAVATION	$ 500.00	$ 12,500.00
151.2	40	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$ 100.00	$ 4,000.00
690.0	15	CY	STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR	$ 1,500.00	$ 22,500.00
904.3	45	CY	5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE	$ 4,000.00	$ 180,000.00
910.1	6,500	LB	STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED	$ 4.50	$ 29,250.00

SUBTOTAL =	$ 270,750.00
ADD 50% CONTINGENCY =	$ 135,375.00
TOTAL =	$ 406,125.00
SAY =	$ 410,000.00

Notes:

ESTIMATED BY: MAH 1/29/24 CHECKED BY: CMP 1/29/24 APPROVED BY:

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 140. BRIDGE EXCAVATION **CY**

Items

- Excavation to Bot. of Proposed Slab

Excavation to Bot. of Proposed Slab

Depth of Soil above arch =	2.50 ft	(say)
Slab Depth =	0.83 ft	
Excavation Depth =	4.33 ft	(Assume 1' below slab)
Width =	39.00 ft	(Add'l 1' on either side of slab)
Length =	39.00 ft	(Add'l 1' on either side of slab)
Gross Volume of Excavation =	6591.00 CF	
Volume of Excavation =	244.11 CY	

BRIDGE EXCAVATION = 244 CY

250 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 144. CLASS B ROCK EXCAVATION **CY**

Items

- Contingency Item for rock encountered during bridge excavation

Volume from Item 140. =	250	CY
% Rock Assumed =	10%	
Volume =	25	CY

25 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 151.1 GRAVEL BORROW FOR BRIDGE FOUNDATION CY

Items

- Under Slab

Width =	29.00 ft	
Length =	41.00 ft	(+2' either side)
Plan Area =	1189.00 SF	
Gravel Borrow Depth =	1.00 ft	(Assumed)
Gravel Borrow Volume =	1189.00 CF	
	44.04 CY	

45 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 151.2 GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES CY

Items

- Behind Masonry Wall to be Rebuilt

Depth =	2.00 ft	(Assume)
Length =	50.00 ft	(Exist)
Height =	10.00 ft	(Assume)
Gravel Borrow Volume =	1000.00 CF	
	37.04 CY	

40 CY

PROJECT: FREETOWN SHEET of
JOB NO. MAX-2015134.10 CALC. BY: MAH DATE: 1/29/24
DESCRIPTION: SOUTH MAIN STREET OVER ASSONET RIVER CHECK BY: CMP DATE: 1/29/24

ITEM 690. STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR CY

Stone Parapet and Wall

Depth =	1.00	FT	(assumed 1 ft for facia covering)
Assume Length =	50.00	FT	
Assume Height =	7	FT	(assumed)
Number of Faces =	1		
Volume =	350	CF	
	12.96	CY	

15 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 904.3 5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE **CY**

Description

- Concrete Relieveing Slab
- Sidewalks

Concrete Relieveing Slab

Width =	29.00	FT	(Sidewalk + Roadway)
Length =	41.00	FT	(From CAD)
Depth =	0.83	FT	(Assumed)
Total Volume =	990.83	CF	

Increase by 10% for miscellaneous 99.08 CF

5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE = 45.00 CY

45 CY

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PROJECT:	FREETOWN	SHEET	1	of	1
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 910.1 STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED LB

Concrete Relieveing Slab

Volume =	36.70	CY
	175	LB/CY
Subtotal =	6422	LB

STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED = 6,422 LB

6,500 LB

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
BRIDGE SECTION

BRIDGE NO.
X-XX-XXX (XXX)

TOWN	FREETOWN			CLASS	HL-93
STA.		ROAD	SOUTH MAIN STREET	OVER	ASSONET
TYPE	Relieving Slab and Saddle	ROADWAY	24'-0"	SIDEWALKS	5'-0"
SPANS	N/A	LENGTH	37'-0"	VERTICAL CL.	N/A

< PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF BRIDGE REPAIR >
OPTION 3 - CONCRETE SADDLE AND RELIEVING SLAB

ITEM	QUANTITY	UNITS	DESCRIPTION	UNIT PRICE	AMOUNT
140.	330	CY	BRIDGE EXCAVATION	$ 90.00	$ 29,700.00
144.0	35	CY	CLASS B ROCK EXCAVATION	$ 500.00	$ 17,500.00
151.2	240	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$ 100.00	$ 24,000.00
690.0	15	CY	STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR	$ 1,500.00	$ 22,500.00
904.3	115	CY	5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE	$ 4,000.00	$ 460,000.00
910.1	11,500	LB	STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED	$ 4.50	$ 51,750.00

SUBTOTAL =	$ 605,450.00
ADD 50% CONTINGENCY =	$ 302,725.00
TOTAL =	$ 908,175.00
SAY =	$ 910,000.00

Notes:

ESTIMATED BY: MAH 1/29/24 CHECKED BY: CMP 1/29/24 APPROVED BY:

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

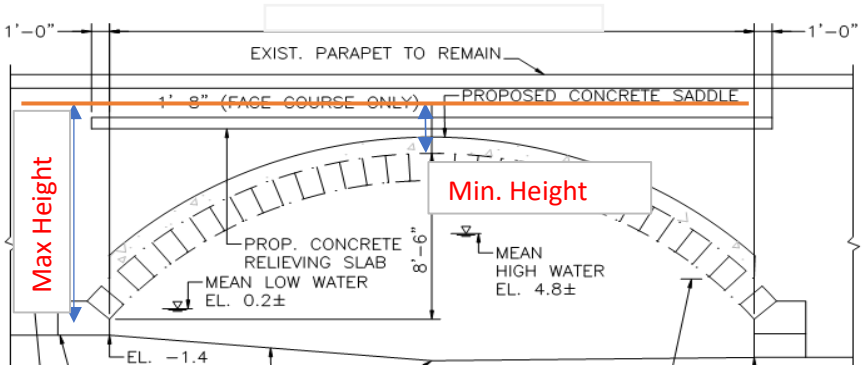
ITEM 140. BRIDGE EXCAVATION **CY**

Items

- Excavation to Top of Existing Arch

Excavation to Top of Existing Arch

Depth of Soil above arch =	1.67 ft	(say)
Arch stone height =	1.33 ft	
Height of arch =	8.50 ft	
Max. Height of soil =	9.83 ft	



Assume Excavation Depth = 2/3* max height *1/3 min height

Excavation Depth =	7.11 ft	(assume max. height is 2/3 of width)
Width =	29.00 ft	
Length =	43.00 ft	(Add'l 1' on either side of slab)
Gross Volume of Excavation =	8867.56 CF	
Volume of Excavation =	328.43 CY	

BRIDGE EXCAVATION = 328 CY

330 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 144. CLASS B ROCK EXCAVATION **CY**

Items

- Contingency Item for rock encountered during bridge excavation

Volume from Item 140. =	330	CY
% Rock Assumed =	10%	
Volume =	33	CY

35 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

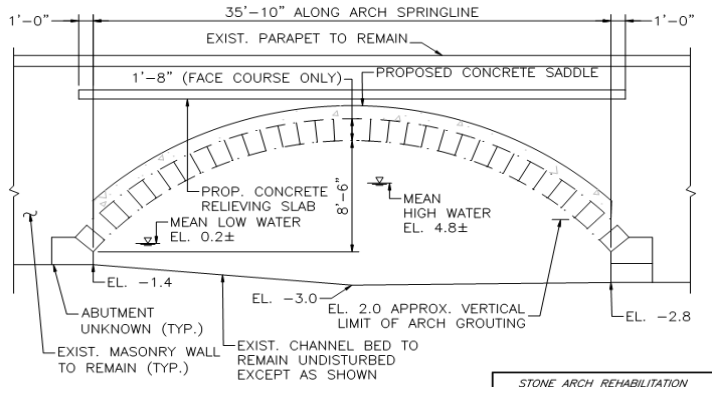
ITEM 151.2 GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES CY

Items

- Under Slab
- Behind Masonry Wall to be Rebuilt

Behind Masonry Wall to be Rebuilt

Depth =	2.00 ft	(Assume)
Length =	50.00 ft	(Exist)
Height =	10.00 ft	(Assume)
Gravel Borrow Volume =	1000.00 CF	
	37.04 CY	



Under Slab

Width =	29.00 ft	
Length =	39.00 ft	(2' wider than exist)
Plan Area =	1131.00 SF	
Depth at CL =	0.50 ft	(Assumed)
Depth =	7.00 ft	(Assumed)
Avg depth =	4.83 ft	(2/3 assumed)
Gravel Borrow Volume =	5466.50 CF	
	202.46 CY	

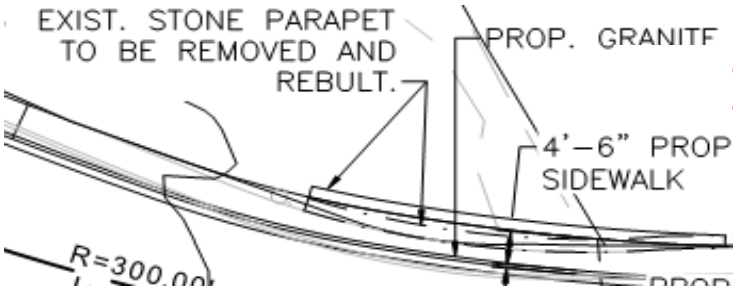
240 CY

PROJECT:	FREETOWN		SHEET		of
JOB NO.	MAX-2015134.10		CALC. BY:	MAH	DATE: 1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER		CHECK BY:	CMP	DATE: 1/29/24

ITEM 690. STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR CY

Stone Parapet and Wall

Depth =	1.00	FT	(assumed 1 ft for facia covering)
Assume Length =	50.00	FT	
Assume Height =	7	FT	(assumed)
Number of Faces =	1		
Volume =	350	CF	
	12.96	CY	



15 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 904.3 5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE **CY**

Description

- Concrete Saddle
- Concrete Relieveing Slab
- Sidewalks

Concrete Saddle

Cross Sectional Volume =	39.85	SF	(From CAD)
Width =	29.00	FT	(Assumed)
Depth =	1.50	FT	(Assumed)
Total Volume =	1733.66	CF	

Concrete Relieveing Slab

Width =	29.00	FT	(Sidewalk + Roadway)
Length =	41.00	FT	(From CAD)
Depth =	0.83	FT	(Assumed)
Total Volume =	990.83	CF	

Increase by 10% for miscellaneous	272.45	CF

5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE = 115.00 CY

115 CY

GPI Greenman-Pedersen, Inc. 181 Ballardvale Street | Suite 202 | Wilmington, MA 01887

PROJECT:	FREETOWN	SHEET	1	of	1
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 910.1 STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED LB

Concrete Saddle

Volume =	64.21	CY
	175	LB/CY
Subtotal =	11237	LB

Concrete Relieveing Slab

Volume =	36.70	CY
	175	LB/CY
Subtotal =	6422	LB

STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED = 11,237 LB

11,500 LB

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
BRIDGE SECTION

BRIDGE NO.
X-XX-XXX (XXX)

TOWN	FREETOWN			CLASS	HL-93
STA.		ROAD	SOUTH MAIN STREET	OVER	ASSONET
TYPE	Concrete Saddle	ROADWAY	24'-0"	SIDEWALKS	5'-0"
SPANS	N/A	LENGTH	37'-0"	VERTICAL CL.	N/A

< PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF BRIDGE REPAIR >
OPTION 3 - CONCRETE SADDLE

ITEM	QUANTITY	UNITS	DESCRIPTION	UNIT PRICE	AMOUNT
140.	410	CY	BRIDGE EXCAVATION	$ 90.00	$ 36,900.00
144.	45	CY	CLASS B ROCK EXCAVATION	$ 500.00	$ 22,500.00
151.2	280	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$ 100.00	$ 28,000.00
690.	15	CY	STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR	$ 1,500.00	$ 22,500.00
904.3	95	CY	5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE	$ 4,000.00	$ 380,000.00
910.1	14,500	LB	STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED	$ 4.50	$ 65,250.00

SUBTOTAL =	$ 555,150.00
ADD 50% CONTINGENCY =	$ 277,575.00
TOTAL =	$ 832,725.00
SAY =	$ 840,000.00

Notes:

ESTIMATED BY: MAH 1/29/24 CHECKED BY: CMP 1/29/24 APPROVED BY:

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

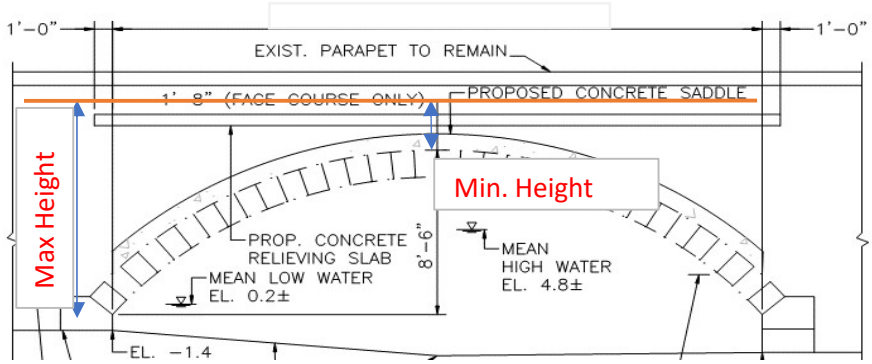
ITEM 140. BRIDGE EXCAVATION **CY**

Items

- Excavation to Top of Existing Arch

Excavation to Top of Existing Arch

Depth of Soil above arch =	1.67 ft	(say)
Arch stone height =	1.33 ft	
Height of arch =	8.50 ft	
Max. Height of soil =	9.83 ft	



Assume Excavation Depth = 2/3* max height *1/3 min height

Excavation Depth =	7.11 ft

Width =	39.00 ft	(Add'l 1' on either side of slab)
Length =	39.00 ft	(Add'l 1' on either side of slab)
Gross Volume of Excavation =	10816.00 CF	
Volume of Excavation =	400.59 CY	

BRIDGE EXCAVATION = 401 CY

410	**CY**

PROJECT:	FREETOWN	SHEET		of	
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ITEM 144. CLASS B ROCK EXCAVATION **CY**

Items

- Contingency Item for rock encountered during bridge excavation

Volume from Item 140. =	410	CY
% Rock Assumed =	10%	
Volume =	41	CY

45 CY

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DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 151.2 GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES CY

Items

- Over Saddle
- Behind Masonry Wall to be Rebuilt

Over Saddle

Width =	37.00 ft	(2' wider than exist)
Length =	37.00 ft	(Exist)
Plan Area =	1369.00 SF	
Depth at CL =	0.17 ft	(Assumed)
Depth =	7.00 ft	(Assumed)
Avg depth =	4.72 ft	(2/3 assumed)
Gravel Borrow Volume =	6464.72 CF	
	239.43 CY	

Behind Masonry Wall to be Rebuilt

Depth =	2.00 ft	(Assume)
Length =	50.00 ft	(Exist)
Height =	10.00 ft	(Assume)
Gravel Borrow Volume =	1000.00 CF	
	37.04 CY	

280 CY

PROJECT: FREETOWN SHEET of
JOB NO. MAX-2015134.10 CALC. BY: MAH DATE: 1/29/24
DESCRIPTION: SOUTH MAIN STREET OVER ASSONET RIVER CHECK BY: CMP DATE: 1/29/24

ITEM 690. STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR CY

Stone Parapet and Wall

Depth =	1.00	FT	(assumed 1 ft for facia covering)
Assume Length =	50.00	FT	
Assume Height =	7	FT	(assumed)
Number of Faces =	1		
Volume =	350	CF	
	12.96	CY	

15 CY

PROJECT:	FREETOWN	SHEET		of	
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 904.3 5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE **CY**

Description

- Concrete Saddle
- Concrete Relieveing Slab
- Sidewalks

Concrete Saddle

Cross Sectional Volume =	39.85	SF	(From CAD)
Width =	37.00	FT	(Assumed)
Depth =	1.50	FT	(Assumed)
Total Volume =	2211.91	CF	

Increase by 10% for miscellaneous 221.19 CF

5000 PSI, 3/4 INCH, 685 HP CEMENT CONCRETE = 95.00 CY

95 CY

PROJECT:	FREETOWN	SHEET	1	of	1
JOB NO.	MAX-2015134.10	CALC. BY:	MAH	DATE:	1/29/24
DESCRIPTION:	SOUTH MAIN STREET OVER ASSONET RIVER	CHECK BY:	CMP	DATE:	1/29/24

ITEM 910.1 STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED LB

Concrete Saddle

Volume =	81.92	CY
	175	LB/CY
Subtotal =	14336	LB

STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED = 14,336 LB

14,500 LB

Appendix C: Options Matrix

SOUTH MAIN STREET BRIDGE OPTIONS STUDY
FREETOWN, MA

Alternative Description				Costs		Property Impacts (1)		Timeframe			Environmental Permits						
Option	**Lanes** (number and width)	**Shoulder Width** (number and width)	**Number and Width of Sidewalks**	**Construction Costs** (millions)	**Engineering Costs** (Design & Construction)	**Right-of-Way Impacts** (permanent takings in square feet (approx.))	**Impacts to Abutters** (see Notes below)	**Design and Permitting** (months)	**Construction** (months)	**Estimated Lifespan (years)**	**NOI (local)**	**MEPA (State) Environmental Notification Form**	**US Army Corps of Engineers Self-Verification**	**US Army Corps of Engineers Pre-Construction Notification**	**CH. 91 License (State)**	**CH. 91 Minor Modification (State)**	**DEP (State) Water Quality Certification**
OPTION 1 - PRECAST CONCRETE ARCH REPLACEMENT (Town Funded)																	
1a	2-11'	2-1'	1 - 5'	$2,370,000	$497,700	500 s.f.	(2)	24	24	75+	X	X		X	X		X
1b	2-11'	2-2'	1 - 5'	$2,390,000	$501,900	705 s.f.		24	24	75+	X	X		X	X		X
1c	2-11'	2-2'	2 - 5'	$3,030,000	$636,300	1,100 s.f.	(3)	24	24	75+	X	X		X	X		X
OPTION 2 - PRECAST CONCRETE ARCH REPLACEMENT (State/Federally Funded)																	
2	2-11'	2-5'	2 - 6'	$3,630,000	$1,270,500	2,820 s.f.	(4)	48	36	75+	X	X		X	X		X
OPTION 3 - RETAIN EXISTING STONE ARCH, LOCALLY FUNDED																	
3a	2-11'	2-1'	1 - 5'	$700,000	$147,000	90 s.f.	(5)	12	9	50+	X		X			X	
3b	2-11'	2-1'	1 - 5'	$1,200,000	$252,000	90 s.f.		12	18	50+	X		X			X	
3c	2-11'	2-1'	1 - 5'	$1,130,000	$237,300	90 s.f.		12	12	50+	X		X			X	

Notes:

(1) Areas provided below are permanent takings required for roadway, bridge and sidewalk encroachments. Permanent easements will also be required for all retaining walls. Temporary easements will also be required for construction.

(2) Minimal impact to 14 South Main St. property. Roadway re-alignment would meet existing at driveway.

(3) Minimal impacts to properties on all four quadrants of the bridge.

(4) Significant property impacts on the northeast, northwest and southwest bridge quadrants

(5) Minimal impact to 14 South Main Street property.