

General Notes:

Existing Conditions:

Both the north and south bridge abutments of the stone arch have been undermined, resulting in complete loss of vertical support for the barrel vault. This support will be restored preventing the bridge from collapsing.

The ring and spandrel wall on the east elevation are separating from the vault. This area will be deconstructed and rebuilt. The voussoirs on the south spring line are missing as is the remainder of the spandrel wall at this location. These areas will be rebuilt

The retaining walls on the east elevation of the bridge are either failed or are in danger of failing. The south retaining wall is founded on a battered stone wall below but from the bearing on the lower wall to the top of the wall, the upper wall is out of plumb by as much as 2 ft. over the 8 ft. height of the wall. The upper portion of this wall will be documented, deconstructed and rebuilt.

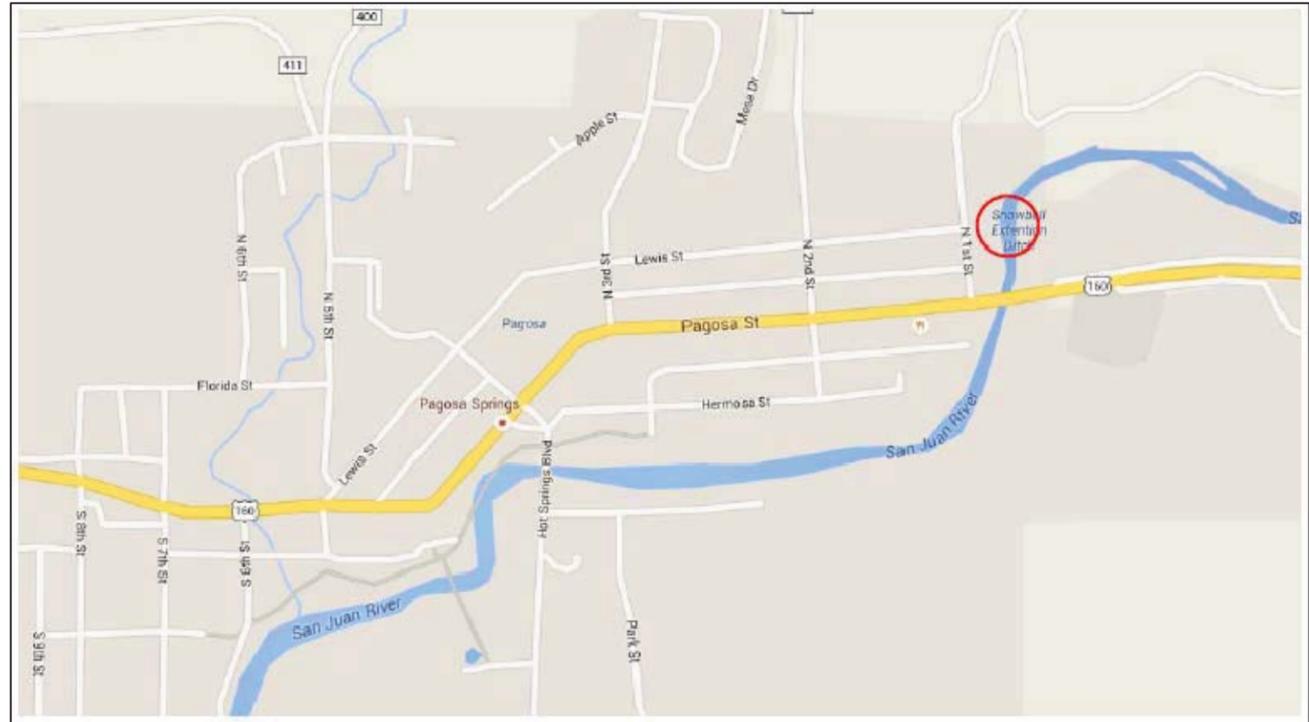
All stone used in reconstruction of the masonry arch bridge, spandrel walls and site retaining walls to be either reclaimed stone from the site or stone similar in strength, appearance and mineralogy obtained from the original source of stone or approved equal.

Mortar used in the reconstruction of the arch bridge and spandrel walls shall be Type O, as determined by analysis of the original mortar.

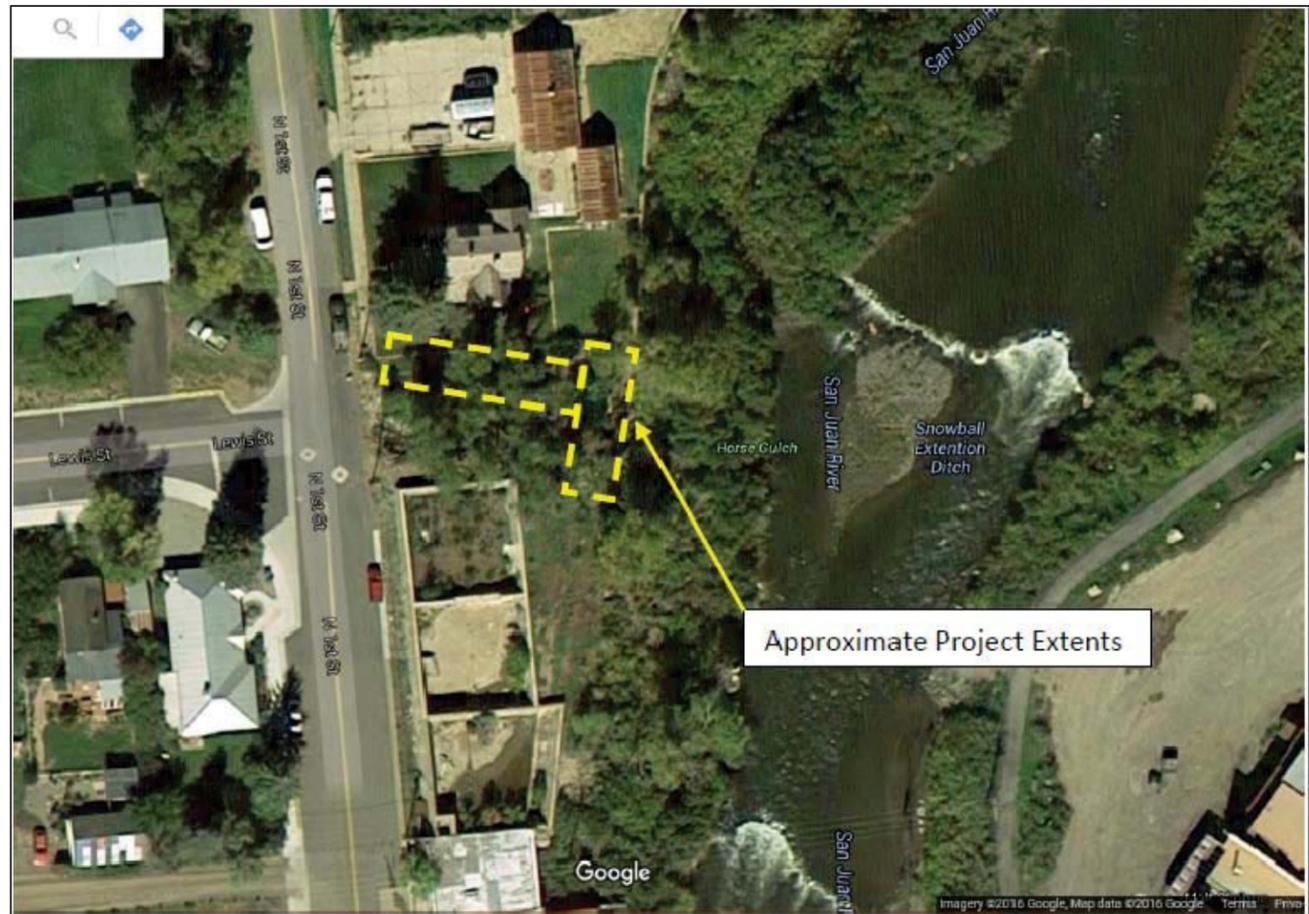
Any metals incorporated into the stone masonry shall be stainless steel Grade 304 or 316.

Any required permits for working in the streambed are the responsibility of the Owner.

2006 International Building Code (IBC)



Project location in Town of Pagosa Springs, Colorado



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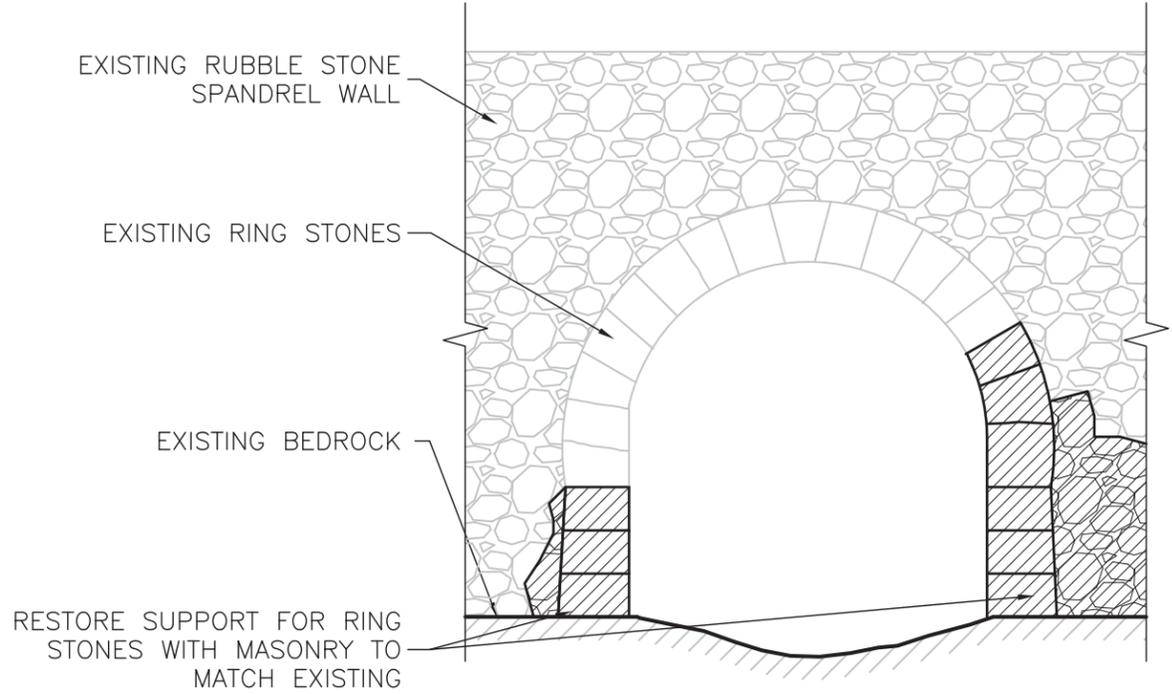
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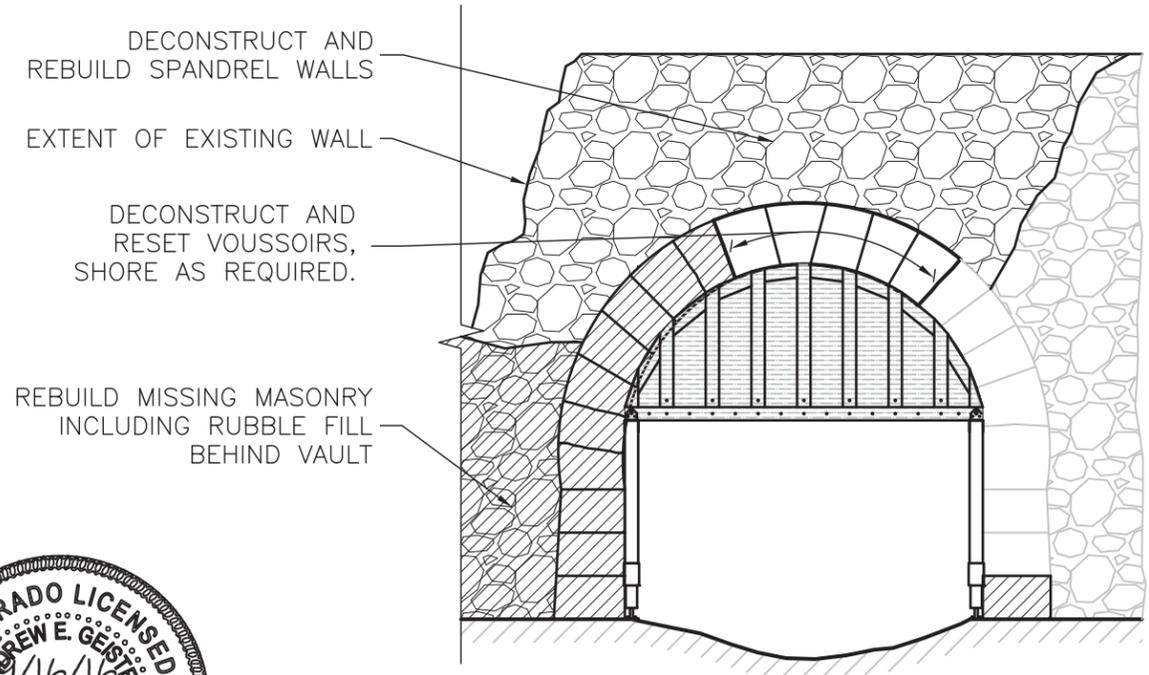
RUMBAUGH CREEK
ARCH BRIDGE REHABILITATION

SCALE: AS NOTED
JOB NO. 16-058
SHEET:

S1



1 RING STABILIZATION
S2 WEST ELEVATION 1/4" = 1'-0"



2 RING STABILIZATION
S2 EAST ELEVATION 1/4" = 1'-0"

Procedures:

1. Confine stream flow to the center of streambed.
 - 1.1. Using a combination of rip rap and/or sand bags (as directed by Riverbend Engineering), confine stream flow to the center of the streambed to allow for effective work conditions at the spring lines of the arch.
2. Underpin the arch ring on upstream face (river left and right).
 - 2.1. Temporarily shore the lower ring stones and spandrel wall stones not displaced from their original position in a manner that allows for work below the shored masonry.
 - 2.2. Clean streambed of debris and accumulated sediments in these areas to expose competent bedrock.
 - 2.3. Fill voids in rubble backup with angular shaped stone chinking and mortar firmly tamped into voids and open joints.
 - 2.4. Identify original stones (if possible) and relay lower stones in arch ring and spandrel wall. Ensure full bearing of stones by mechanically flattening the bedrock, chipping off projections on the unit bedding surfaces and laying in a full bed of Type S mortar.
 - 2.5. Continue to lay stones to closure with the existing (not displaced) masonry. Closure stones to be similar in size to surrounding units and allow for similar mortar joint dimensions.
3. Deconstruct and relay the arch ring and spandrel wall on downstream face.
 - 3.1. Since the spandrel wall and arch ring have separated from the barrel vault, it will be necessary to rebuild this portion to restore the original geometry. Number the spandrel wall stones so that the remaining stones can be placed back into their original positions. Deconstruct the spandrel wall over the arch ring and into the abutment walls as necessary for stability. Measure and document arch ring profile and build wood centering to match profile. Number arch ring stones for replacement and deconstruct arch ring stones. Note: separation of the arch ring is minimal at the north side (river left). It is permissible to leave several of these ring stones in place.
 - 3.2. Clean streambed of debris and accumulated sediments in these areas to expose competent bedrock.
 - 3.3. Fill voids in the rubble backup with angular shaped stone chinking and mortar firmly tamped into voids and open joints.
 - 3.4. Identify original stones (if possible) and relay the lower stones in the arch ring and spandrel wall. Ensure full bearing of stones by mechanically flattening the bedrock, chipping off projections on the unit bedding surfaces and laying in a full bed of Type S mortar.
 - 3.5. Continue to lay/relay stones to complete the arch ring on top of the wood centering. Ensure the ring stones are tight to the edge of the barrel vault and tooth ring stones into barrel vault where possible. Allow rebuilt arch ring to cure for min. 5 days before rebuilding spandrel wall. Rebuild spandrel wall above arch ring to original dimensions. New and closure stones to be similar in size to surrounding units and allow for similar mortar joint dimensions.

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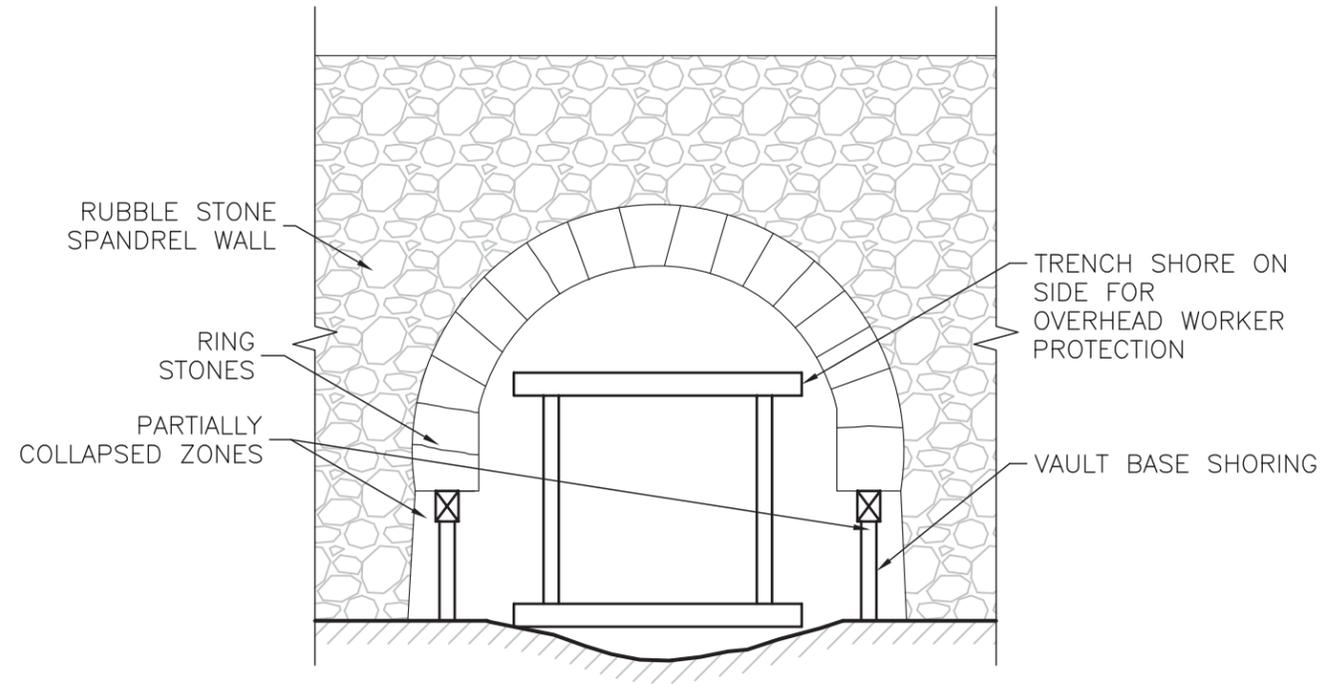
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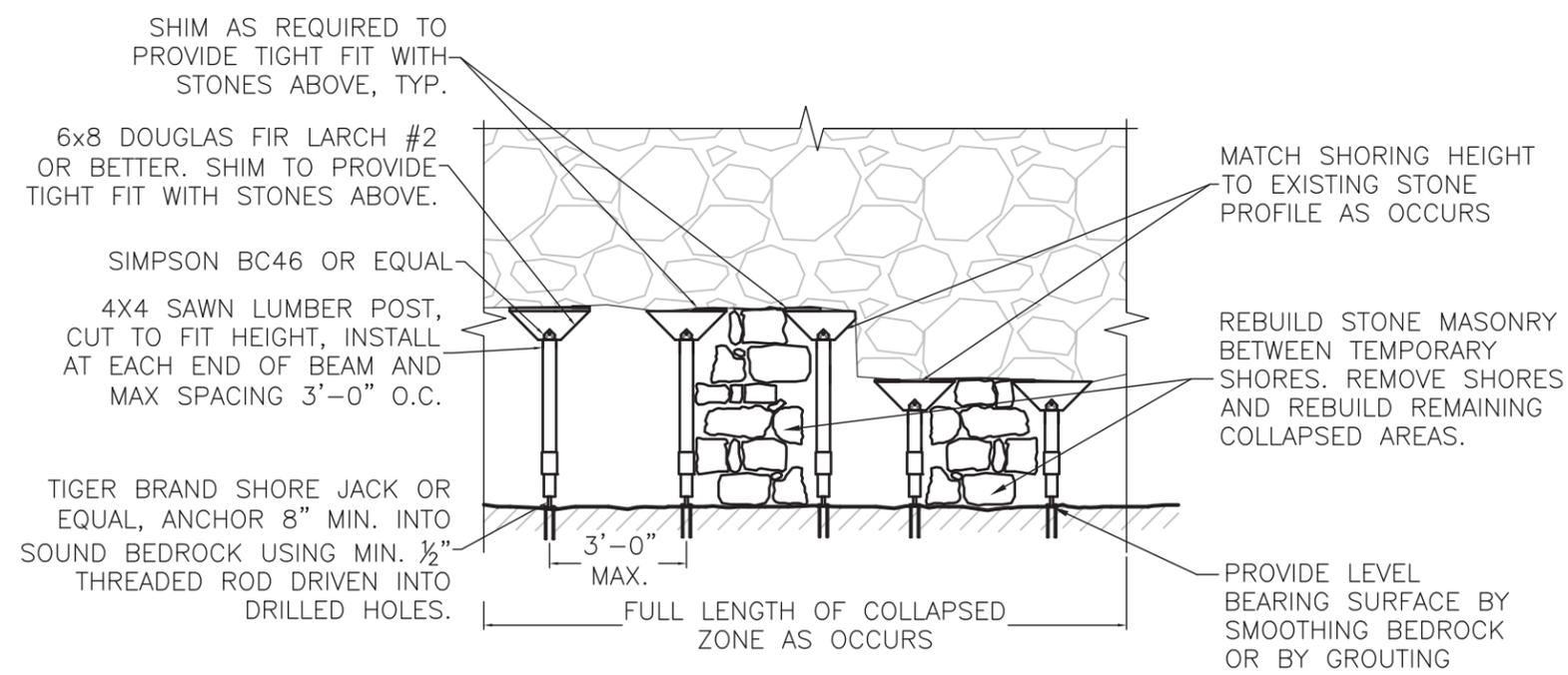
RUMBAUGH CREEK
ARCH BRIDGE REHABILITATION

SCALE: AS NOTED
JOB NO. 16-058
SHEET:





1 TRENCH SHORE
S3 ELEVATION 1/4" = 1'-0"



2 VAULT BASE SHORING
S3 ELEVATION 1/4" = 1'-0"

- Procedures:
- Shore the arch barrel and upstream and downstream rings.
 - Construct and install ring base shoring per drawings. Worker overhead protection is required and must be able to support 10,000 pounds per foot of length and provide access to the springline. We recommend either a suitable trench shore rotated 90 degrees on its side or a radiused forming system such as Dayton Superior Flex-Form. Construct and install vault base shoring per drawings.
 - Restore support for barrel vault.
 - Install base shoring per design along the lower base of the barrel vault as shown. The shoring design allows open areas for reconstruction of stone masonry from bedrock to the remaining barrel vault above the spring line.
 - Install full vault shoring per Detail 1/S4.
 - Clean streambed of debris and accumulated sediments in these areas to expose competent bedrock.
 - Fill voids in rubble backup with angular shaped stone chinking and mortar firmly tamped into voids and open joints.
 - Identify original stones (if possible) and relay lower stones in arch ring and spandrel wall. Ensure full bearing of stones by mechanically flattening the bedrock, chipping off projections on the unit bedding surfaces and laying in a full bed of Type S mortar.
 - Continue to lay/relay stones to complete the lower barrel vault between the wood shoring frames. Tooth masonry at both sides of the new stone pier to allow subsequent and adjacent masonry piers to bond into this work. Match coursing between piers where possible.
 - New and closure stones shall be similar in size to surrounding units and allow for similar mortar joint dimensions.
 - Remove the shoring between the newly installed stone piers and, repeating steps 2.3 to 2.7 above, infill masonry to form a continuous transverse support for the barrel vault on river left and river right.
 - Repoint any accessible voids in barrel vault.
 - Allow all masonry work to cure for one week (min. nightly temperature 40° F.)
 - Remove barrel vault shoring proceeding from upstream end of bridge towards downstream end.

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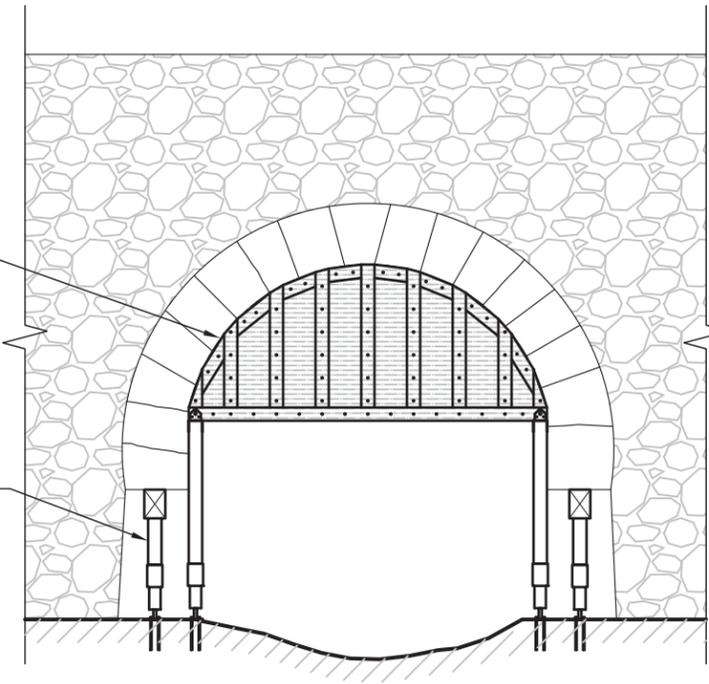


S3

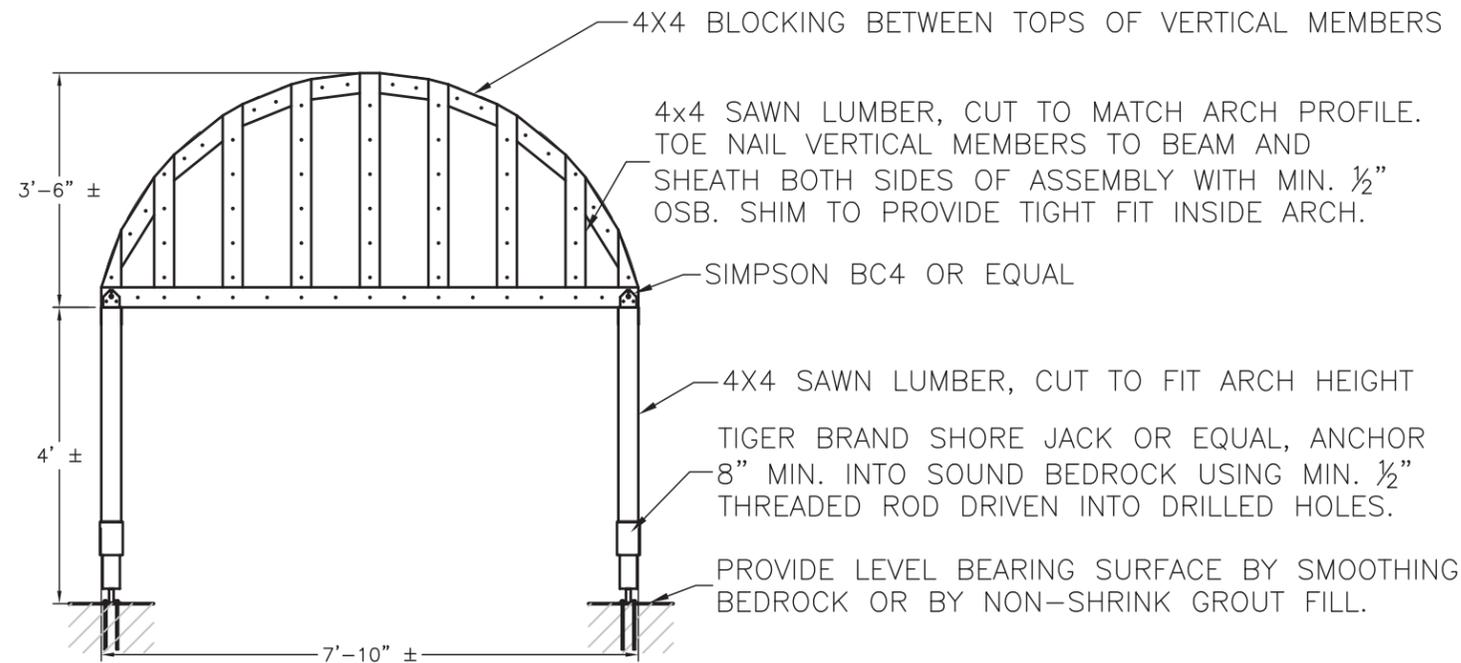


VAULT SHORING, 5 AT EQUAL SPACES THROUGH WIDTH OF BRIDGE. SEE DETAIL 2/S4

RING BASE SHORING



1 ARCH SHORING
S4 ELEVATION 1/4" = 1'-0"



2 VAULT SHORING
S4 ELEVATION 3/8" = 1'-0"

Procedures:

1. Restore support for barrel vault (Repeated from Sheet S3).
 - 1.1. Install base shoring per design along the lower base of the barrel vault as shown. The shoring design allows open areas for reconstruction of stone masonry from bedrock to the remaining barrel vault above the spring line.
 - 1.2. Clean streambed of debris and accumulated sediments in these areas to expose competent bedrock.
 - 1.3. Fill voids in rubble backup with angular shaped stone chinking and mortar firmly tamped into voids and open joints.
 - 1.4. Identify original stones (if possible) and relay lower stones in arch ring and spandrel wall. Ensure full bearing of stones by mechanically flattening the bedrock, chipping off projections on the unit bedding surfaces and laying in a full bed of Type S mortar.
 - 1.5. Continue to lay/relay stones to complete the lower barrel vault between the wood shoring frames. Tooth masonry at both sides of the new stone pier to allow subsequent and adjacent masonry piers to bond into this work. Match coursing between piers where possible.
 - 1.6. New and closure stones shall be similar in size to surrounding units and allow for similar mortar joint dimensions.
 - 1.7. Remove the shoring between the newly installed stone piers and, repeating steps 1.2 to 1.6 above, infill masonry to form a continuous transverse support for the barrel vault on river left and river right.
 - 1.8. Repoint any accessible voids in barrel vault.
 - 1.9. Allow all masonry work to cure for one week (min. nightly temperature 40° F.)
 - 1.10. Remove barrel vault shoring proceeding from upstream end of bridge towards downstream end.
2. Rebuild remaining spandrel and wing walls.
 - 2.1. Where remaining walls are more than 1/4 inch per foot out of plumb and over 4 ft. tall, number stones, deconstruct wall and relay masonry. Rebuild failed walls. Identify original stones (if possible) from debris surrounding the failed walls and relay stones to restore the continuity of the spandrel and wing walls.
3. Scour mitigation.
 - 3.1. Refer to drawings and specifications from Riverbend Engineering for methods of preventing future scour from damaging the reconstructed stone masonry bridge. These documents will guide the stabilization of the stream banks to prevent reoccurring erosion of the banks and prevent future scour of the masonry arch bridge.



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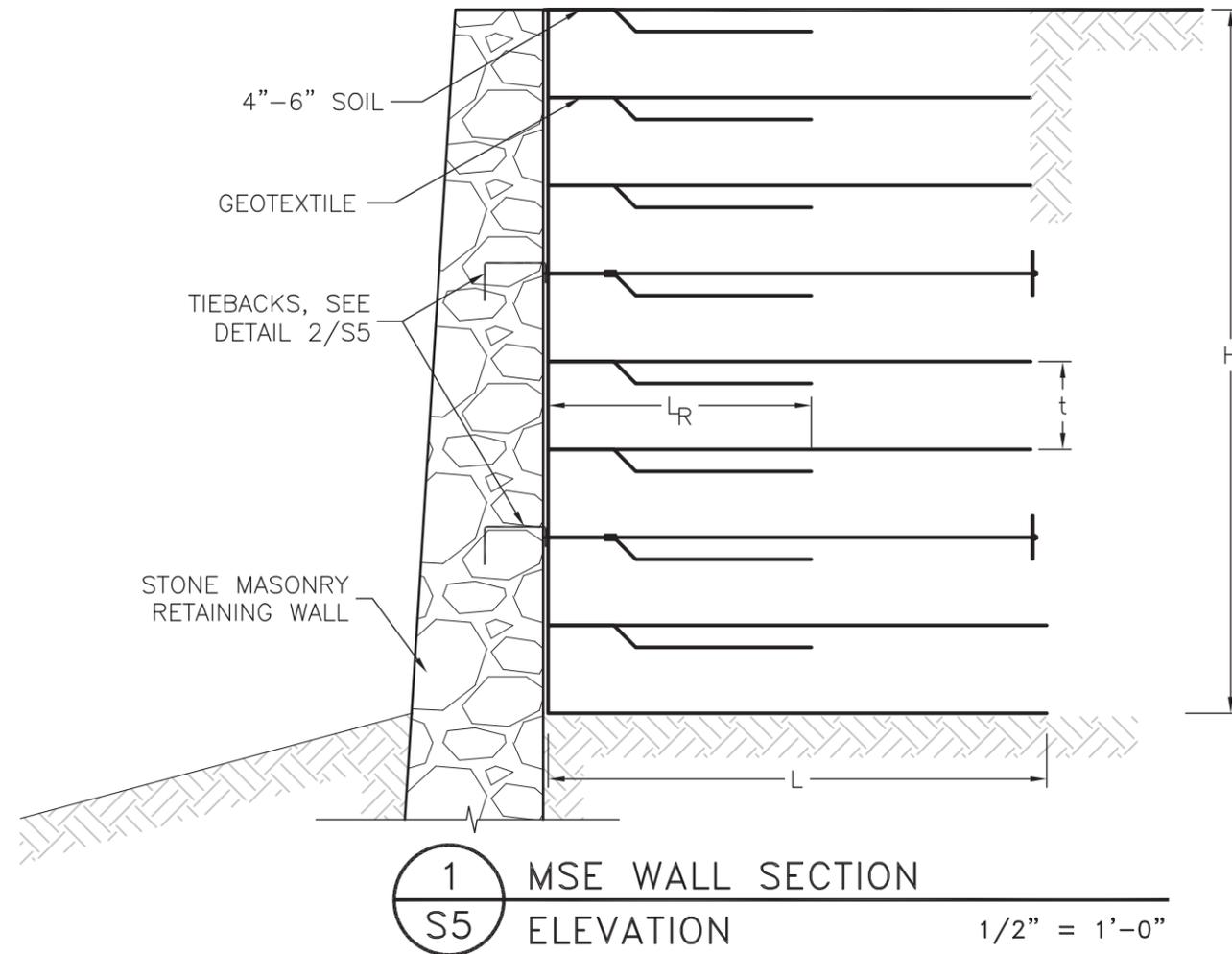
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S4

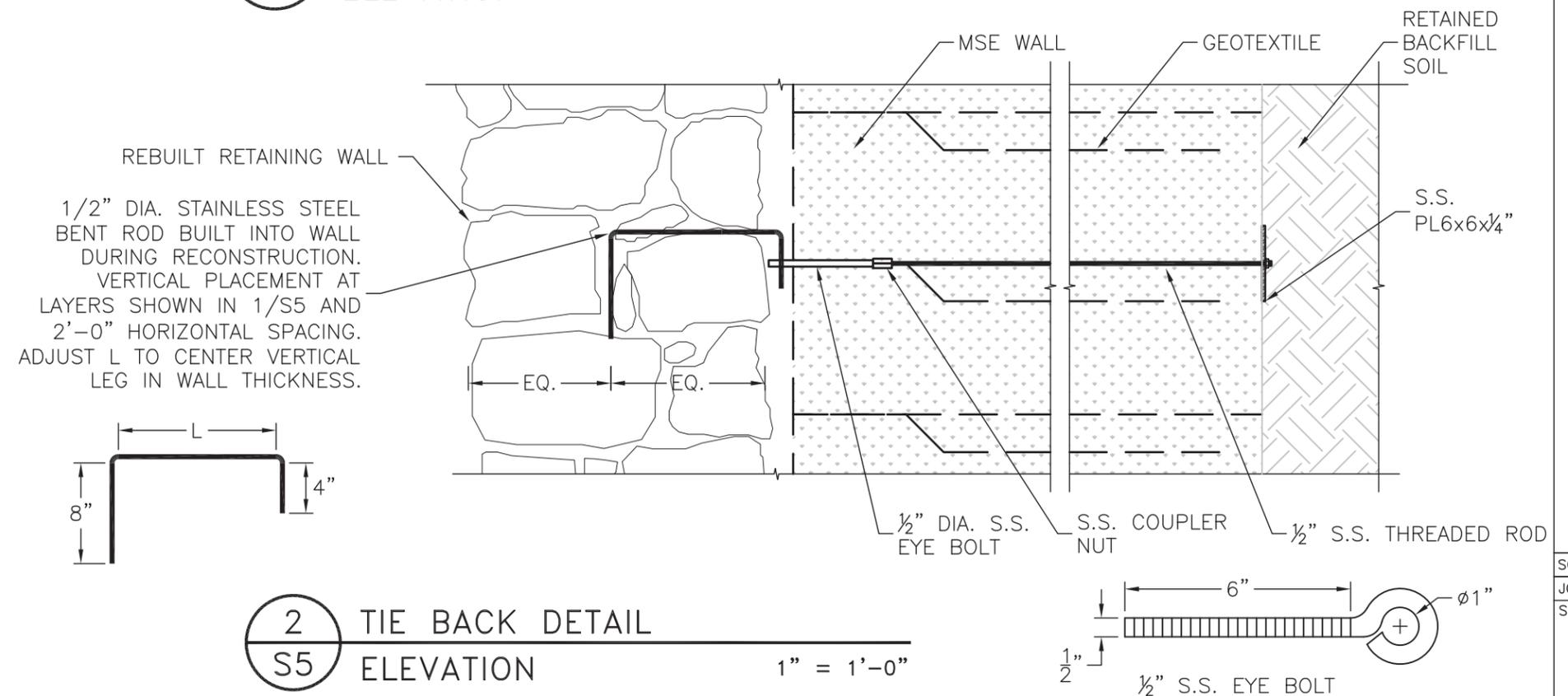


Procedures:

1. Deconstruct and relay the south retaining wall.
 - 1.1. Deconstruct and rebuild the stone retaining wall emanating from the southeast corner of the bridge. The top eight feet of the south wall is severely out of plumb and shall be documented, photographed and stones numbered prior to deconstruction to the level of the battered wall below.
 - 1.2. Excavation of the soil behind the wall for a minimum distance of 8 ft. is required to install a mechanically stabilized earth (MSE) wall retain the soil. The reconstructed stone masonry retaining wall will be rebuilt, essentially facing the MSE wall.

H	L	L _R	t
8' - 0"	4' - 6"	4' - 6"	1' - 0"

H: HEIGHT OF MSE WALL
L: LENGTH OF BOTTOM LAYER OF FABRIC
L_R: LENGTH OF WRAPPED LAYER OF FABRIC
t: LAYER THICKNESS



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