

**Underwater Inspection of  
SFN - 2801388  
US 322 (Mayfield Road) over the Beaver Creek  
(GEA-322-0863)  
July 23, 2014  
For  
Ohio Department of Transportation  
District-12**



*(North Elevation of Bridge)*

By  
**GPI/Greenman-Pedersen, Inc.**

Eric Thorkildsen, P.E. 78663  
Reviewer

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## Structure Inventory Data

### Structure Data - General Information

Structure Type:	Corrugated metal pipe arch culvert
Number of Culverts:	three
Total Length:	72 Feet

### Substructure Data - General Information

Abutments:	N/A
Wingwalls:	N/A
Piers:	N/A
Slope Protection:	Vegetated slopes

### Channel Description - General Description of Channel

The Beaver Creek flows south to north through this structure. No true thalweg was present at this structure. A maximum depth of 4.2 feet was found at north apron. Flow at this bridge was less than 1 foot per second.

## Inspection Report

### Inspection Inventory and Appraisal Information

#### Structure Location Information

Structure File Number:	2801388
Facility:	US 322 (Mayfield Road)
Feature:	Beaver Creek
County:	Geauga

#### Inspection Data

Team Leader-Diver:	James Henry
P.E. Reviewer:	Eric Thorkildsen, P.E.
Type of Equipment Used:	Surface supplied air diving
Dive Team:	Michael Nitchman Marty Faulk Jason Silva Alex Kraeger
Date & Time:	07/23/2014
Water Temperature:	75 Degrees F
Waterway Velocity (Current):	<1 Foot/Second
Depth Turbidity (Visibility):	Less than 2 Foot
Type of Material of Streambed:	Soft silt with 1 to 6 inches of penetration.
Presence & Condition of Riprap or Scour Countermeasures:	N/A
Extent of Marine Growth on Substructure Elements:	There is light aquatic growth on the structure.

### Substructure Inspection Data

Substructures Inspected:	Pipe 1, Pipe 2 and Pipe 3. Upstream and downstream aprons.
General Shape:	Each pipe is corrugated metal pipe arch culvert 6 feet 4 inches wide by 4 feet 9 inches high. Reinforced concrete aprons are 24 feet long by 6 feet wide and 1 foot thick.
Maximum Water Depth At Substructure Inspected:	Approximately 4.2 feet was found at north apron.

### Waterline

Water Level References:	The top of Pipe 2.
Water Surfaces:	The waterline was approximately 18 inches below the reference.

### Description of Structure

Bridge GEA-322-0863 (2801388) carries the US 322 over Beaver Creek in Claridon Township, OH. The structure was built in 1961. The three Pipes and aprons of this structure were inspected during this underwater inspection. The numbering convention will follow that previously established by last underwater inspection report with the west pipe as Pipe 1.

### Inspection Operations

The underwater inspection was performed by Greenman-Pedersen Inc. on July 23, 2014. This regularly scheduled Underwater Dive Inspection included a 100% Level I inspection and a 10% Level II inspection. Inspector started inspection on Pipe 1 at north end (upstream) and continued to south end (downstream) for each pipe continuing east. Surface supplied air; probing and tactile methods were used to complete inspection. Soundings were taken along openings of each pipe and directly adjacent to apron. Sounding rod was used to perform soundings.

## Inspection Findings

### Channel

- The Channel has stayed relatively the same since the last inspection with some minor changes in streambed elevation.
- Penetrations taken during soundings were typically 1 to 3 inches, with penetrations off of apron being 6 inches.
- Bottom material in all pipes consists of soft silt ½ inch in depth.

### Pipe 1

- Moderate to heavy corrosion was observed throughout Pipe 1 at waterline and bolted connections. Corrosion was documented in underwater inspection performed in 2007 and has advanced in severity. (See photo 8)
- Light surface corrosion on bolted connections was confirmed throughout Pipe 1 as documented in underwater inspection performed in 2007 and has not advanced in severity. All connections are secure and intact.
- Indention at 2 o'clock position looking north to south in Pipe 1 63 feet from north entrance measuring 8 inches tall 3 inches deep 6 inches wide was confirmed from underwater inspection performed in 2007 and has not advanced in severity. (See photo 7)

### Pipe 2

- Light to heavy corrosion was observed throughout Pipe 2 at waterline and bolted connections. Corrosion was documented in underwater inspection performed in 2007 and has advanced in severity. (See photo 10)
- Light to heavy surface corrosion on bolted connections was confirmed throughout Pipe 2 as documented in underwater inspection performed in 2007 and has advanced in severity. Most connections are secure and intact with isolated backed out bolts observed. (See photos 11 and 12)
- Deflection at 1 o'clock position looking north to south in Pipe 2 starts 8 feet 6 inches from north entrance and continues approximately 8 feet north to south at bolted connection measuring 3 inches tall.

### Pier 3

- Light to heavy corrosion was observed throughout Pipe 3 at waterline and bolted connections. Corrosion was documented in underwater inspection performed in 2007 and has advanced in severity. (See photos 15)
- Light to heavy surface corrosion on bolted connection was confirmed throughout Pipe 3 as documented in underwater inspection performed in 2007 and has advanced in severity. One bolt missing at 11 o'clock position looking north to south in Pipe 3 approximately 45 feet from north entrance. (See photo 16)

### **Inspection Findings continued**

- Indention at 12 o'clock position looking north to south in Pipe 3 58 feet from north entrance measuring 8 inches tall 7 inches deep 12 inches wide was confirmed from underwater inspection performed in 2007 and has advanced in severity from 3 inches in depth to 7 inches in depth. (See photo 17)

### **Aprons (upstream and downstream)**

- Aprons are covered in a layer of silt and show no signs of undermining or other distress.

### **Comparison to Previous Report and Summary of Inspection**

The corrugated metal pipe arch culvert pipes inspected at Bridge No. 2801388 were found to have light to heavy corrosion throughout at waterline and bolted connections and has advanced in severity since 2007 underwater inspection. Indentations, in same locations in pipes as underwater inspection done in 2007 have advanced in severity. Concrete aprons were found to be typically in good condition. Tree debris noted in the underwater inspection in 2007 has been removed. Bolt missing in connection in Pipe 3 was not noted in 2007 inspection.

### **Conclusions and Recommendations**

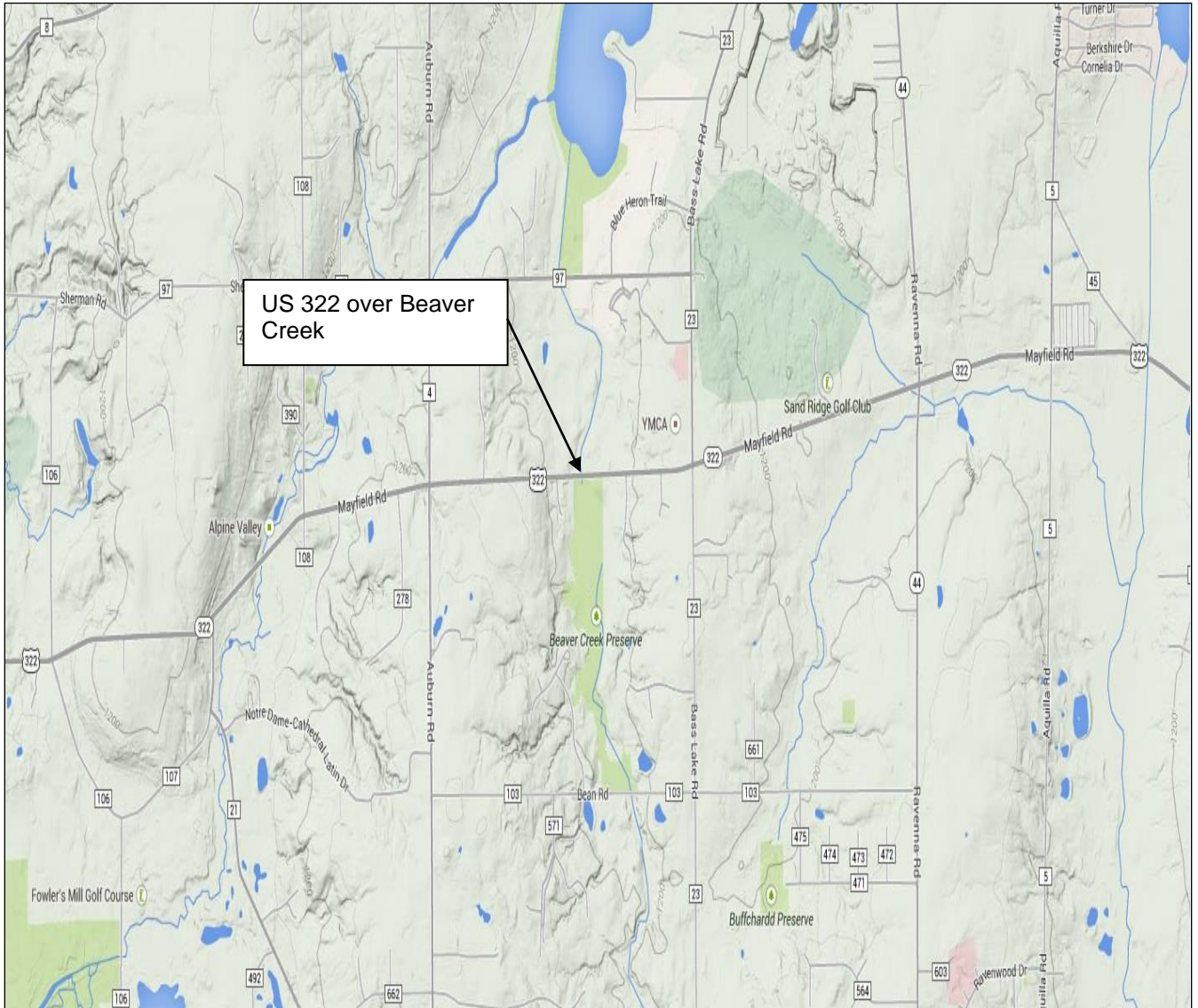
With heavy corrosion on bolt heads and seams of connections and other deficiencies noted we would recommend this structure for future replacement. This structure is at or near end of the anticipated service life.

**GPI/Greenman-Pedersen, Inc.**

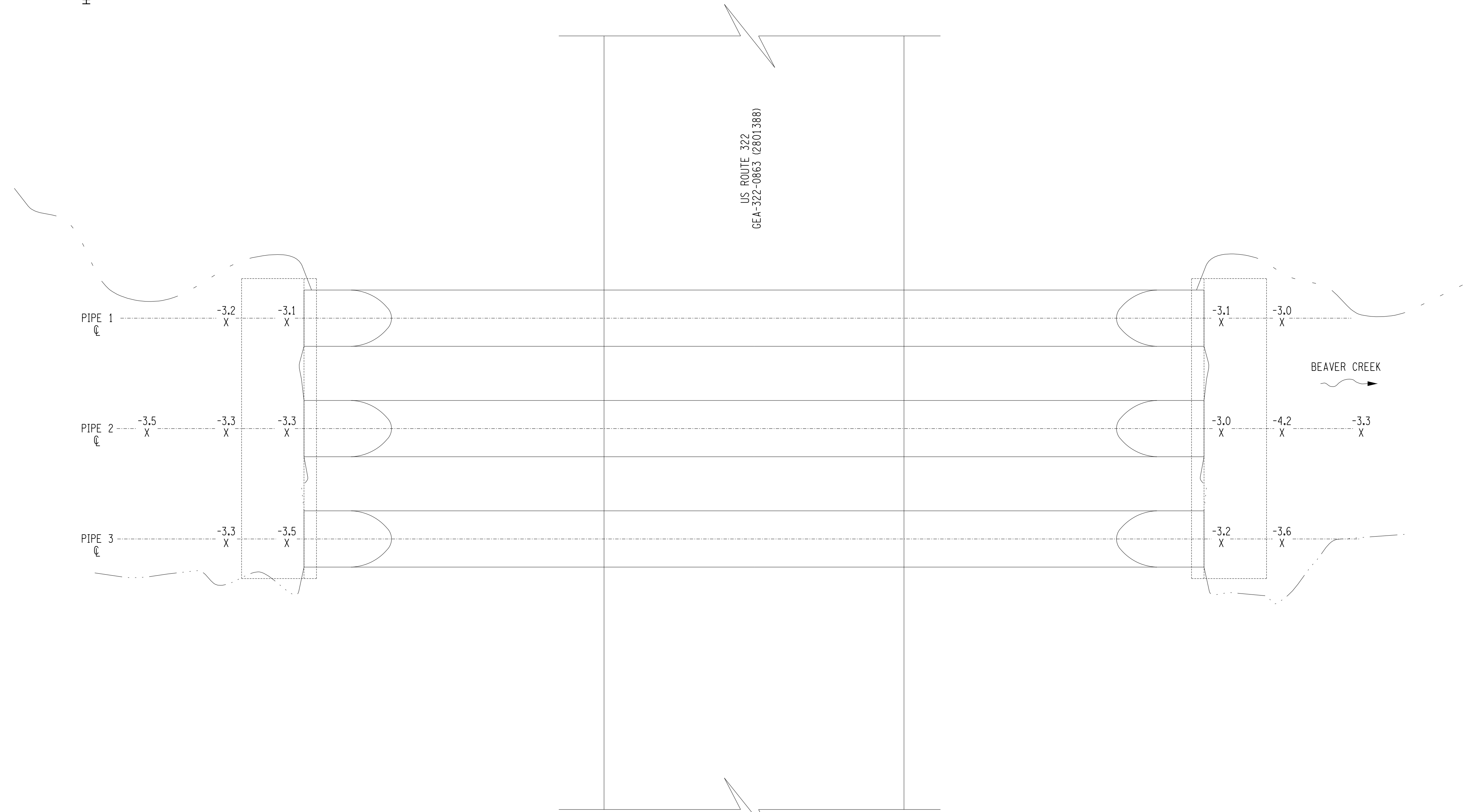
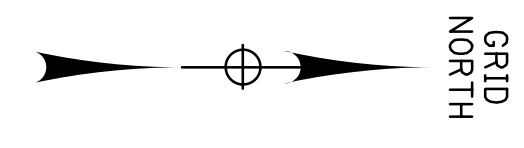
# Appendix A

## Location Map and Soundings





DESIGN SUPERVISOR - DESIGN - CHECK - DRAFTING M. NITGHMAN - CHECK - PROJECT MANAGER -



SOUNDING PLAN  
NTS

NOTES

1. WATER LINE REFERENCE ELEVATION WAS TAKEN FROM TOP OF PIPE 2 AT THE NORTH ENTRANCE. ON JULY 23, 2014 THIS DISTANCE WAS 18 INCHES.
2. THREE SOUNDINGS TAKEN AT ENTRANCES OF PIPES, 1 FOOT OFF APRONS AND ONE SOUNDING TAKEN AT 10 FEET OFF APRON CENTER CHANNEL.

<p><b>GPI</b> GREENMAN-PEDERSEN, INC. CONSULTING ENGINEERS</p>	<p>US 322 OVER BEAVER CREEK GEA-322-0863 2801388</p>
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# Appendix B

# Photographs





Photograph 1  
Overall View of  
the North  
Elevation.  
Looking  
Southwest



Photograph 2  
Overall View of  
the South  
Elevation.  
Looking North.





Photograph 3  
South approach  
(downstream)  
Looking South.



Photograph 4  
North approach  
(upstream).  
Looking North.



Photograph 5  
View of Pipe 1,  
North entrance.  
Looking South.



Photograph 6  
View of Pipe 1,  
Typical  
corrosion.  
Looking South.





Photograph 7  
View of  
indentation Pipe  
1, Looking South.



Photograph 8  
View of Pipe 1,  
Typical heavy  
corrosion on  
bolted  
connections.  
Looking south.



Photograph 9  
View of Pipe 2  
North entrance.  
Looking south.



Photograph  
10  
View of Pipe 2,  
Typical  
corrosion.  
Looking South.





Photograph  
11  
View of Pipe 2,  
Typical heavy  
corrosion on  
bolted  
connections.  
Looking south.



Photograph  
12  
View of Pipe 2.  
Typical Backed  
out bolt.



Photograph  
13  
View of Pipe 3  
North entrance.  
Looking south.



Photograph  
14  
View of Pipe 3,  
Typical  
corrosion.  
Looking South.





Photograph  
15  
View of Pipe 3,  
Typical heavy  
corrosion on  
bolted  
connections.  
Looking south.



Photograph  
16  
View of Pipe 3,  
Missing bolt.



Photograph  
17  
View of  
indentation Pipe  
3, Looking South.