

“City of Havelock  
Request for Engineering Services: Woodhaven Drive”  
Addendum 1  
July 30, 2019

Addition to bid: Inspection report of storm culvert listed in project description.

**54" Diameter (East Cell)**

This pipe is 97.5' long x 54" in diameter. Each joint has been photographed (both sides); however, all the joints and bands/collars appear to be in good shape. There was minor rusting around the joints, however no leaking to be seen. The invert was in good, sound condition. Overall the pipe is in good shape and no repairs are suggested or recommended.

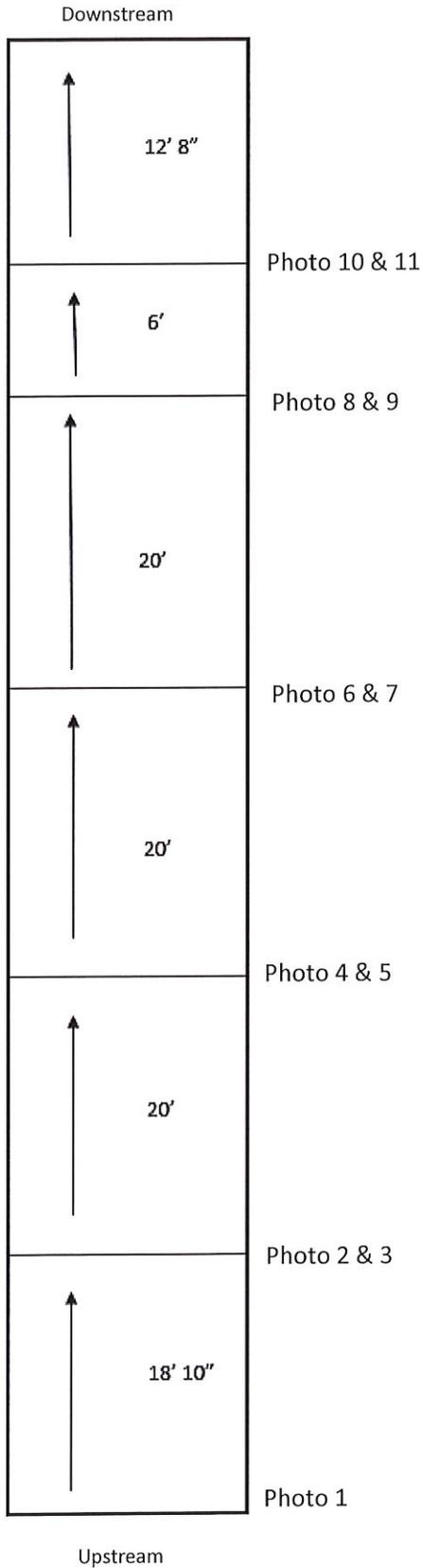




Photo 1



Photo 2

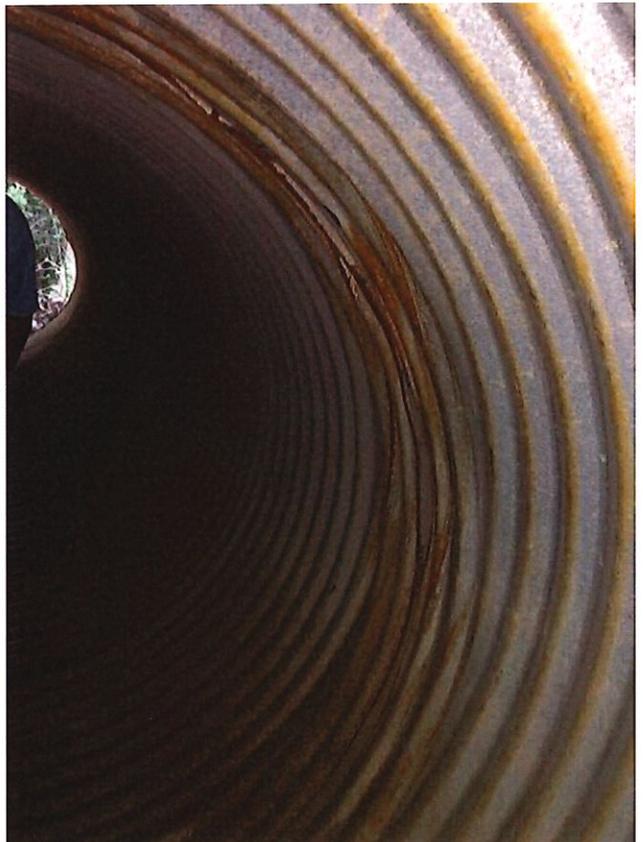


Photo 3

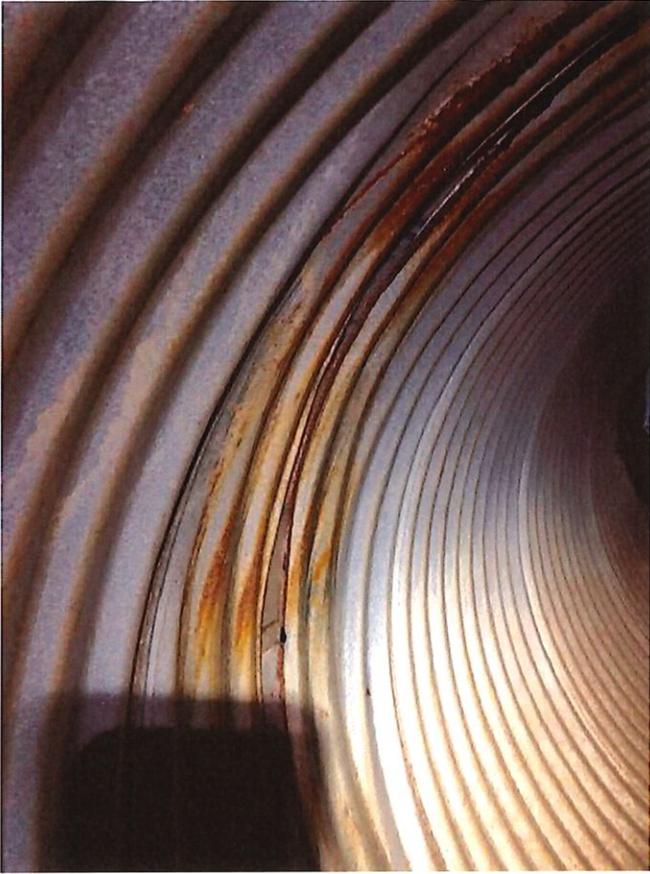


Photo 4

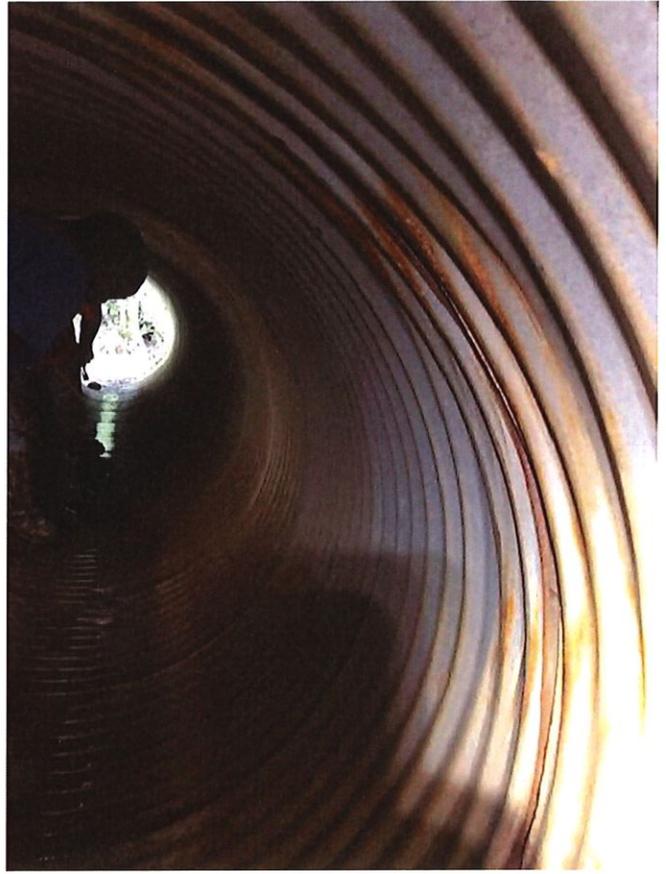


Photo 5



Photo 6

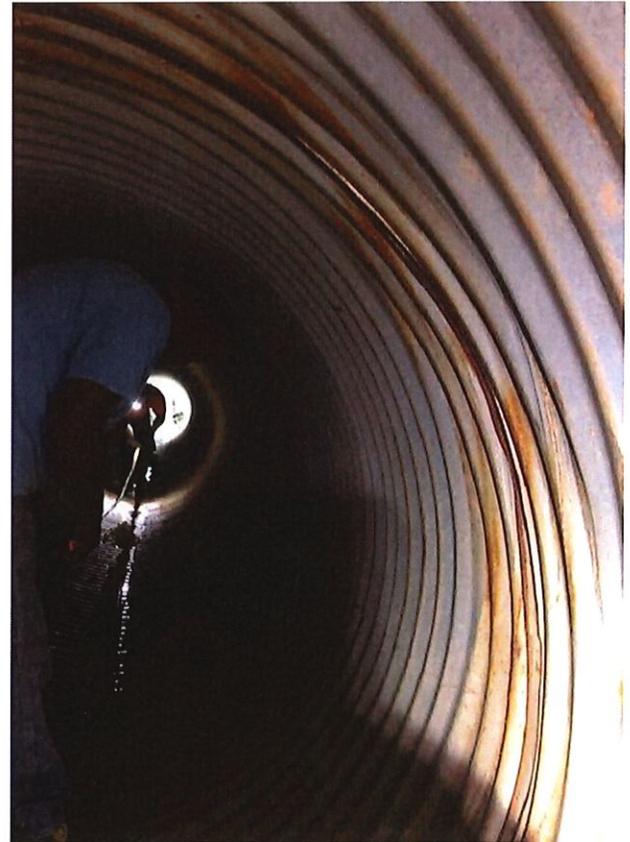


Photo 7

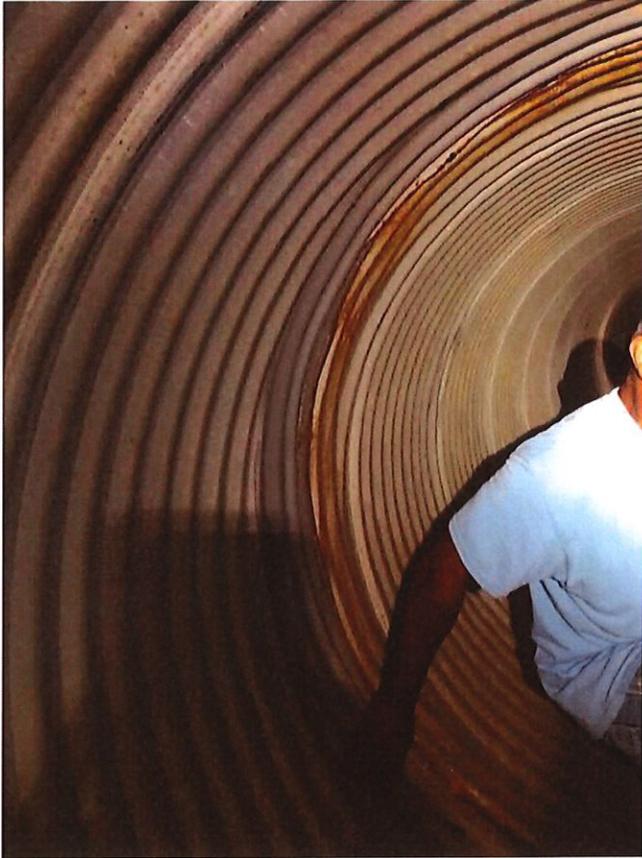


Photo 8

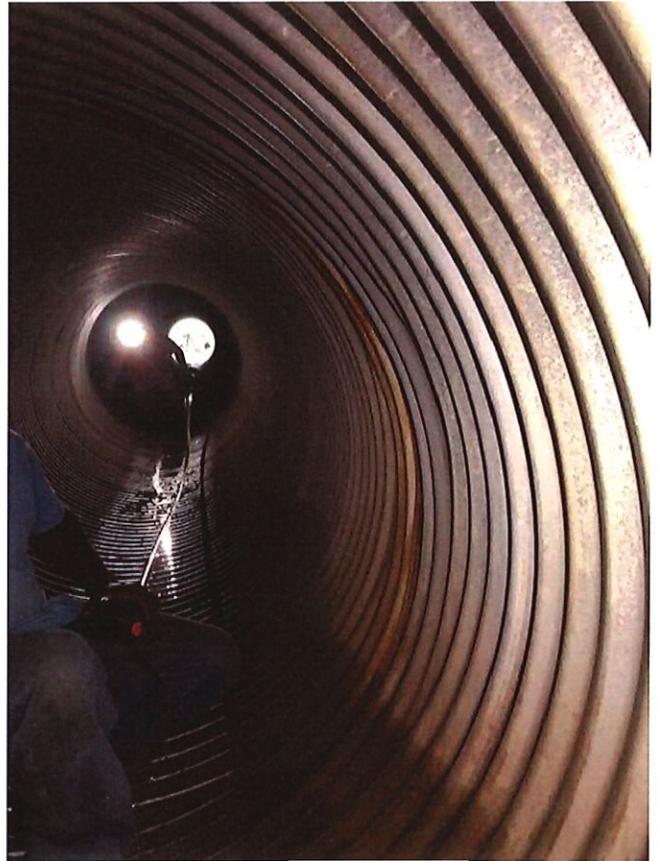


Photo 9

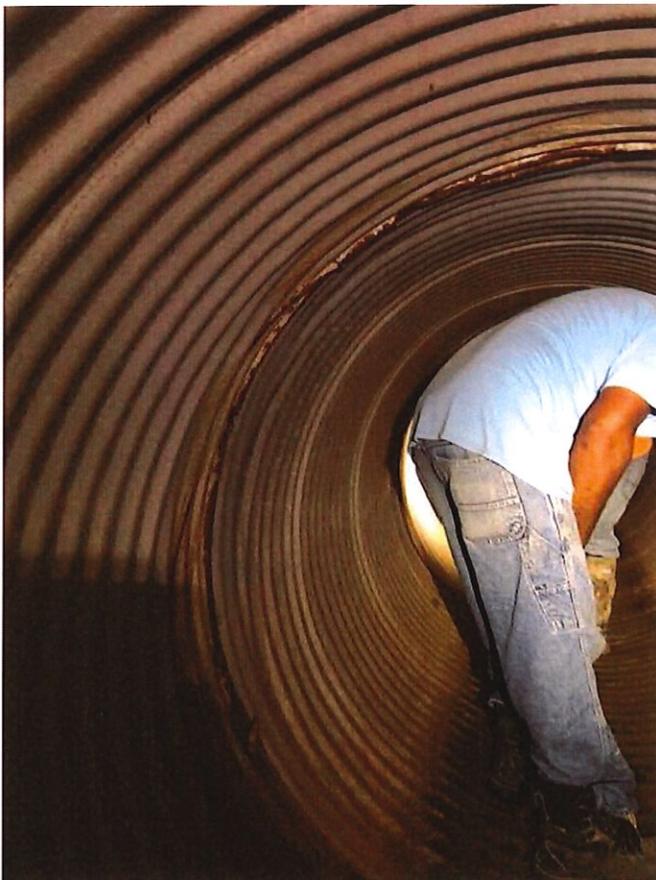


Photo 10

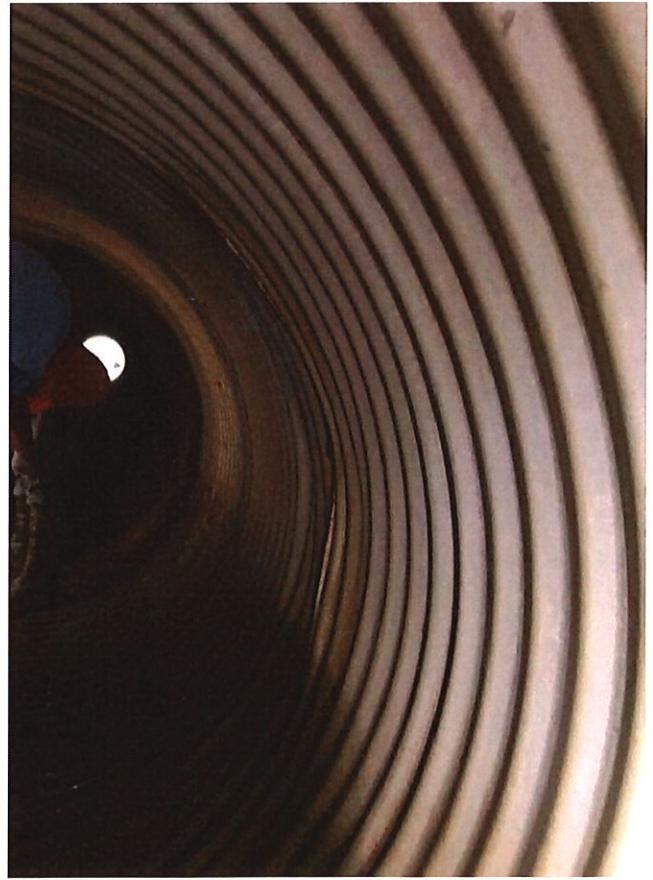


Photo 11

**54" Diameter (West Cell)**

This pipe is 91' 9" long x 54" in diameter. Each joint has been photographed and all joints and bands/collars appear to be in good shape. There is some minor rusting, however, there are no signs of leaking or infiltration. There are two circumferential cracks in the pipe, as well as a hole in the invert towards the downstream end. They have been photographed and measured.

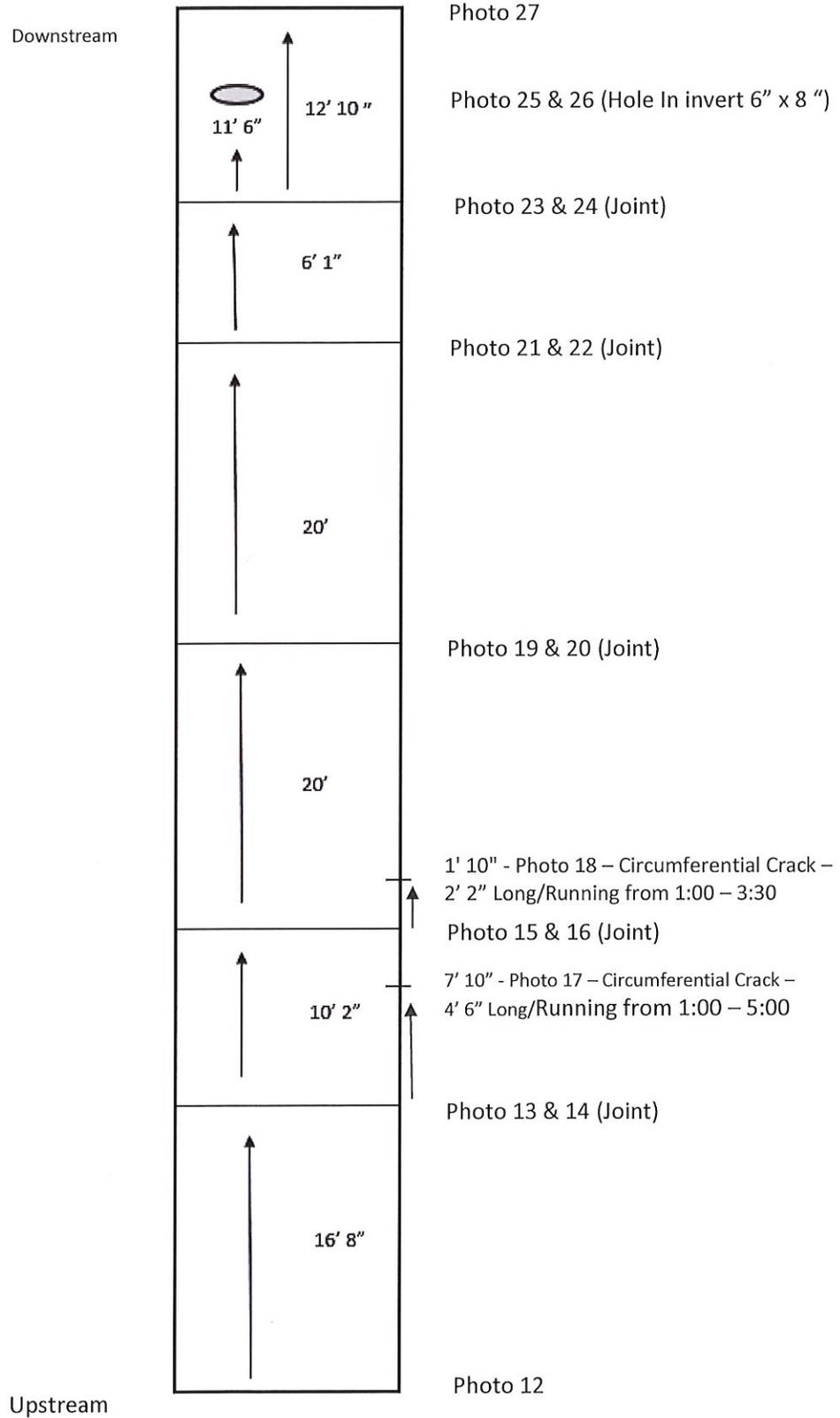




Photo 12 (Upstream End)



Photo 13

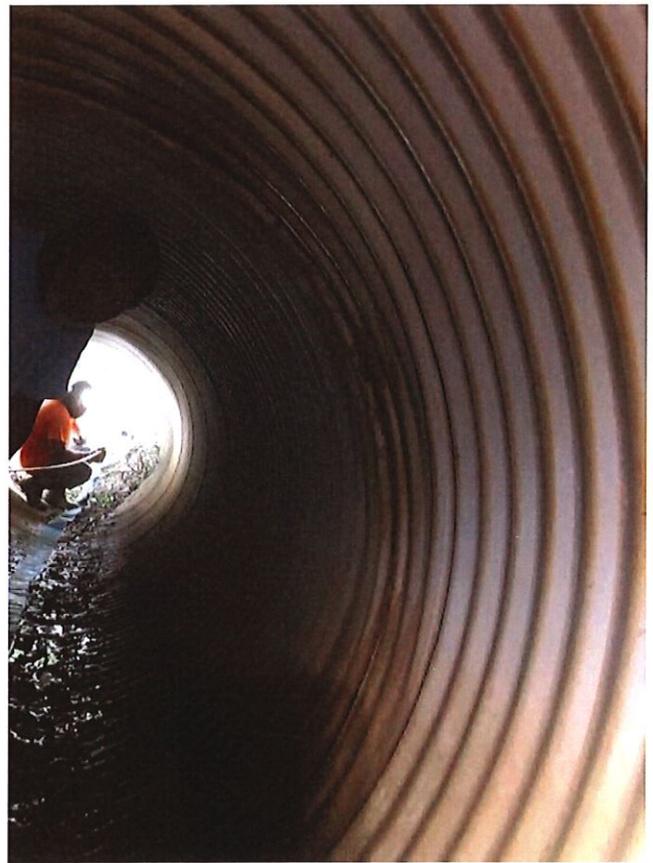


Photo 14

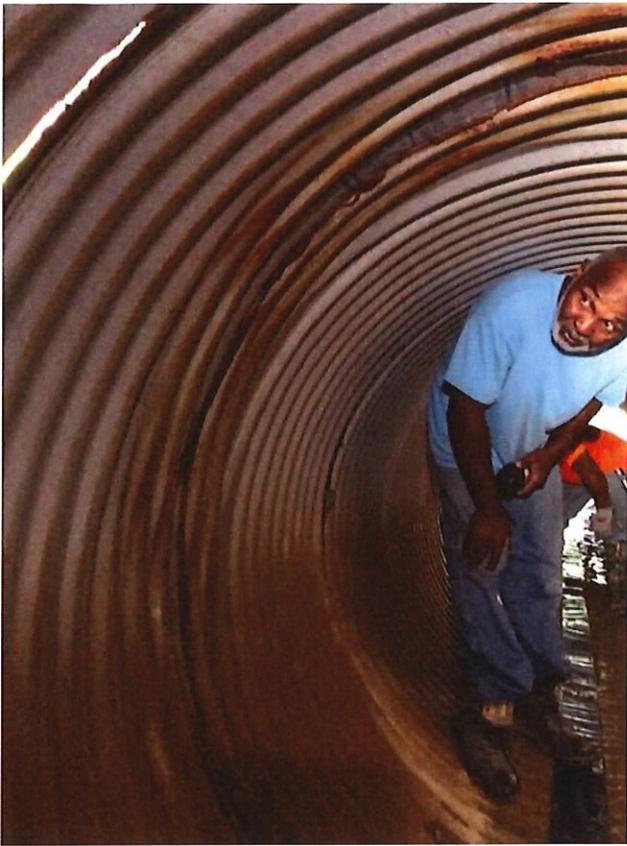


Photo 15

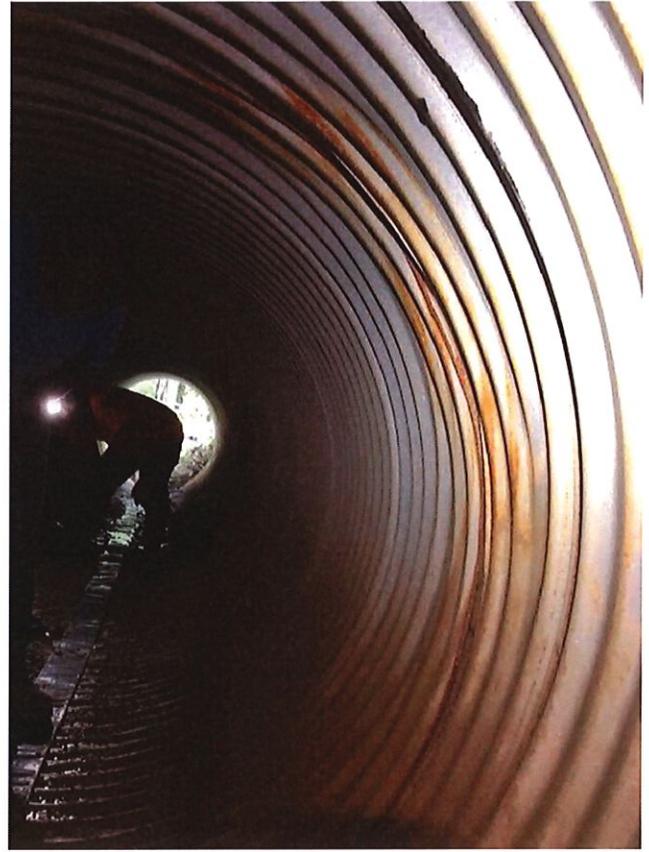


Photo 16

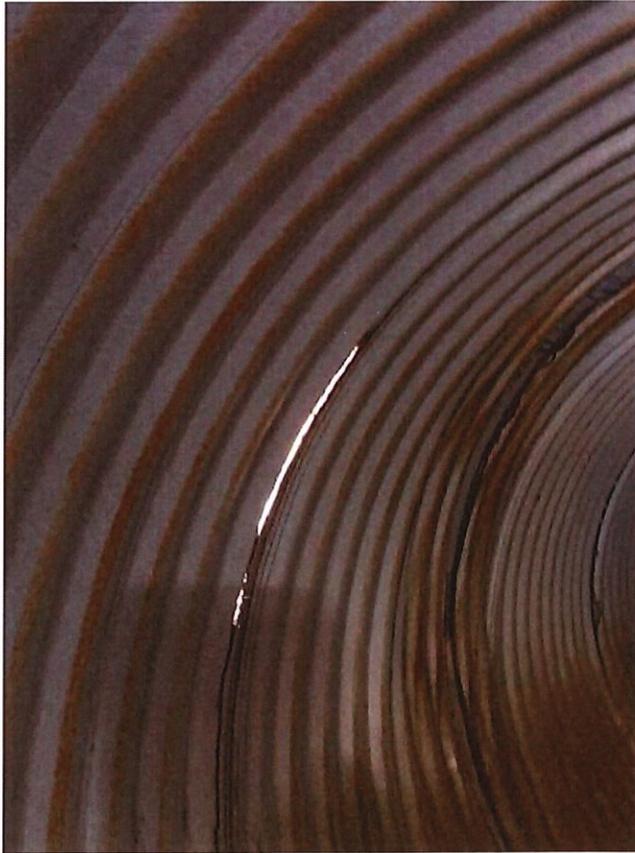


Photo 17  
7' 10" from Joint  
Circumferential Crack – 4' 6" Long from 1:00 – 5:00

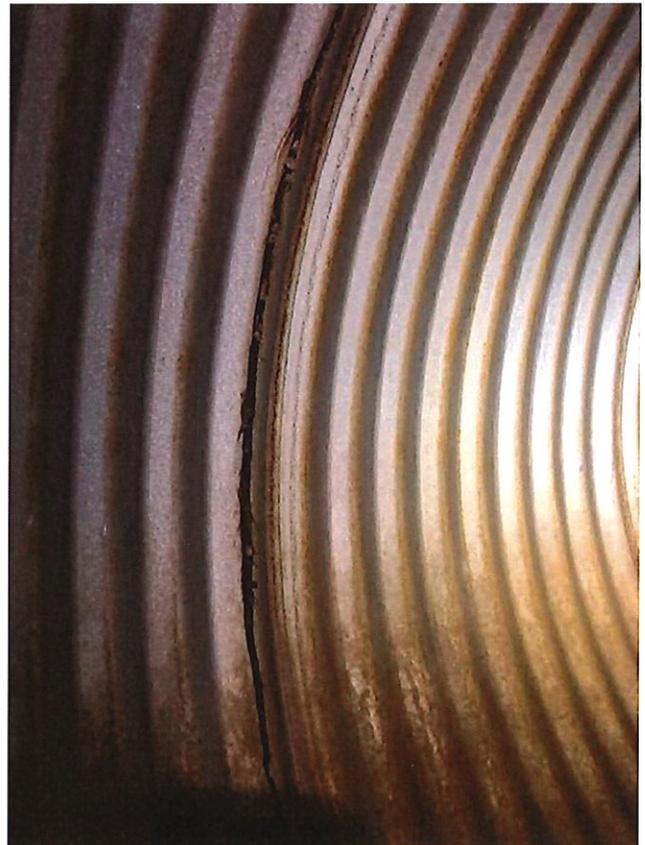


Photo 18  
1' 10" from Joint  
Circumference Crack – 2' 2" Long from 1:00 – 3:30



Photo 19

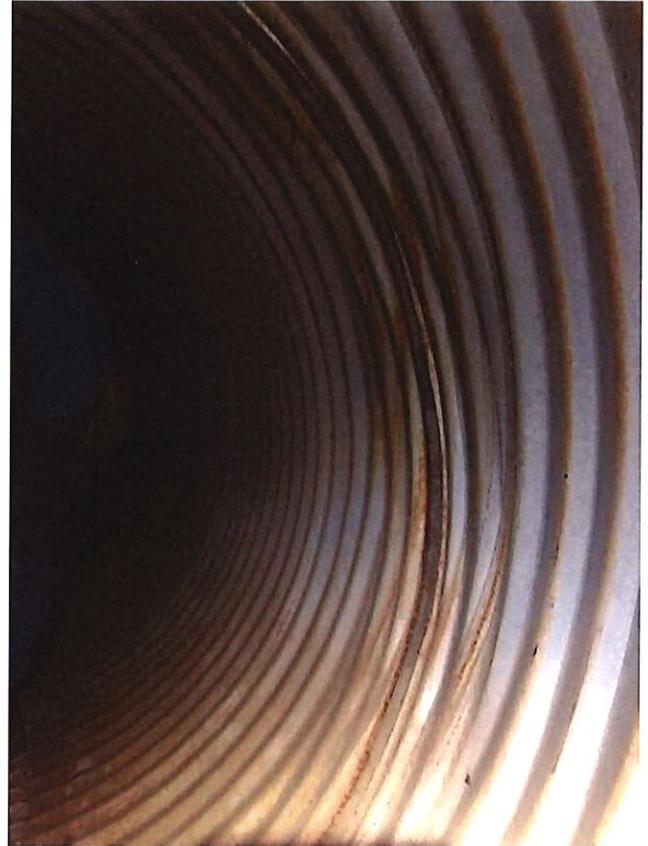


Photo 20

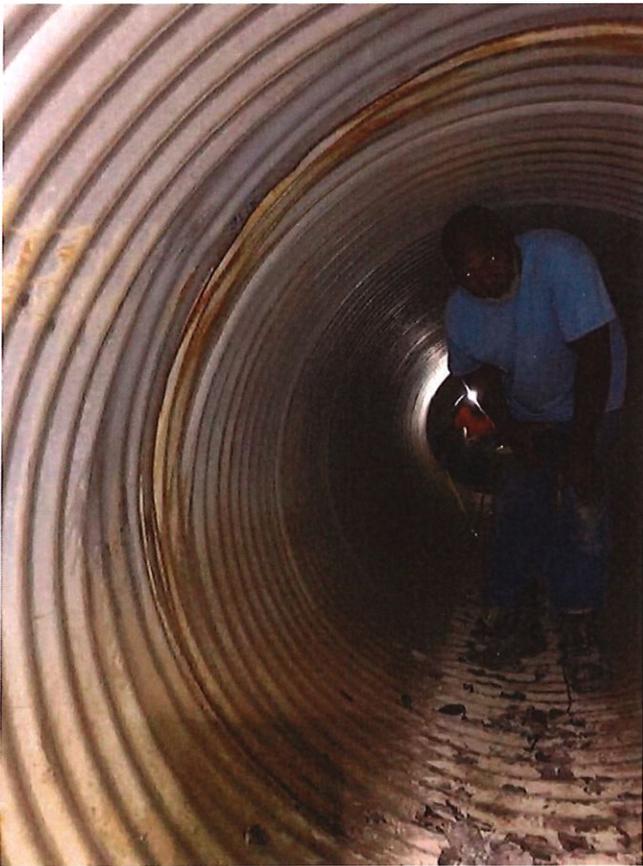


Photo 21



Photo 22

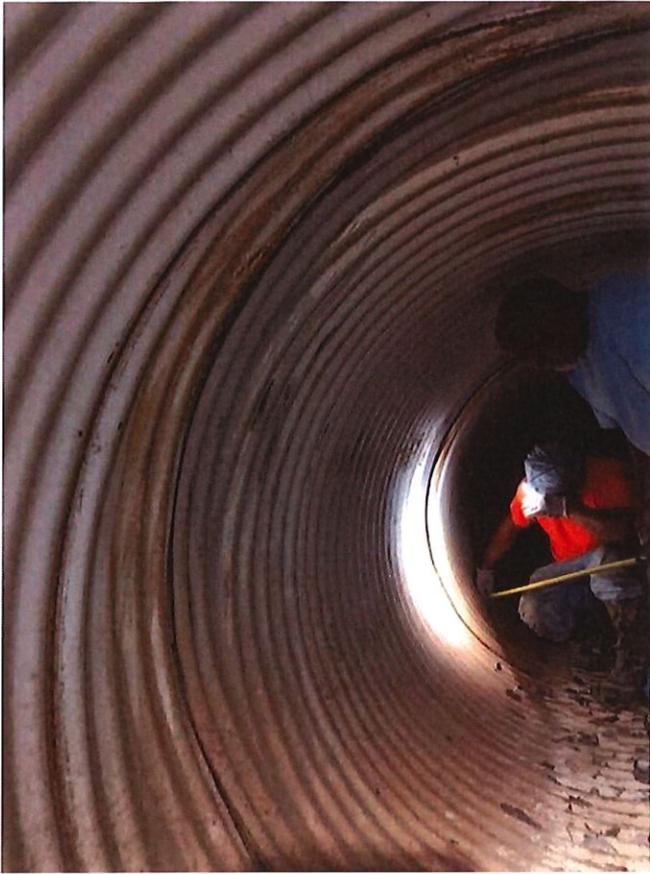


Photo 23

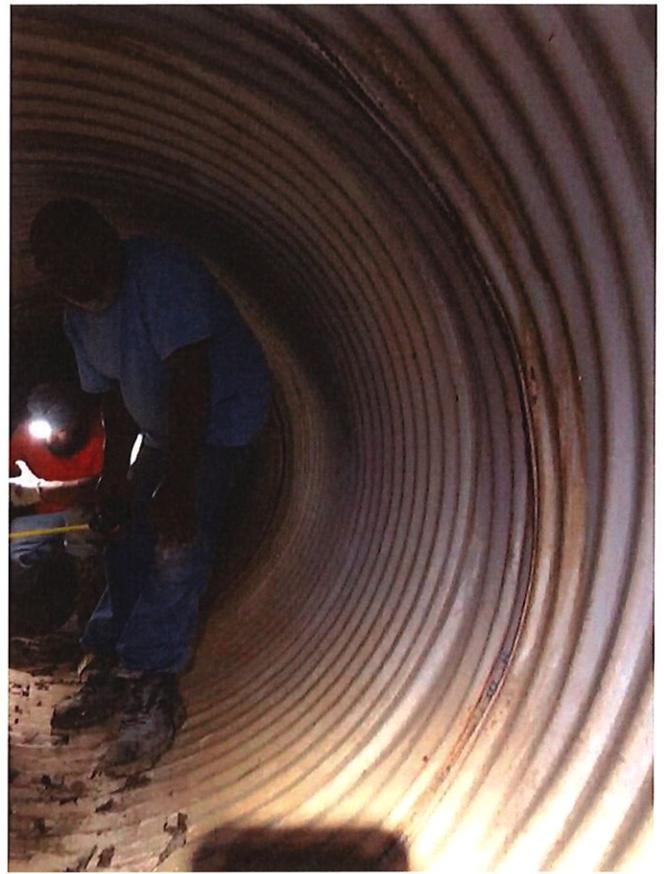


Photo 24



Photo 25  
(Hole In invert 6" x 8")

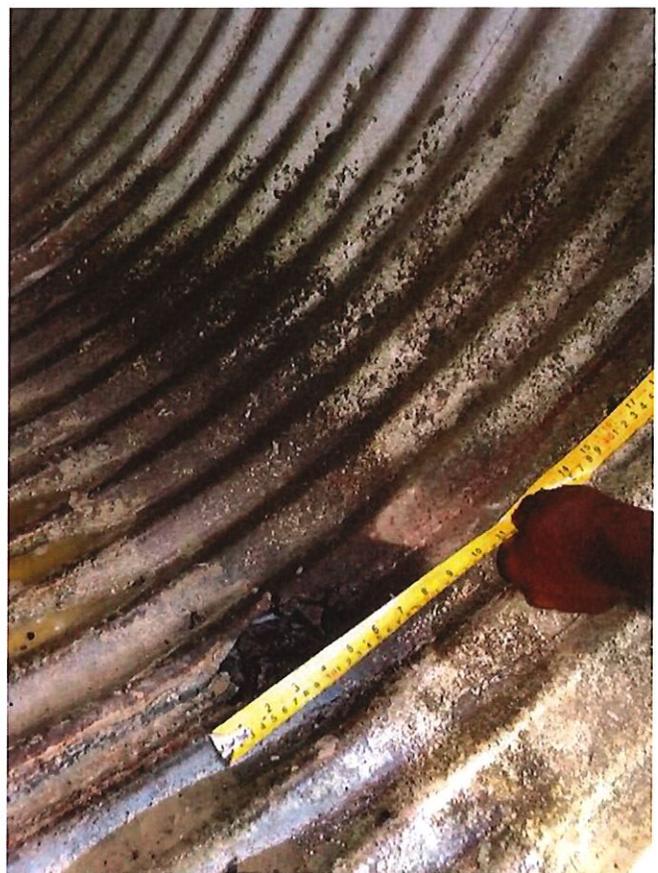


Photo 26  
(Hole In invert 6" x 8")

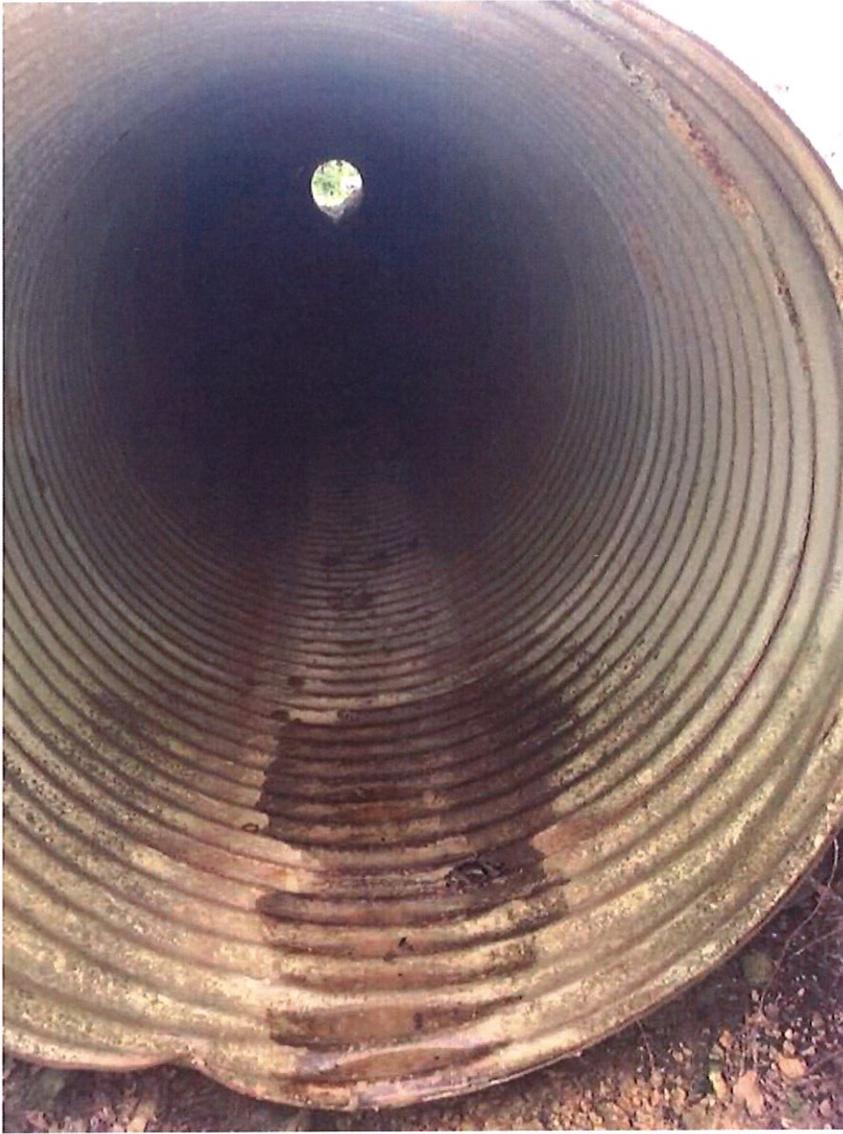


Photo 27 (Downstream End)

## 72" x 96" Arch (Center Cell)

This pipe is 100' 2" long, with only 4 joints, which 3 are separated and leaking severely. In addition, the pipe is rusting from the invert to the midpoint of the pipe, and signs of severe rusting above that. Also, there are 2 circumferential cracks located between Joint 1 and Joint 2; they 2.5' and 3.5' long.

There is a 10" diameter DIP running through the pipe located at 39' 6" from the upstream end. We were told it is a sanitary line. It goes through both sides of the CMP; however, there are no signs of infiltration where it protrudes and exits the CMP.

As you can see from the photos, upstream and downstream dams were constructed using sandbags and plywood; however, the I&I at the joints did not allow the water level to decrease. We were able to incorporate a Super Max 6" hydraulic pump (rented from United Rentals). It included 50' of 8" discharge hose and 100' of suction hose. Even with this equipment, the I&I was greater than the discharge and we were only able to reduce the water level to about 1.5'. This did show the rusting, which was more severe at higher levels on the pipe - this is due to the fluctuating water level. Typically, the pipe will rust faster if there is intermittent flow. It exposes the pipe to the elements, which accelerates the rusting.

The rusting extended approximately 1' above the midpoint of the CMP, which can be seen in the photos. The rise of the arch pipe is 72", the rust extends to 48" above the invert

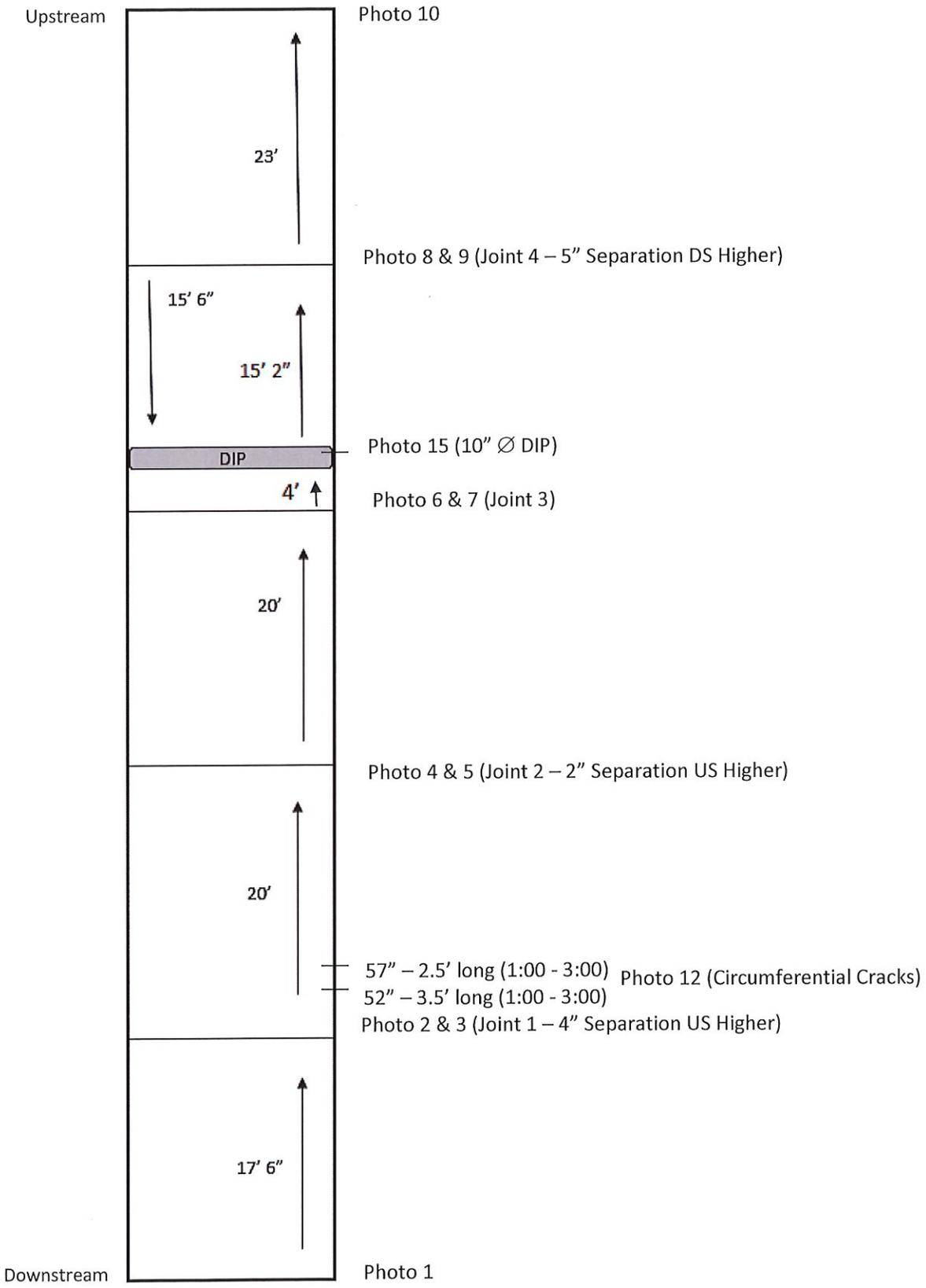
Joint 1 - No failure

Joint 2 - The separation at the invert is approximately 4" and is allowing significant I&I (Inflow and Infiltration) into the CMP. Suggested repair recommendations are provided.

Joint 3 - The separation at the invert is approximately 2" and is allowing significant I&I into the CMP

Joint 4 - The separation at the invert is approximately 5" and is allowing significant I&I into the CMP

Suggested 'repair recommendations' are provided at the end of the report.



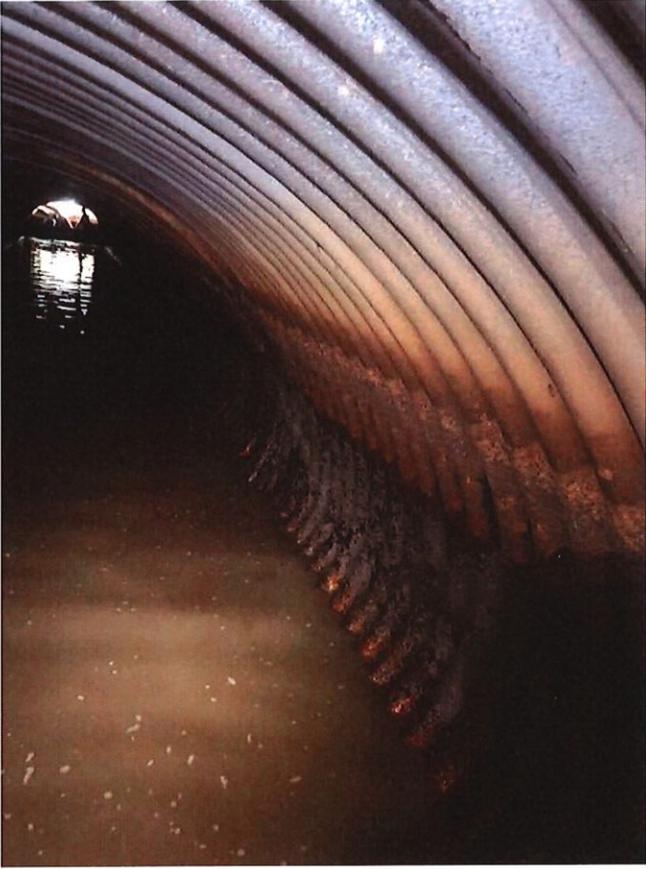


Photo 1

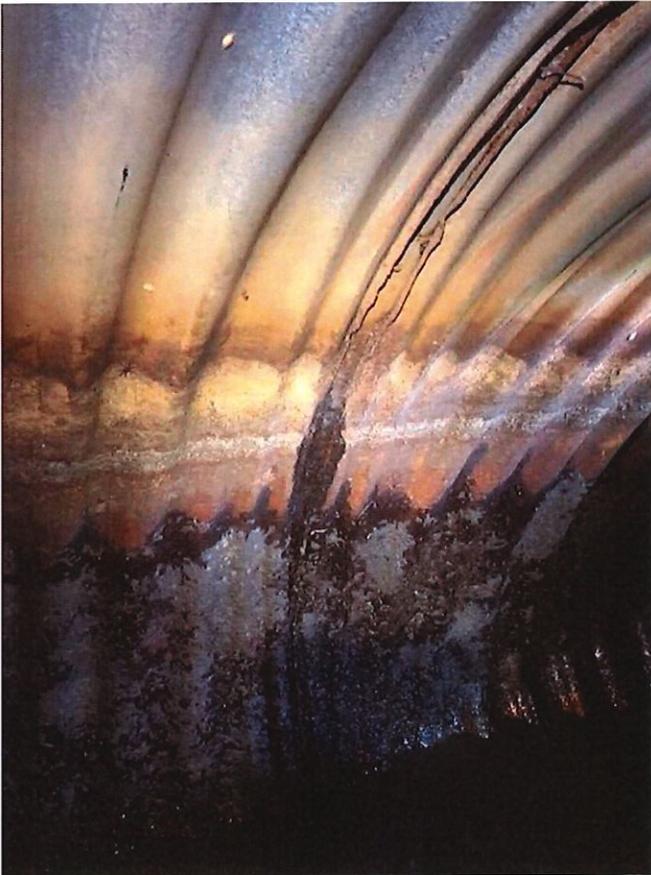


Photo 2

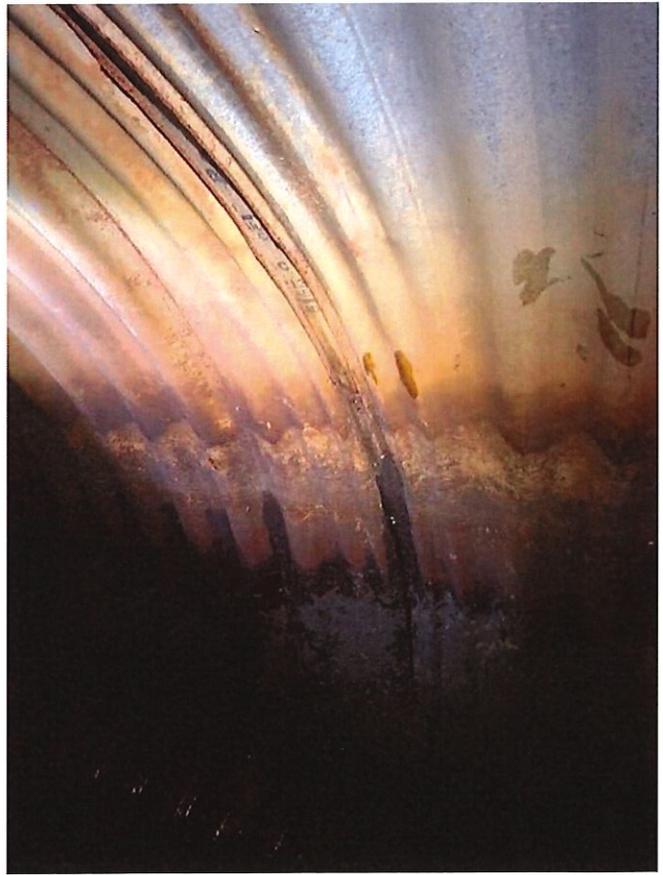


Photo 3

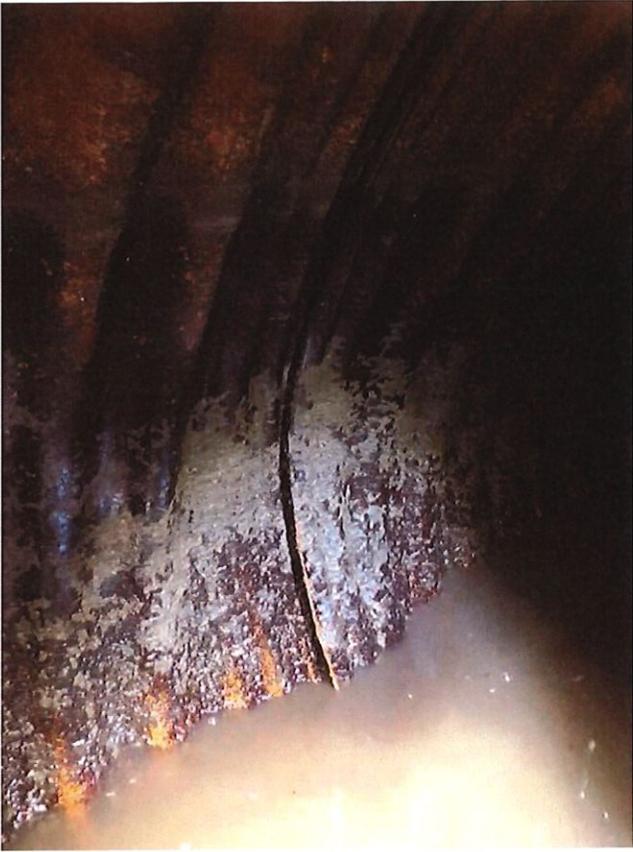


Photo 4

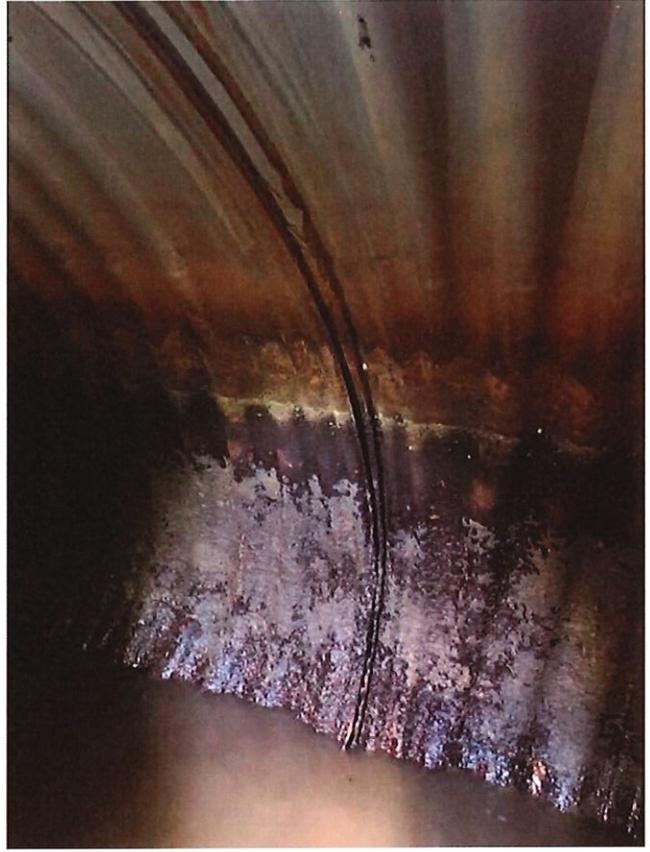


Photo 5

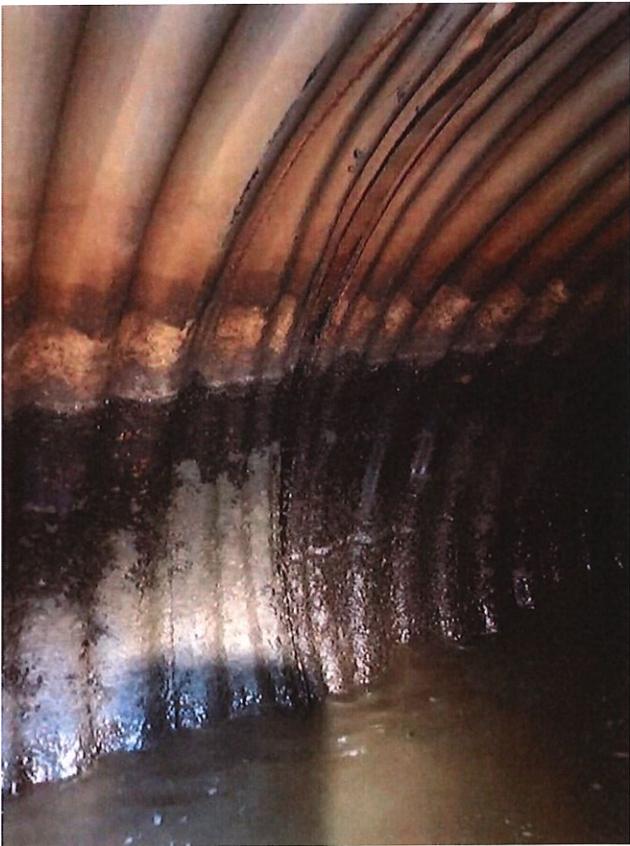


Photo 6

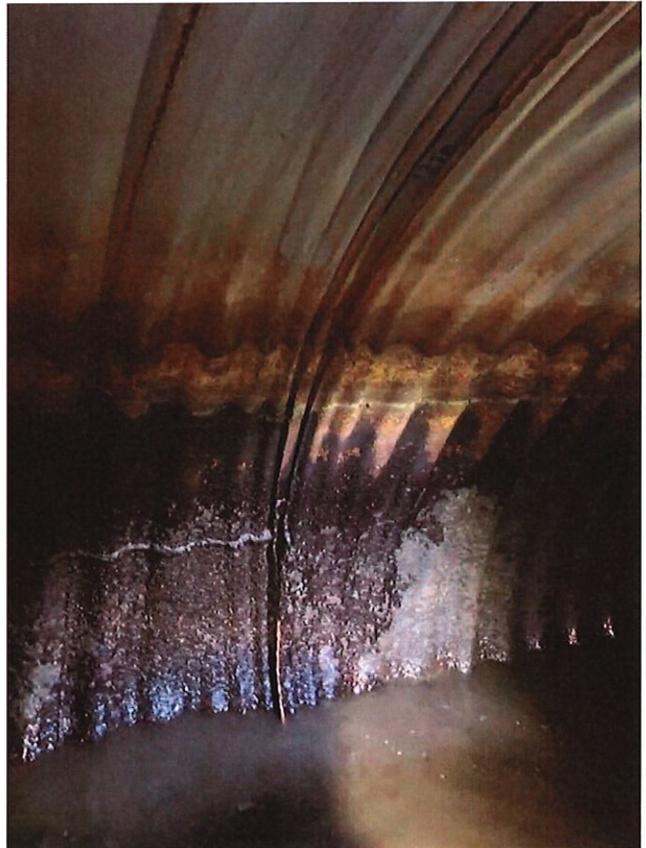


Photo 7

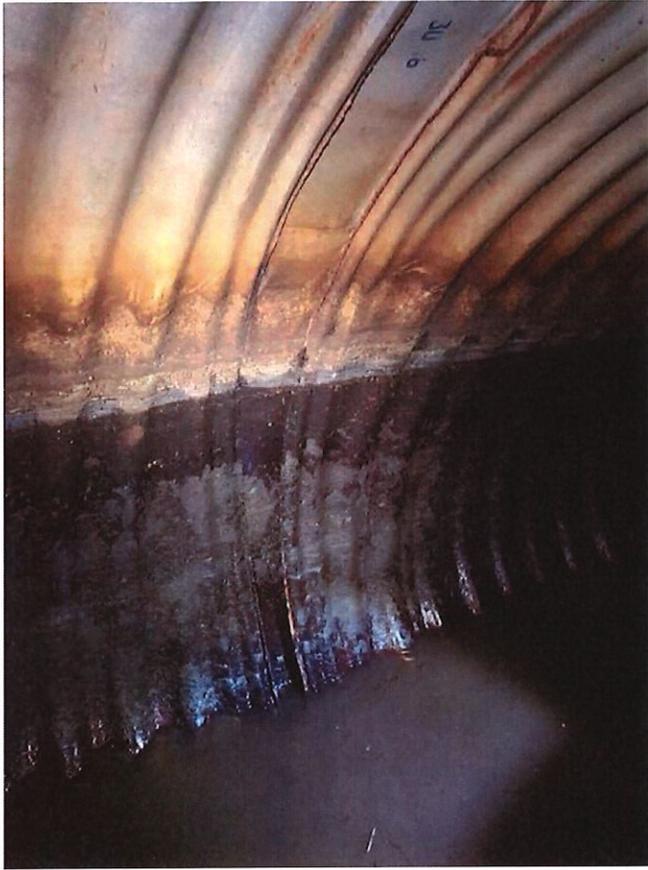


Photo 8

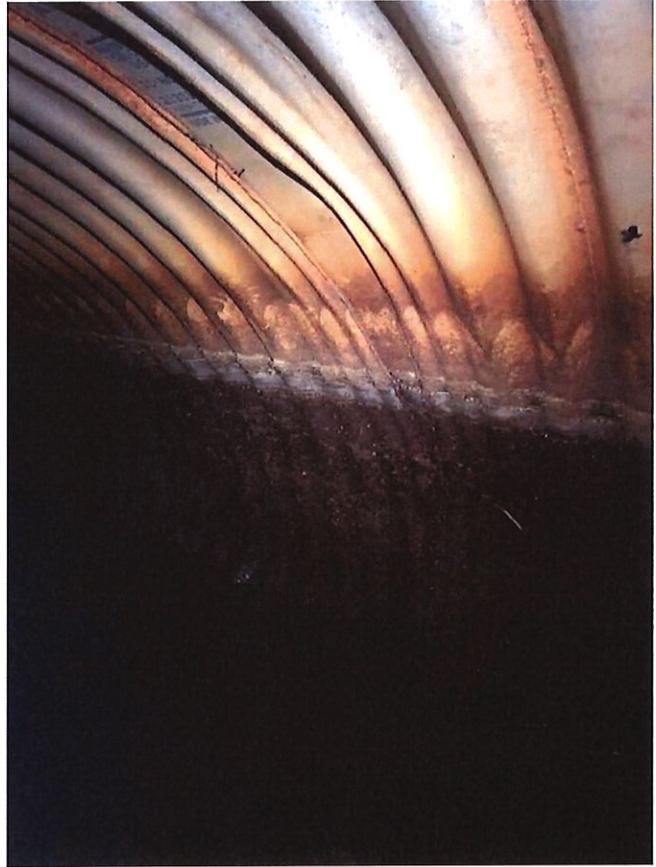


Photo 9

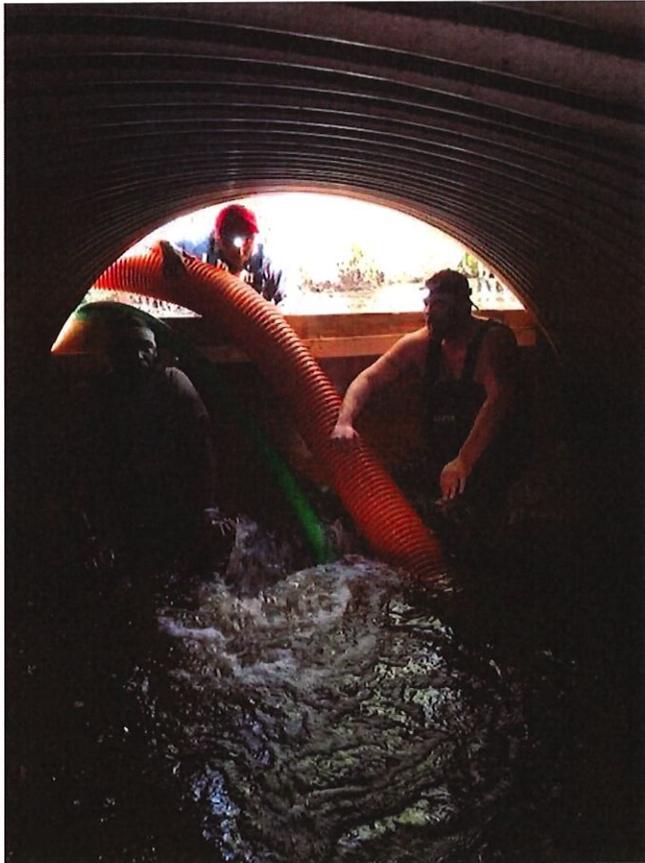


Photo 10

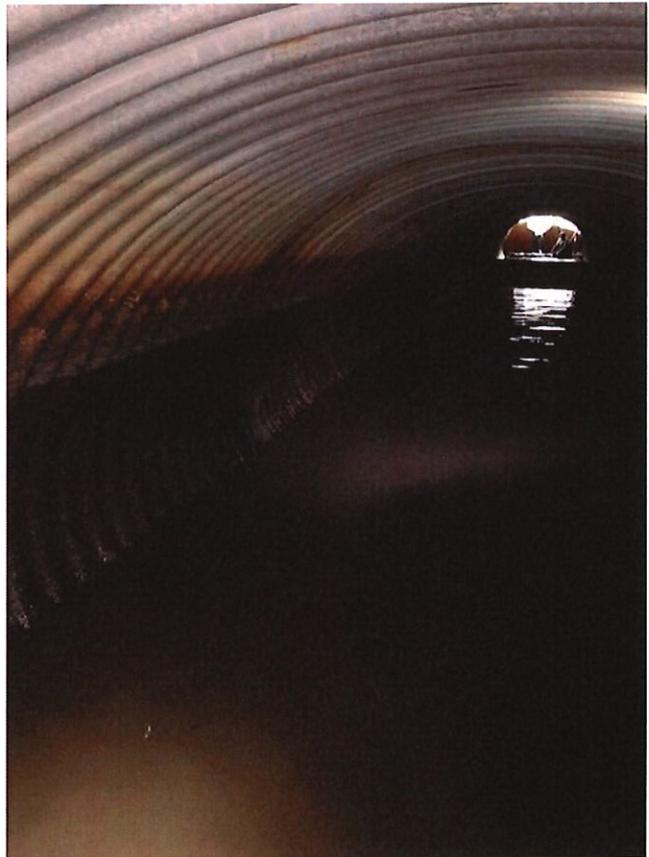


Photo 11  
Upstream looking Downstream

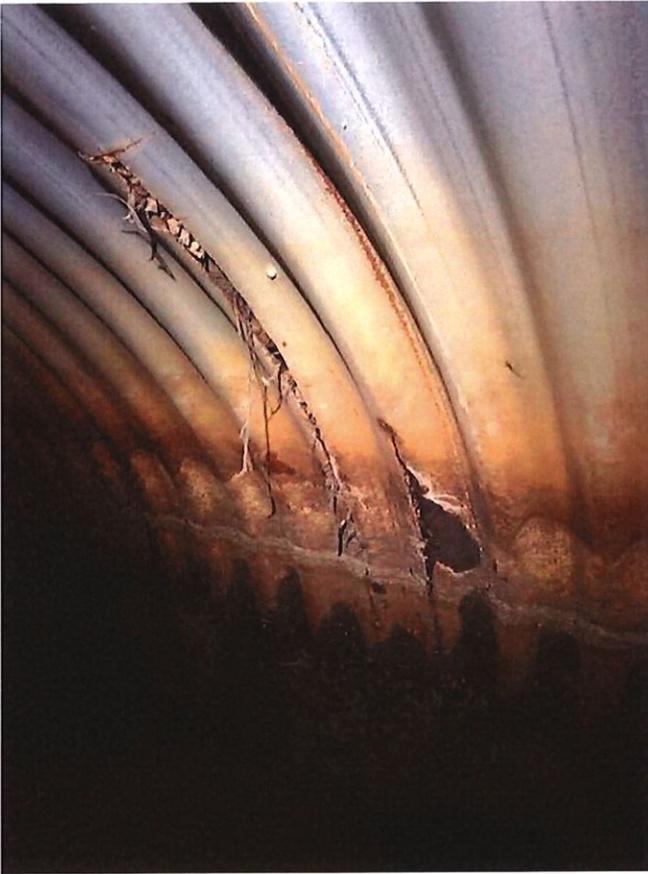


Photo 12

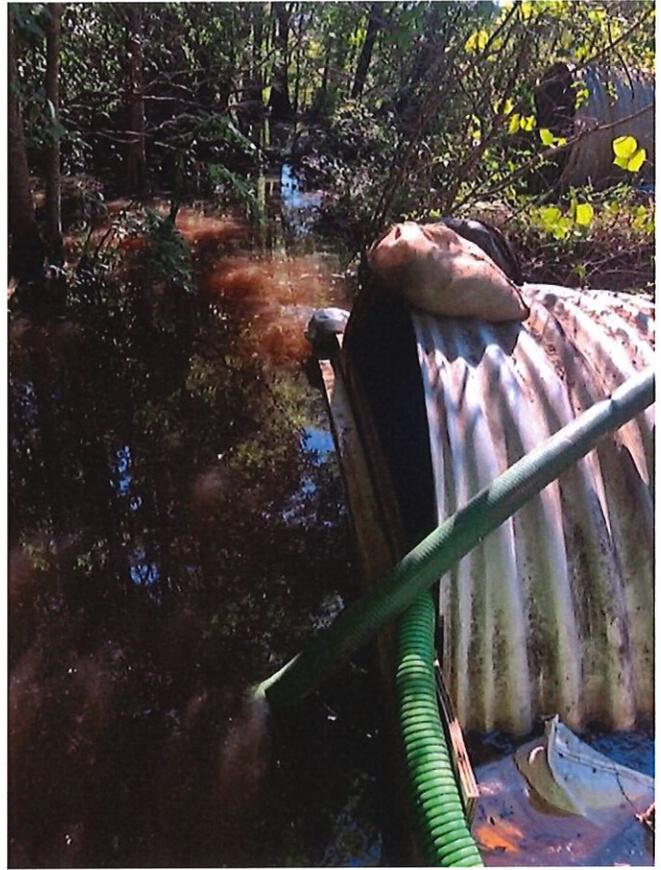


Photo 13



Photo 14  
Downstream Dam

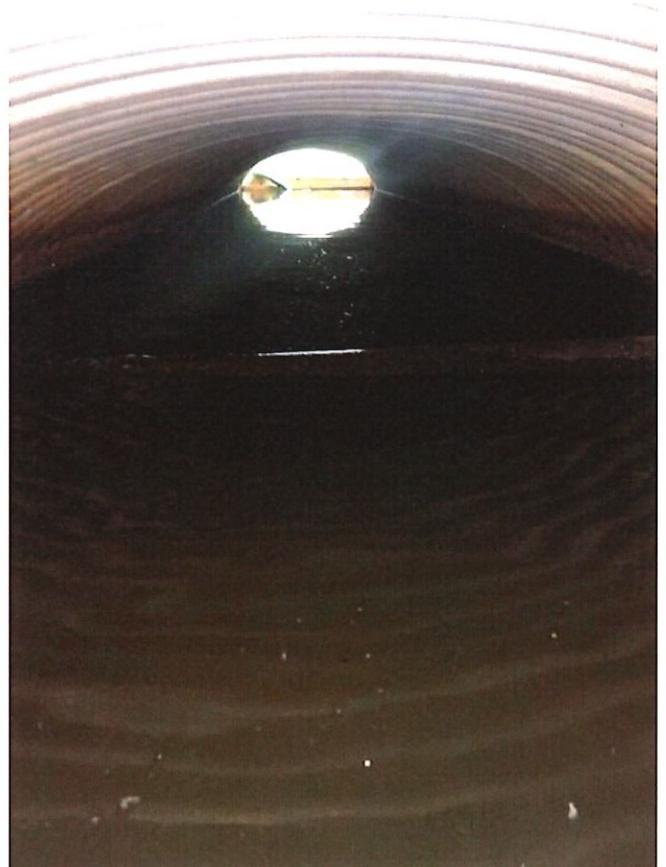


Photo 15

# 8" Hydraulic Pump / Suction Hose / Discharge Hose



