

Seattle Steam Outfall Pipe Measurement FINDINGS REPORT

Pier 57, 1301 Alaskan Way
Seattle, Washington

Muir Job No. 12010035



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1.0 OVERVIEW

Muir Contracting, Inc. was contracted by Stantec Consulting Services, Inc. on September 17, 2012 to locate and provide details on an existing outfall pipe owned and operated by the Seattle Steam Company. On September 20, 2012, Muir Contracting located, measured, and documented the existing outfall pipe. This report summarizes our findings.

2.0 BACKGROUND

According to an existing site map (Figure 1, below), the outfall pipe was presumed to be located beneath Pier 57, where it crosses in a straight line under Alaskan Way to the steam plant on Western Avenue. The site plan references the following coordinates for the outfall pipe location: Latitude 47°-36'23"N and Longitude 122°-20'10"W.

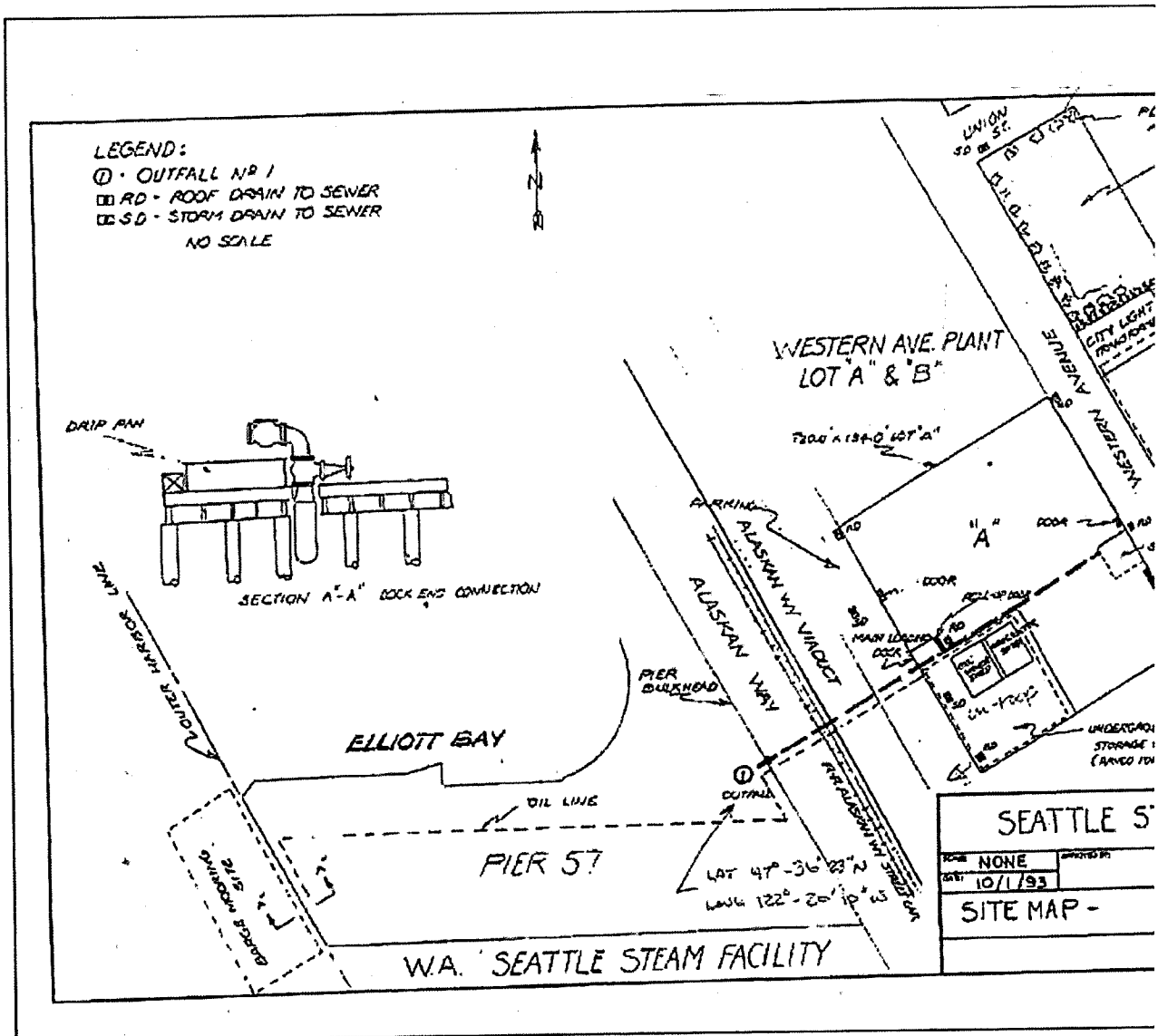


Figure 1. Existing Site Map



3.0 FINDINGS

On Thursday, September 20, 2012, Muir Contracting's Project Manager, Amanda Grindle, arrived at the presumed location for the outfall pipe via boat beneath Pier 57. Per Pacific Northwest Tide Tables, high tide was at 9:04 a.m. and low tide was at 2:38 p.m. Upon arrival at the site at approximately 11:00 a.m., the tide was at mid-point and beginning to recede. The water level at the site, directly below the subject outfall pipe and approximately two feet from the seawall, was approximately nine feet deep (measurement was taken at approximately 11:30 a.m.). Based on barnacle grown on the pier pilings, it would appear that typical water levels at the high tide mark are at least 2-3 feet higher. The sea water became significantly deeper (i.e. the sea floor was no longer visible) approximately ten feet from the seawall. Measurements were not obtained as to the depth of the water further out from the seawall; however, based on a USCG bathymetry relief map taken in 2001, depths for the area range from approximately 80 feet deep near the pier to 330 feet deep past the pier.

The outfall pipe was located easily within minutes of arrival. (There were no other pipes similar to the outfall pipe within the vicinity). The exact pipe location is very close to the location shown on the existing site map. The confirmed Lat/Long is: 47°-36'22.77"N and 122°-20'27.56"W. Figure 3 below shows the location of the pipe on Google Earth.

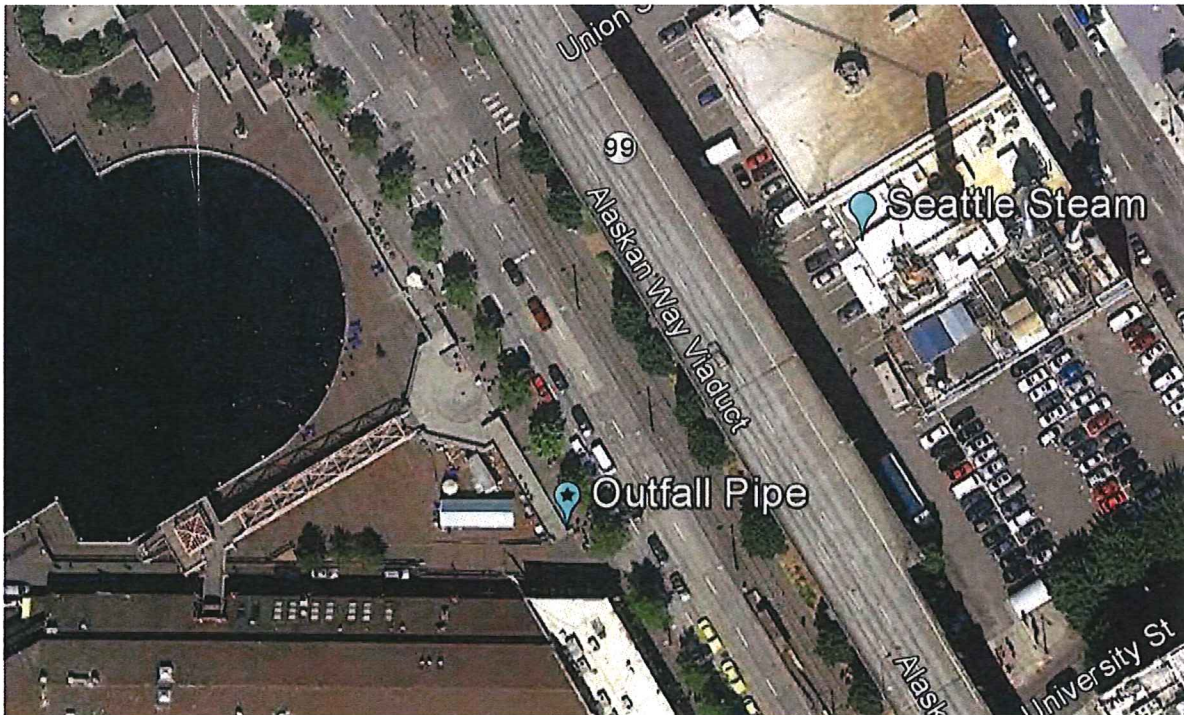


Figure 2. Google Earth Map – Outfall Pipe Location



The following measurements were obtained on the outfall pipe:

- Pipe Diameter: 8"
- Flange Diameter: 12"
- Pipe Outlet Diameter: 4" (Approximate – outlet exhibits signs of deterioration/rust)
- Pipe Length Extending from Seawall: 27"
- Pipe Orientation Extending from Seawall: Slight slope down (less than 1-2 percent slope)
- Distance from Bottom of Pier to top of Pipe: 11"
- Distance from Bottom of Pier to Pipe Outlet: 35"
- Distance from Pipe Outlet to Seafloor: 188"
- Water Depth at Time of Measurement: 108" (Approximate)
- Distance from Pipe Outlet to Water at Time of Measurement: 80" (Approximate)

Overall, the pipe shows signs of deterioration (rust). There is significant build-up of rust and other organics on the pipe outlet (below the flange). The pipe did not emit any liquids during the investigation. There was a faint stream of air emitting from the pipe that was slightly warmer than the ambient temperature at the time. Photos are provided in Appendix A.

Figure 3 below provides a diagram of the pipe (not to scale).

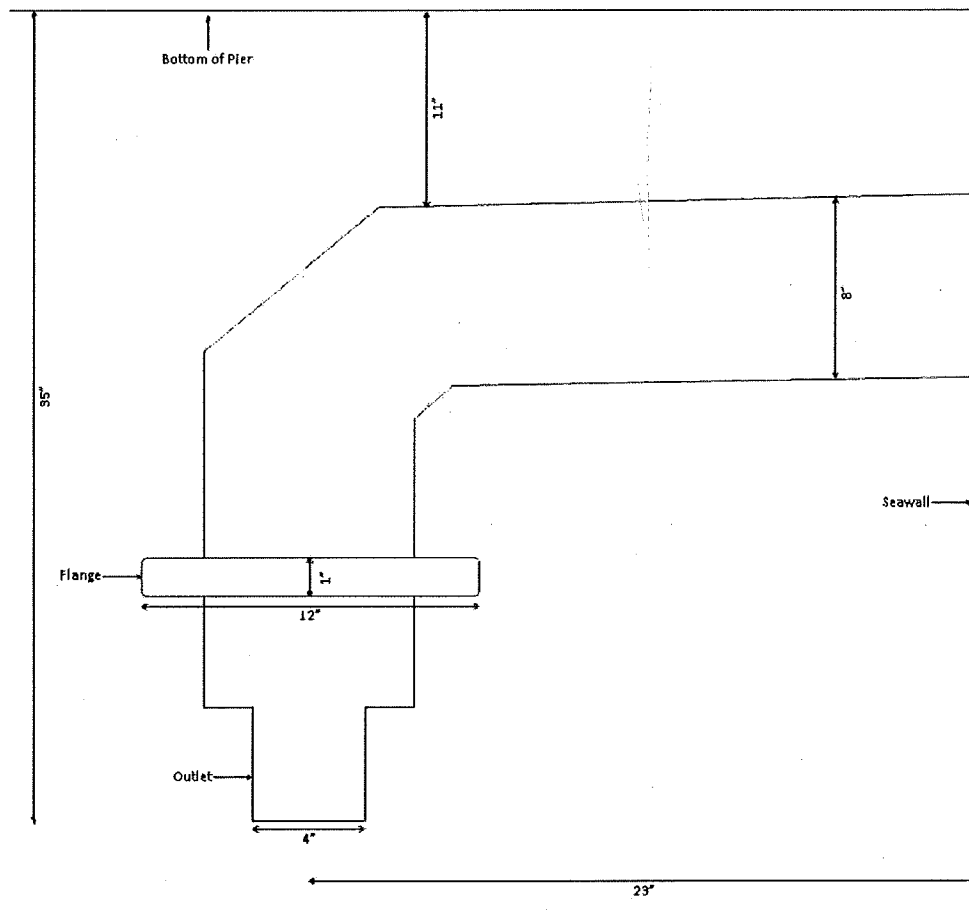


Figure 3. Pipe Diagram Facing North (Not To Scale)

APPENDIX A
PHOTOGRAPHS





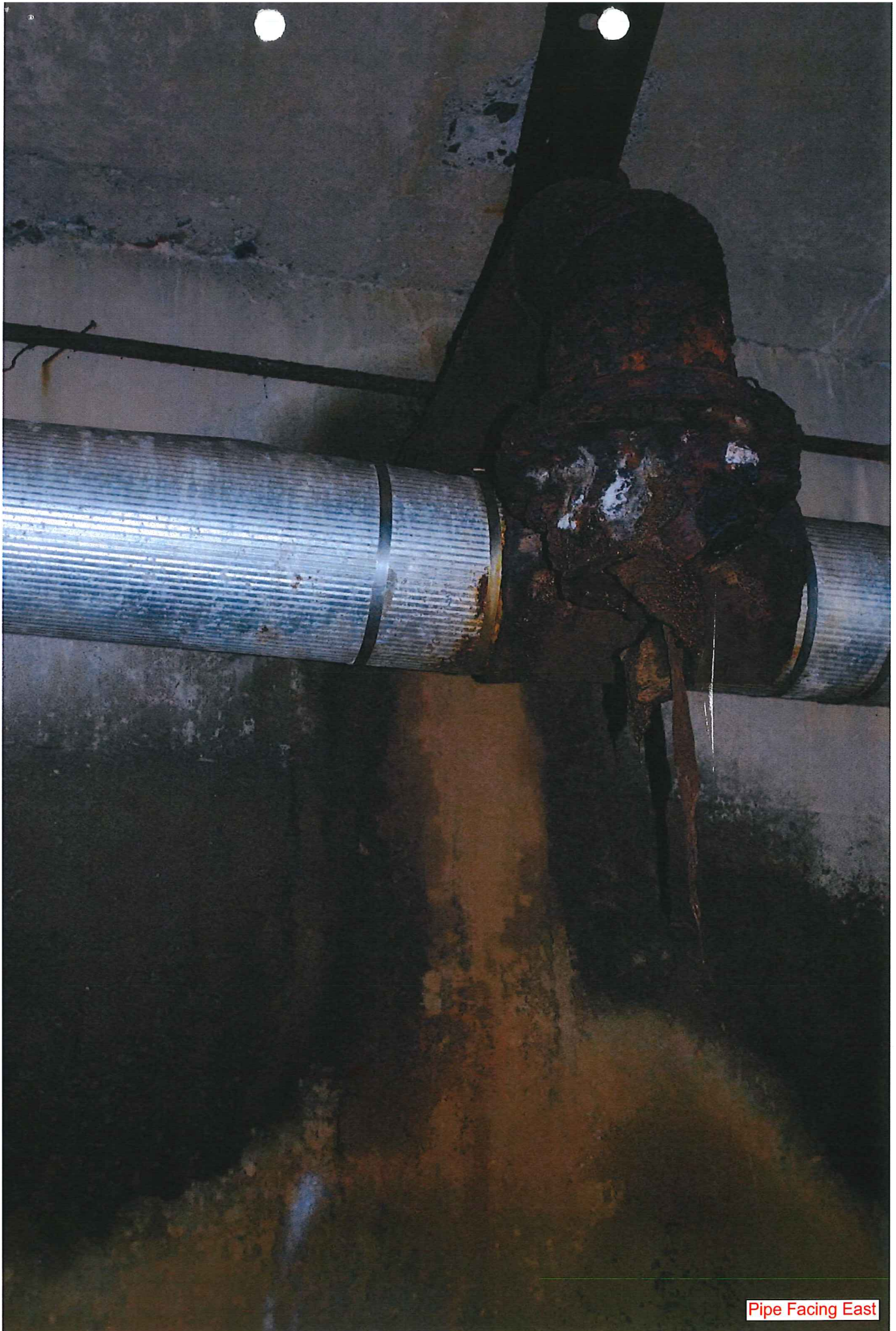


Pipe Facing Southeast





Pipe Facing East



Pipe Facing East



Pipe Facing East

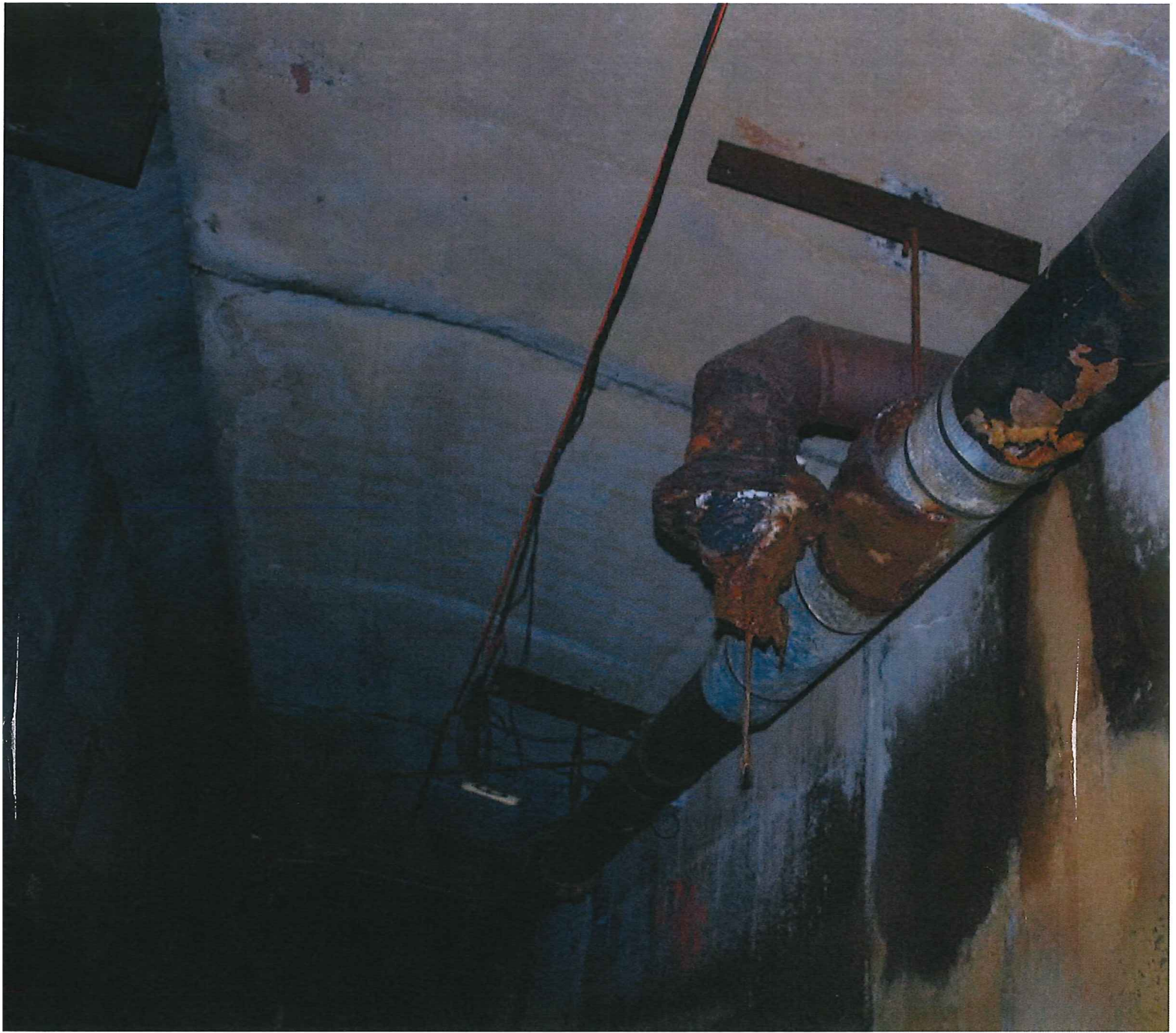










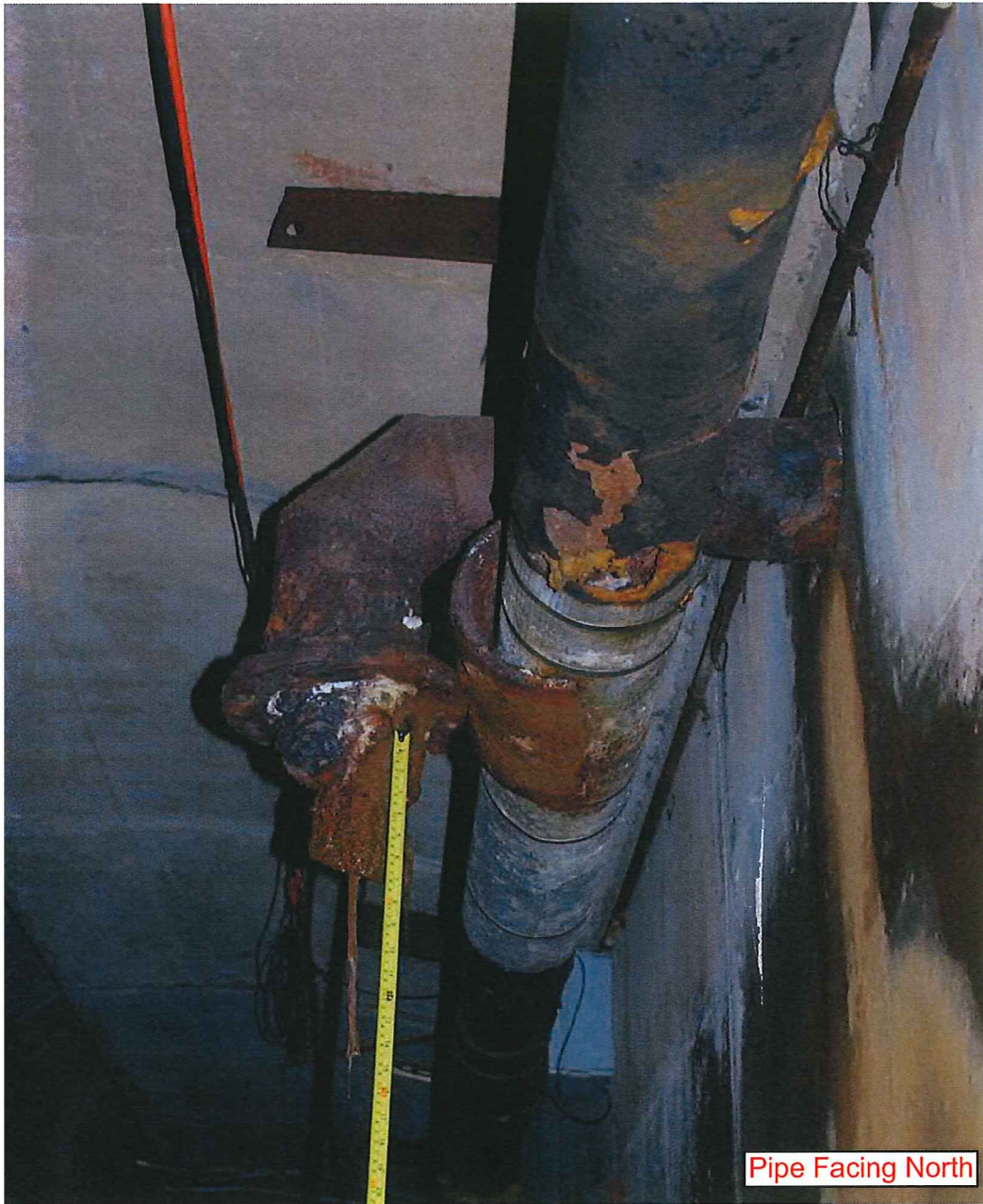






Pipe Facing North

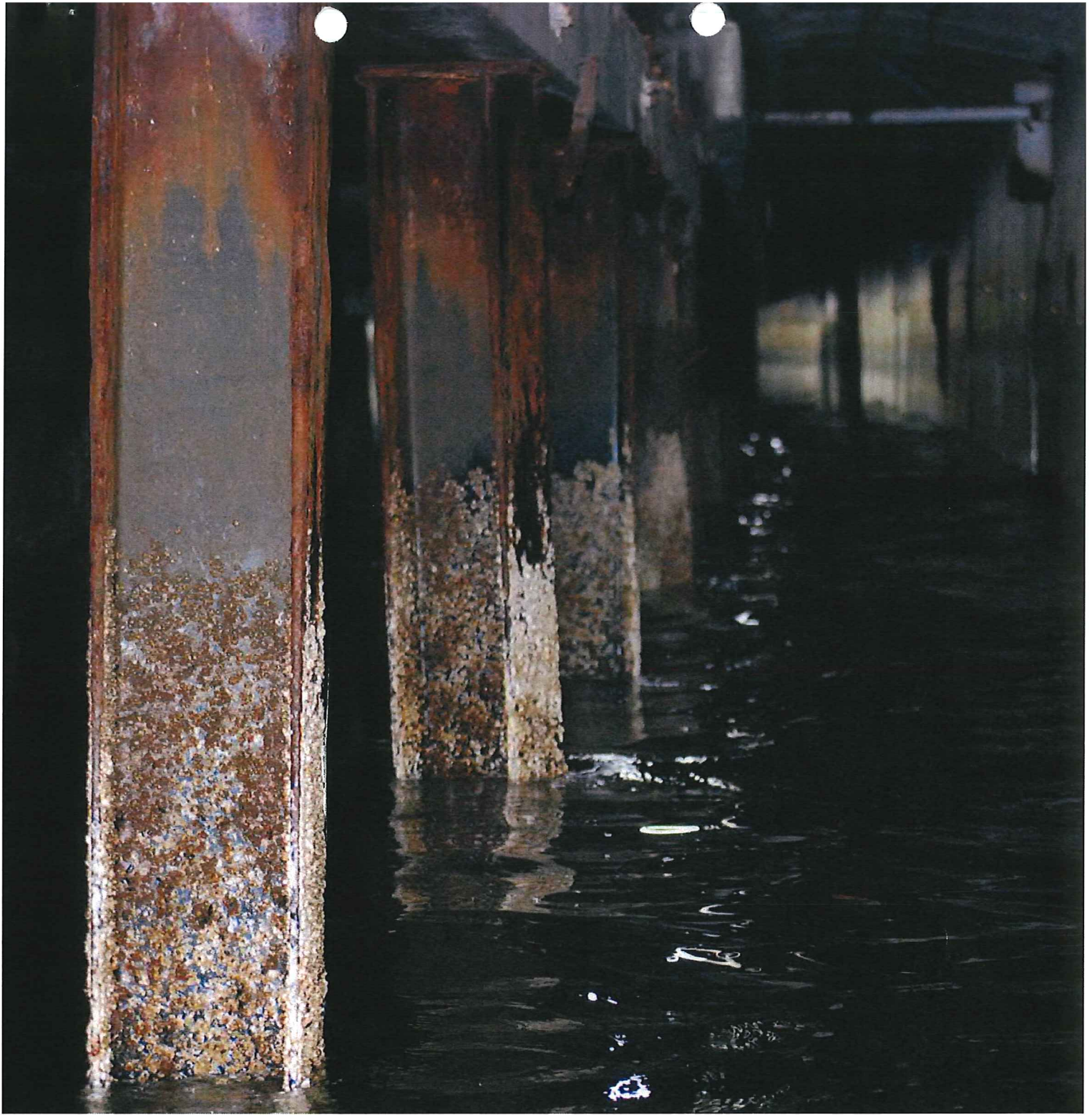




Pipe Facing North

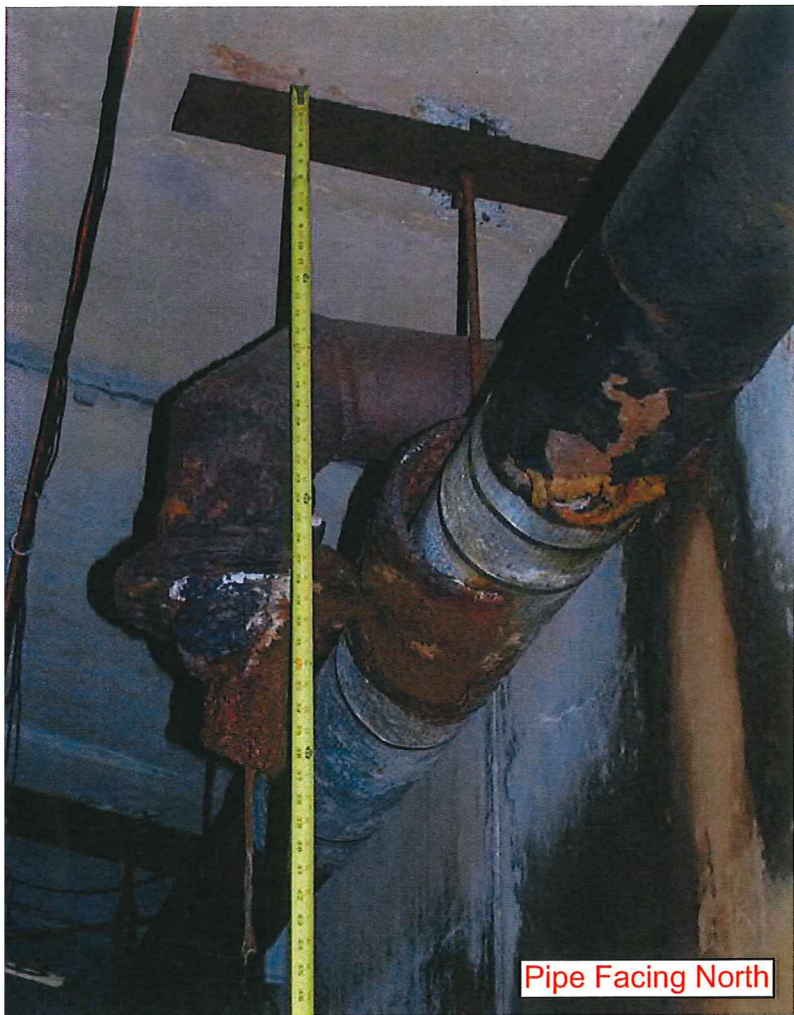


Pipe Facing North









Pipe Facing North







