City of Atlanta
Department of Watershed Management (DWM)

FC-7383A, TASK ORDER NO. 142

FLINT RIVER PUMP STATION UPGRADES

Existing Conditions Report

DRAFT

January 12, 2021

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FIGURES

APPENDIX

1 INTRODUCTION

The Flint River Pump Station has gone through many phases of repurposing and upgrading over the past 100 years. These phases include repurposing the Flint River Water Reclamation Facility from a wastewater treatment plant to a two-stage multi-pump transfer pump station in 1987, to replacing the 1st stage screw pumps with additional submersible pumps and a hydraulic centrifugal pump in 2005. The purpose of the Existing Conditions Report is to document what mechanical, electrical, instrumentation, and structural assets are at the Flint River Pump Station.

The document includes a brief overview of the existing facilities and separately lists out each mechanical, electrical, instrumentation, and structural assets at the Influent Pump Station, Electrical Building, Screening Building, Effluent Pump Station, and Clarifier Pump Station. Each asset has a corresponding asset identification, which corresponds to the asset identification listed in the Attachement A: Existing Assets Spreadsheet.

2 EXISTING FACILITIES

Based on review of the City of Atlanta Public Works Department Water Pollution Control Division Flint River Water Pollution Control Plant Drawings from 1969 (existing drawings), and site visits the following process flow diagram was developed for the Flint River Pump Station.

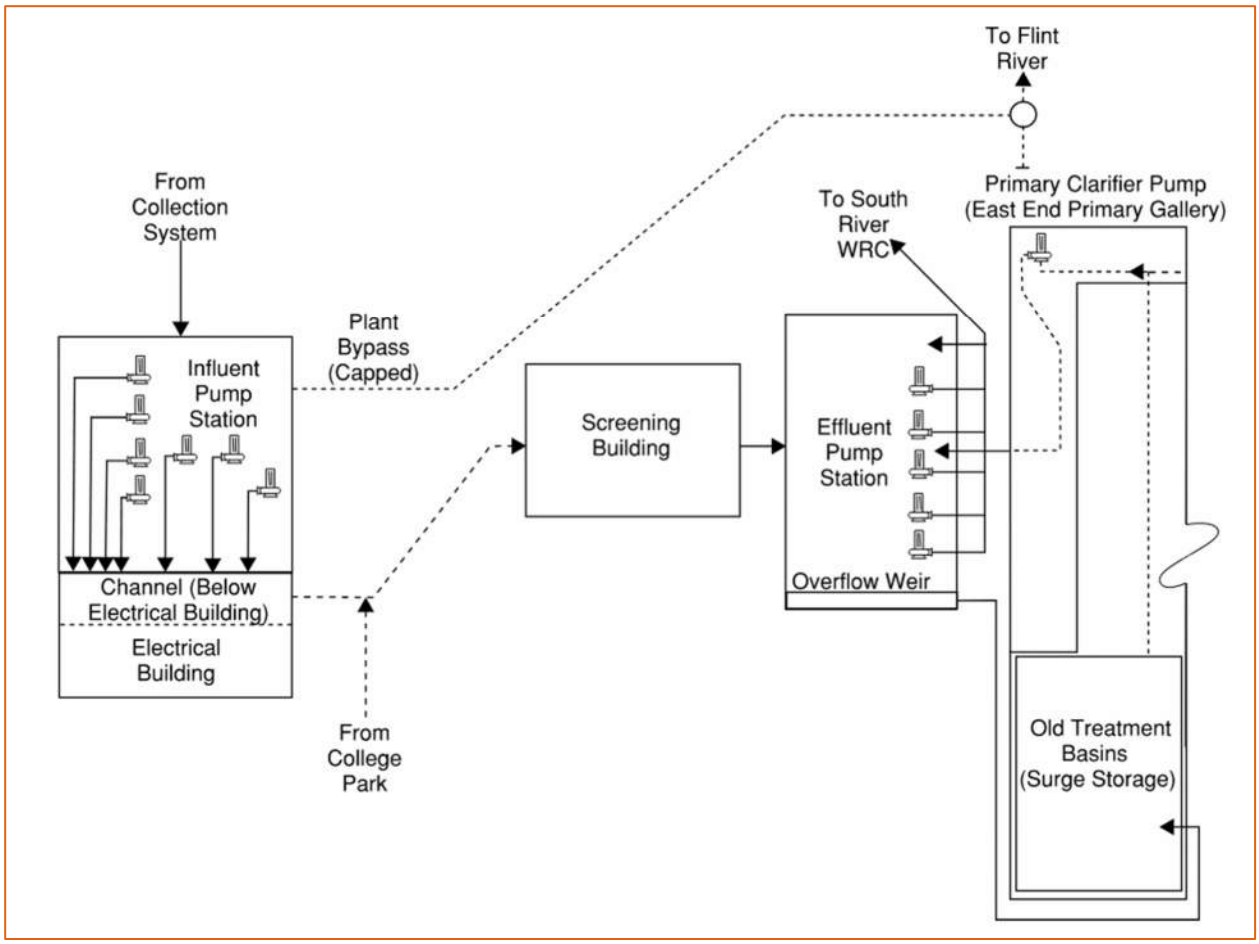

Figure 1: Process Flow Diagram

2.1 Influent Pump Station (Spiral Pump Station)

The Influent Pump Station was converted from a spiral pump station to a submersible pump station in 1987. The Influent Pump Station collects wastewater by gravity flow through a 66-inch influent pipe from the airport property, under I-285. The influent slide gates are no longer operated and remain open, hydraulically connecting each section of the wet well. The Influent Pump Station has a total of seven pumps in the old screw pump wet well. There are four submersible pumps on rail mounts along the North wall, two submersible pumps in the wet well center and one emergency diesel driven hydraulic centrifugal pump on a concrete bench on the southside of the wet well. The Influent Pump Station lifts the wastewater into a channel beneath the electrical building. The channel is connected to a 42-inch ductile iron pipe (DIP) which gravity feeds into the screening building.

2.1.1 Mechanical

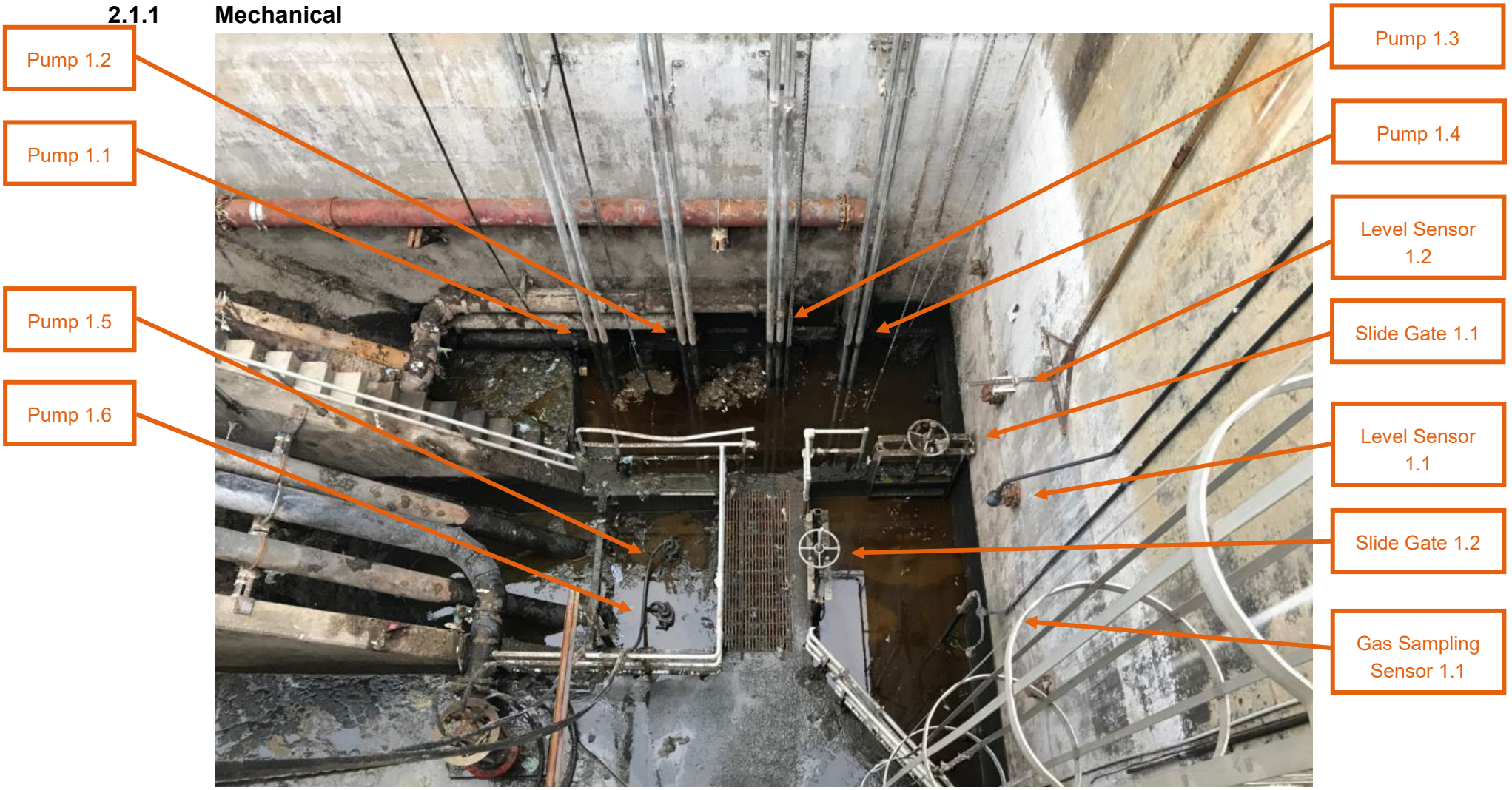

Figure 2: Influent Pump Station (Spiral Pump Station)

Figure 3: Gate Valve 1.5 and 1.6

Figure 4: Spare Pump 1.1 and Spare Pump 1.2

Figure 5: Spare Pump 1.3 and Spare Pump 1.4

2.1.2 Electrical

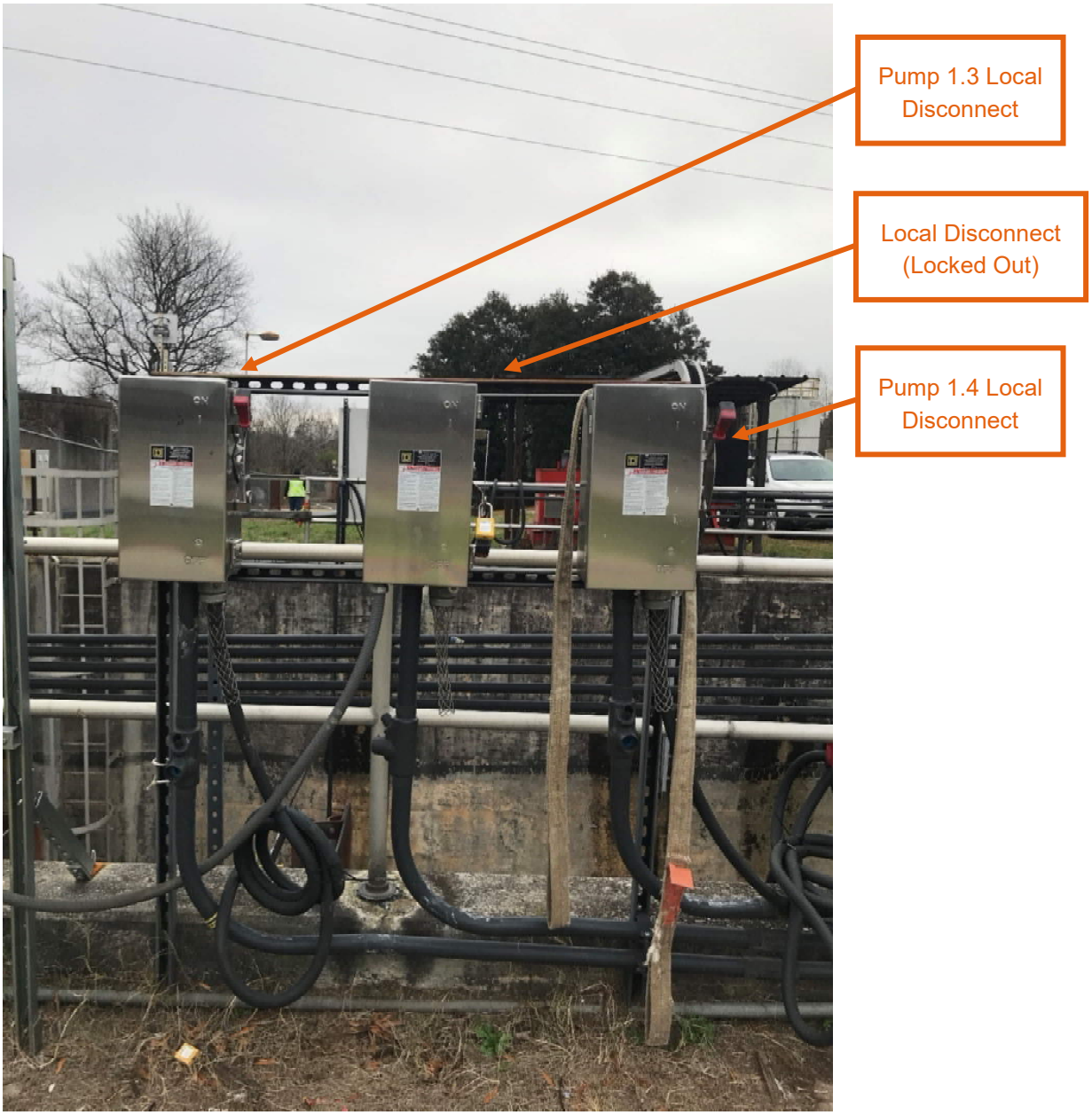

Figure 6: Pump 1.3 and 1.4 Local Disconnects

2.1.3 Instrumentation

Figure 7: Flygt Local Control Panels

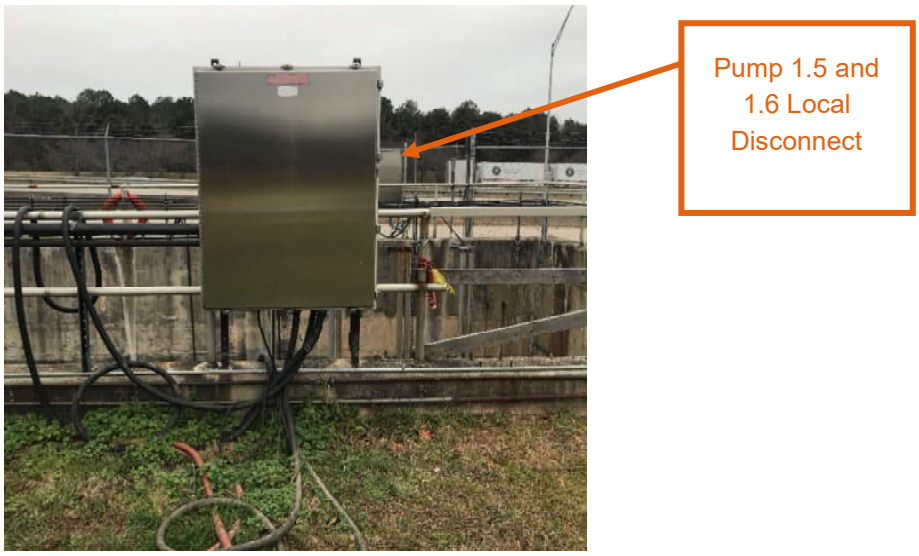

Figure 8: Pump 1.4 and 1.5 Local Disconnect

Figure 9: Level Sensor 1.1 Control Panel Exterior and Interior

Figure 10: Level Sensor 1.2 Control Panel Exterior and Interior

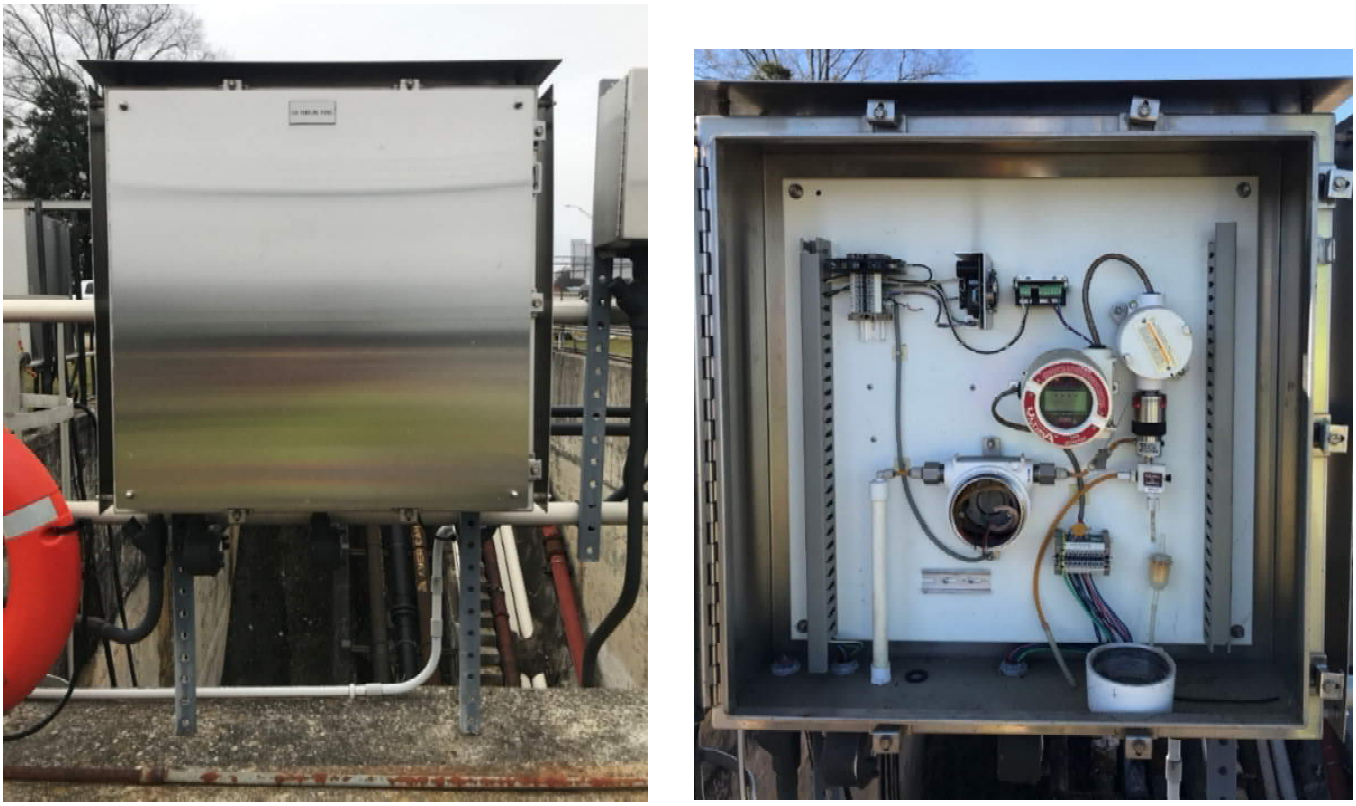

Figure 11: Gas Sampling System 1.1 Panel Exterior and Interior

2.2 Electrical Building

The Electrical Building is located west of the influent pump station, directly above the influent pump station discharge channel. The building houses the Flint River Pump Station Motor Control Center (MCC) which powers all equipment on site. The Electrical Building houses separate control panels for pumps 1.1-1.3, 1.4, 1.5, and 1.6. The Flint River Allen Bradley supervisory control and data acquisition (SCADA) system control panel and operator interface terminal (OIT) is inside the Electric Building. The SCADA system provides wet well level readings of the influent and effluent Pump Stations, pump ON or OFF status, pump run time, and cycle time.

2.2.1 Structural

Figure 12: Electrical Building

2.2.2 Electrical

Figure 13: Switchgear and Diesel Generator

Figure 14: Motor Control Center (MCC)

2.2.3 Instrumentation

Figure 15: Pump 1.3 and 1.4 Control Panel

Figure 16: Control Panel

Figure 17: Pump 1.5 and 1.6 Control Panel

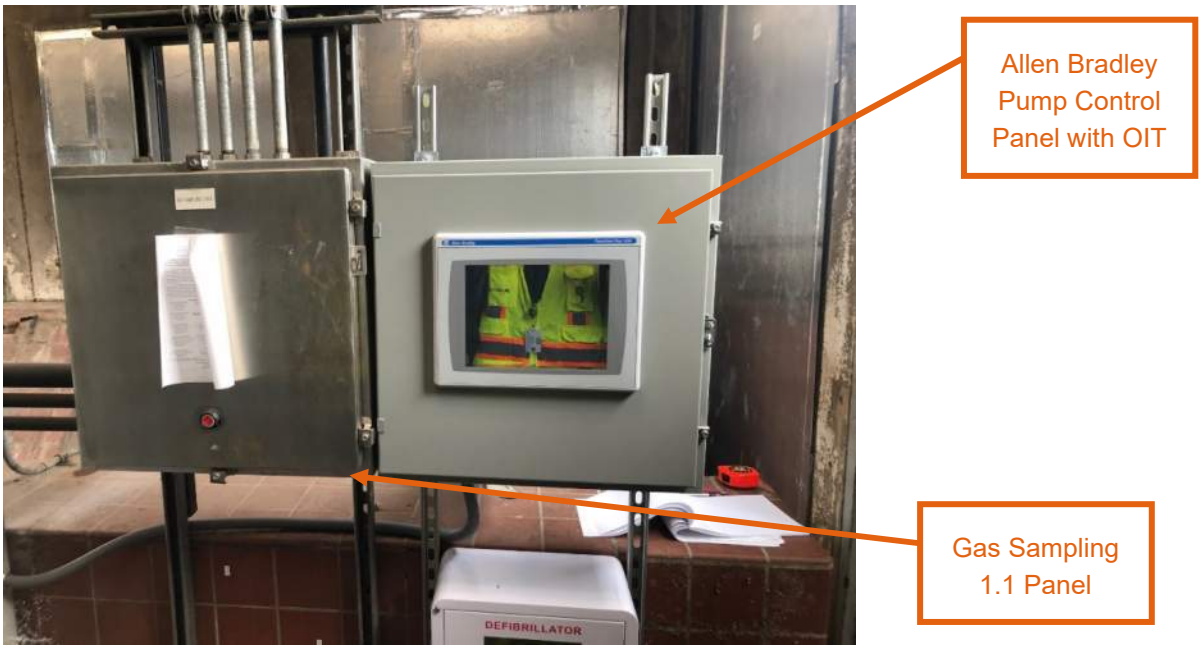

Figure 18: Gas Sampling System 1.1 Panel and Allen Bradley Pump Control Panel with OIT

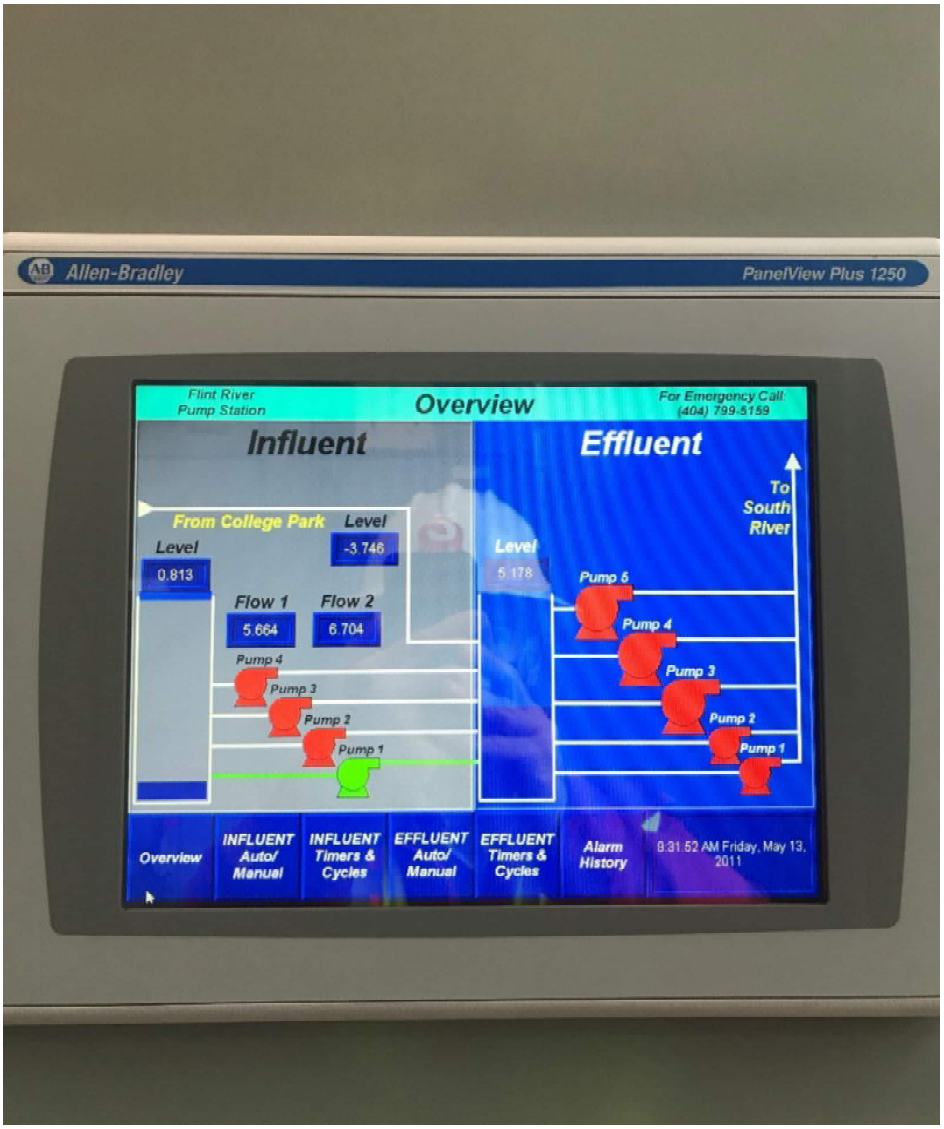

Figure 19: SCADA Overview Screen

2.3 Screening Building

Currently, no screening occurs in the screening building and wastewater passes through the screening building by gravity to the effluent pump station. The screening channel influent isolation gates and both screens have been removed but the screening channel effluent gates are still installed in each channel. Following the screening effluent gates are two flumes each with two operating level sensors.

2.3.1 Mechanical

Figure 20: Screening Building Effluent Slide Gates and Flume Level Sensor Controllers

Figure 21: Flume 3.1 and 3.2

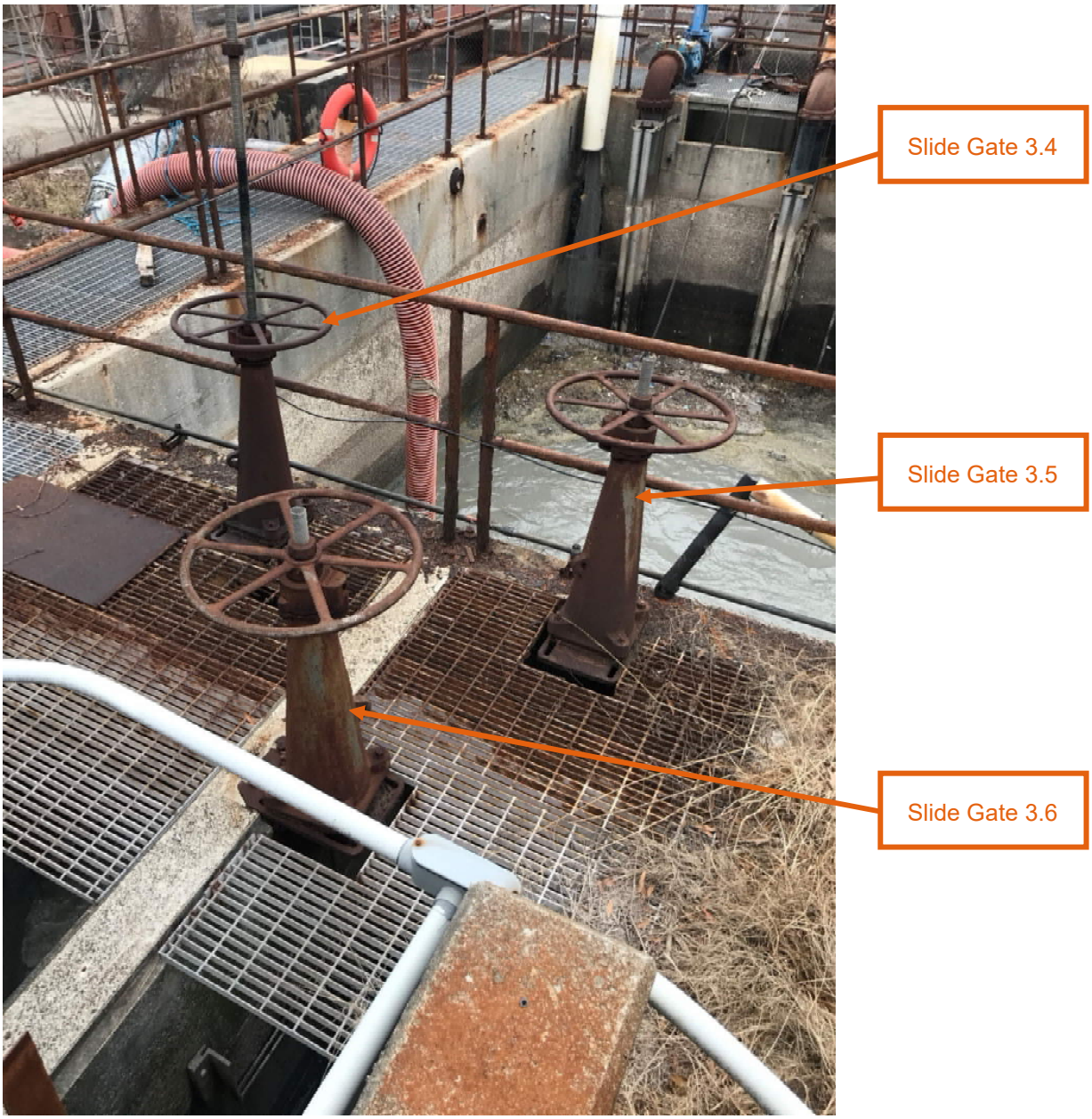

Figure 22: Flume Effluent Slide Gates 3.4, 3.5 and 3.6

2.3.2 Structural

Figure 23: Screening Building

2.3.3 Electrical

Figure 24: Panelboard LA and Transformer Disconnect Switch

Figure 25: Transformer TA Junction Box

2.3.4 Instrumentation

Figure 26: East Flume 3.1 and West Flume 3.2 Level Sensor Controllers

Figure 27: Rain Gauge 3.1 and Flume Level Sensor 3.1 and 3.2 Panel and Receivers

Figure 28: Chemical Heat Trace Monitoring Panel

2.4 Effluent Pump Station (Grit Chamber)

The Effluent Pump Station wet well was converted from a grit chamber to a pump station in 1987. The station is made up of five parallel pumps, two single stage and three two stage pumps. Each pump discharge piping has a check valve and knife gate valve. The pumps discharge into a main 24-inch header on the southside of the wet well. Downstream of the pump discharge manifold, is a 12-inch tee with a surge relief valve. Downstream of the surge relief valve is a pressure sensor. The 24-inch force main goes underground after the sensor and continues to the South River Water Reclamation Facility.

2.4.1 Mechanical

Figure 29: Effluent Pump Station

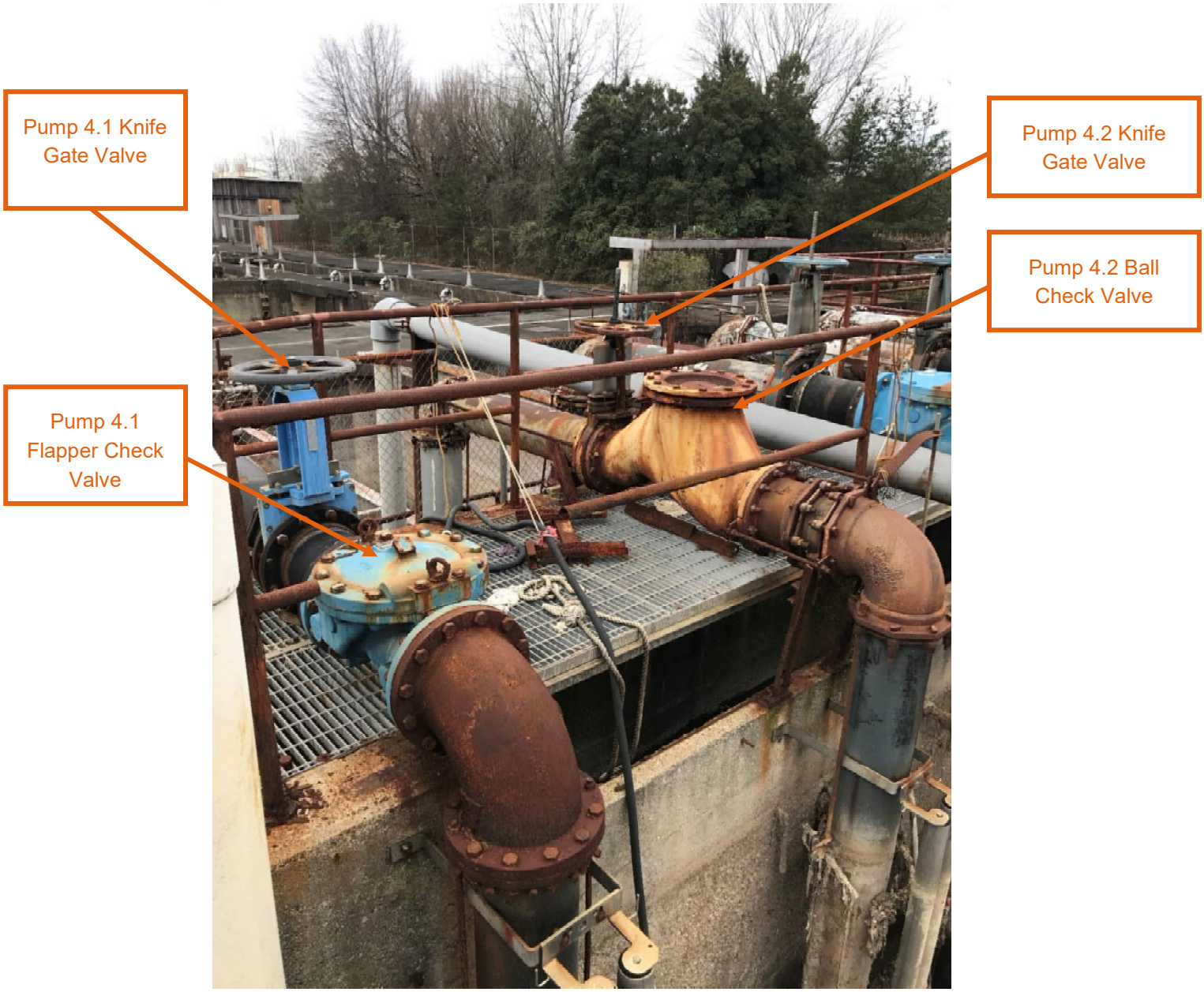

Figure 30: Pumps 4.1 and 4.2 Discharge Piping

Figure 31: Pumps 4.3, 4.4, and 4.5 Discharge Piping

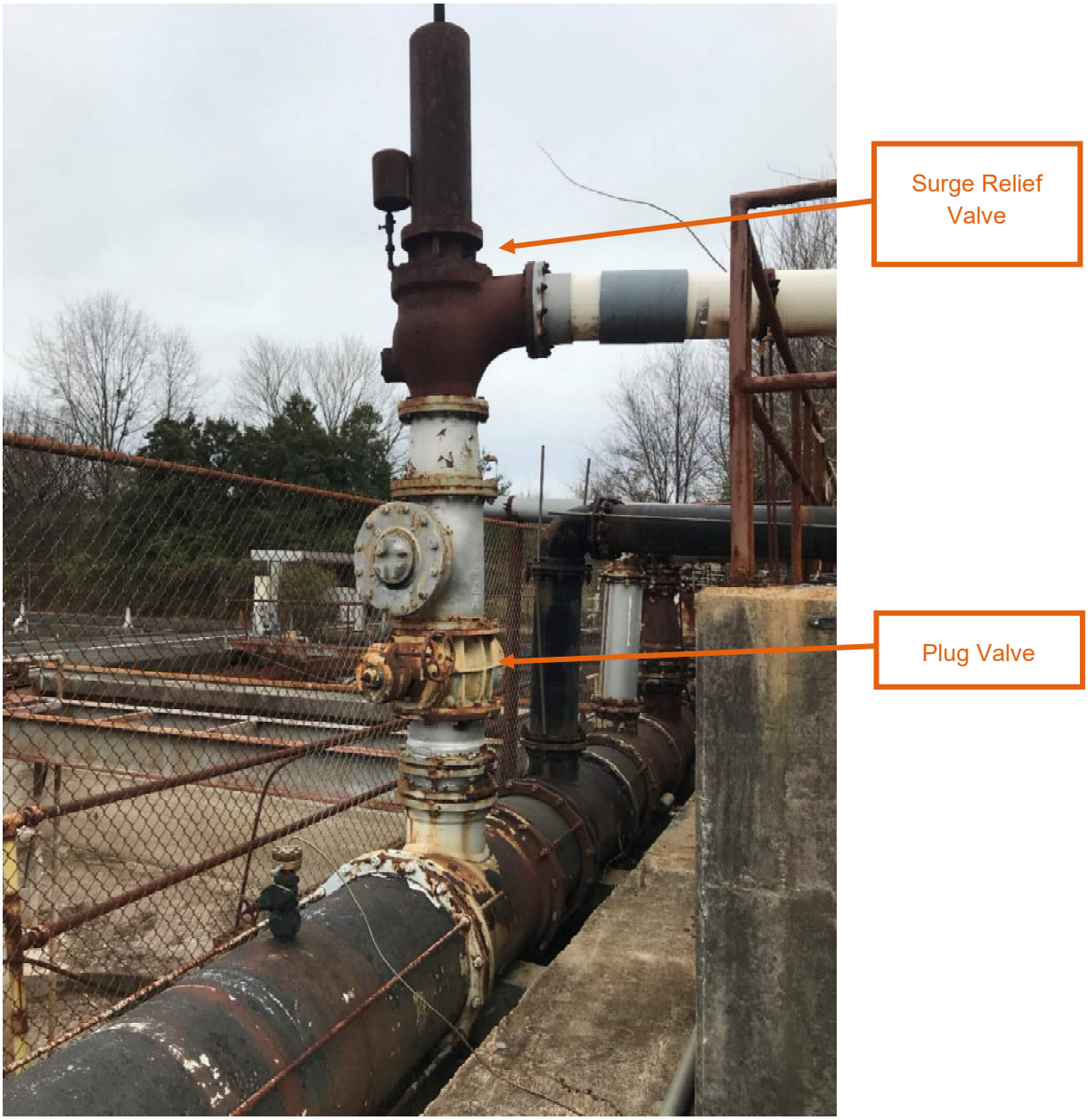

Figure 32: Effluent Pump Station Surge Relief Piping

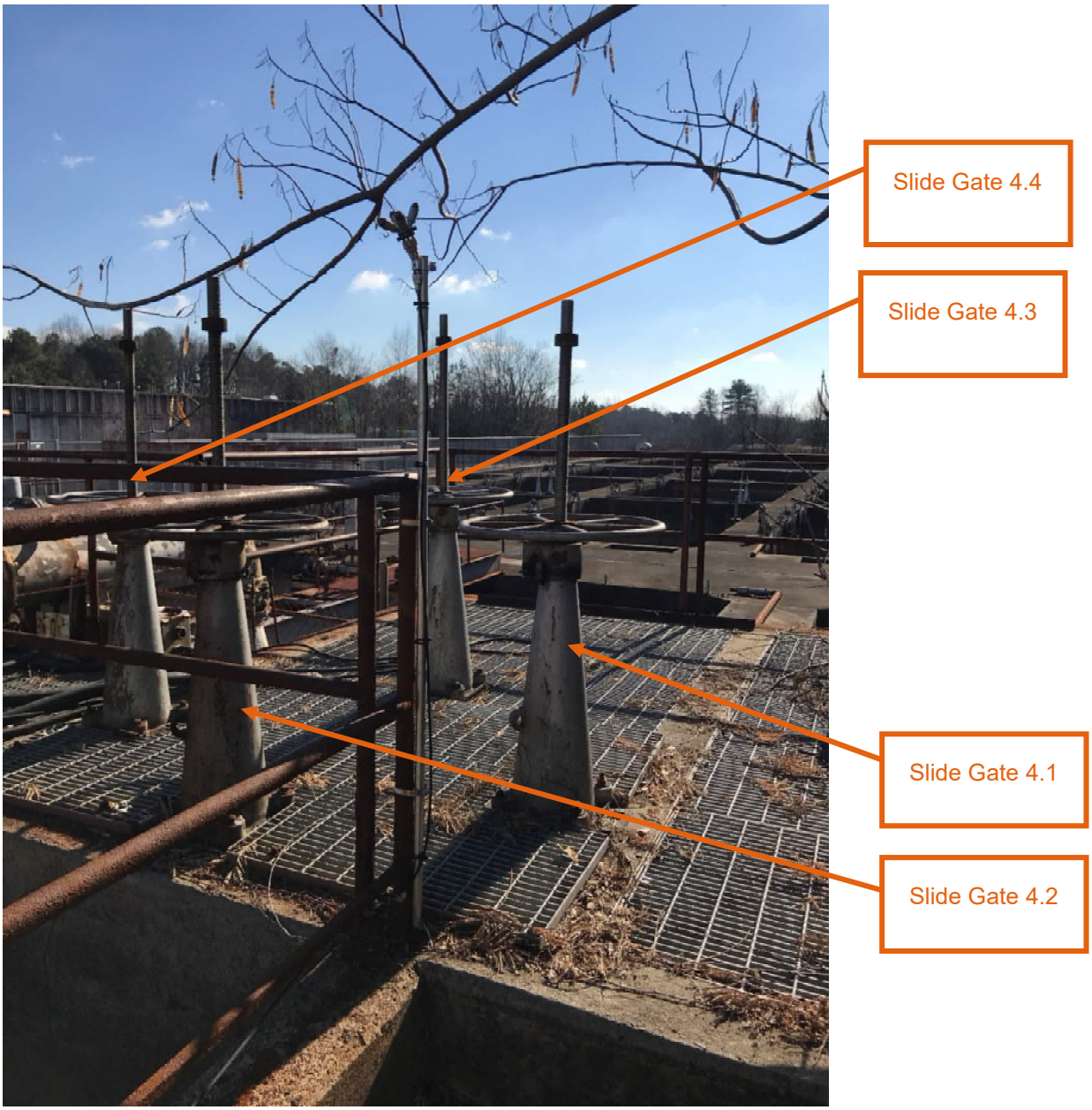

Figure 33: Overflow Weir Slide Gates 4.1, 4.2, 4.3, and 4.4

2.4.2 Electrical

Figure 34: Effluent Pumps Cable Junction Boxes

2.4.3 Instrumentation

Figure 35: Ultrasonic Level Sensor 4.1 and Controller Panel

Figure 36: Pressure Sensor 4.1

Figure 37: Pressure Indicator 4.1

2.5 Clarifier Pump Station

The clarifiers and all biological treatment basins at the Flint River Pump Station are used as storage during wet weather flow conditions. During wet weather events, wastewater in the effluent pump station overtops a weir on the westside of the wet well and flows by gravity around to the plant basins. After wet weather events the clarifier pumps pump out the wastewater in the basins back into the effluent pump station wet well. The Clarifier Pump Station is in the east end primary gallery basement. Based on review of the existing drawings and site visits, the clarifier pump is connected to the low point of the old plant drain system. When the Flint River Water Pollution Control Plant was operational, the plant drain system converged in the northeast end of the primary gallery. The main 30-inch drain line continued outside the gallery to a manhole east of the primary clarifiers. The plant drain system continued around the plant through a series of manholes until discharging into Flint River. The 30-inch plant drain line was capped when the plant was converted to a transfer station. The single submersible pump is located at the plant drain system low point, with the ability to drain all the basins after wet weather events. The primary gallery also has a sump pump continuously pumping water out of the gallery basement and into the clarifiers.

2.5.1 Mechanical

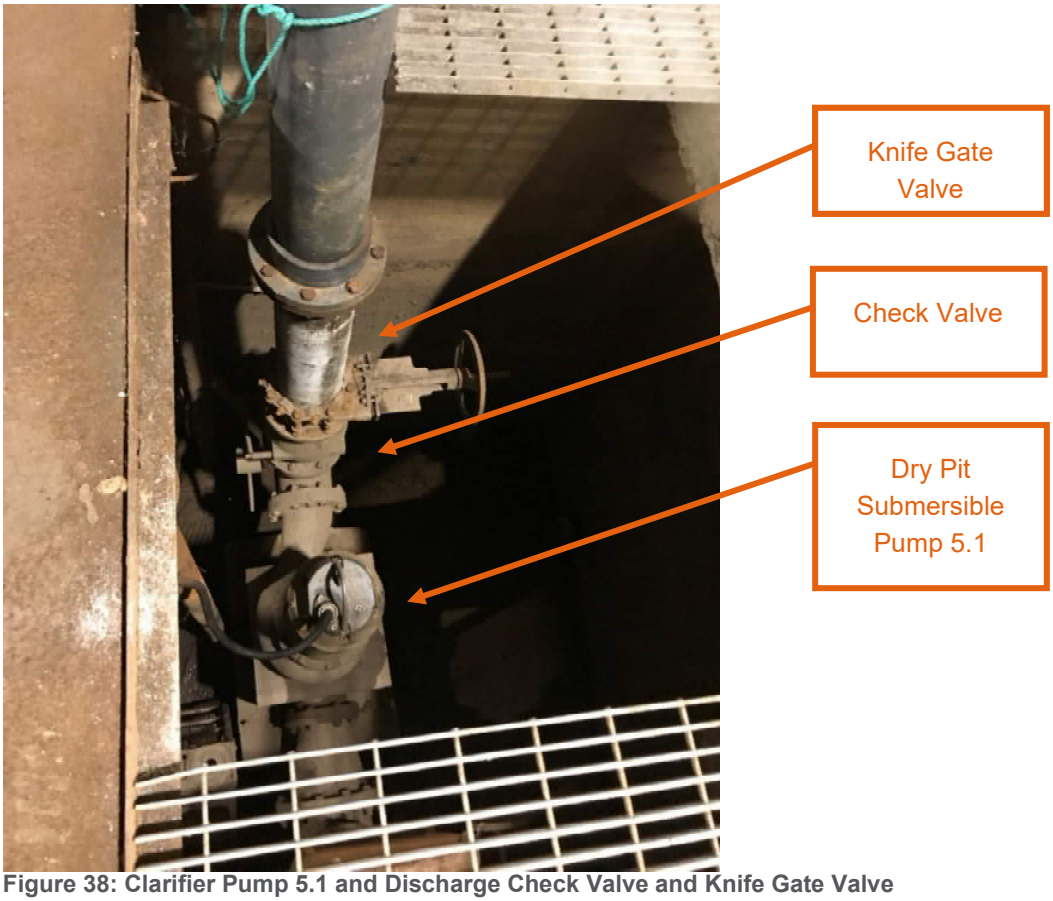

Figure 38: Clarifier Pump 5.1 and Discharge Check Valve and Knife Gate Valve

2.5.2 Electrical

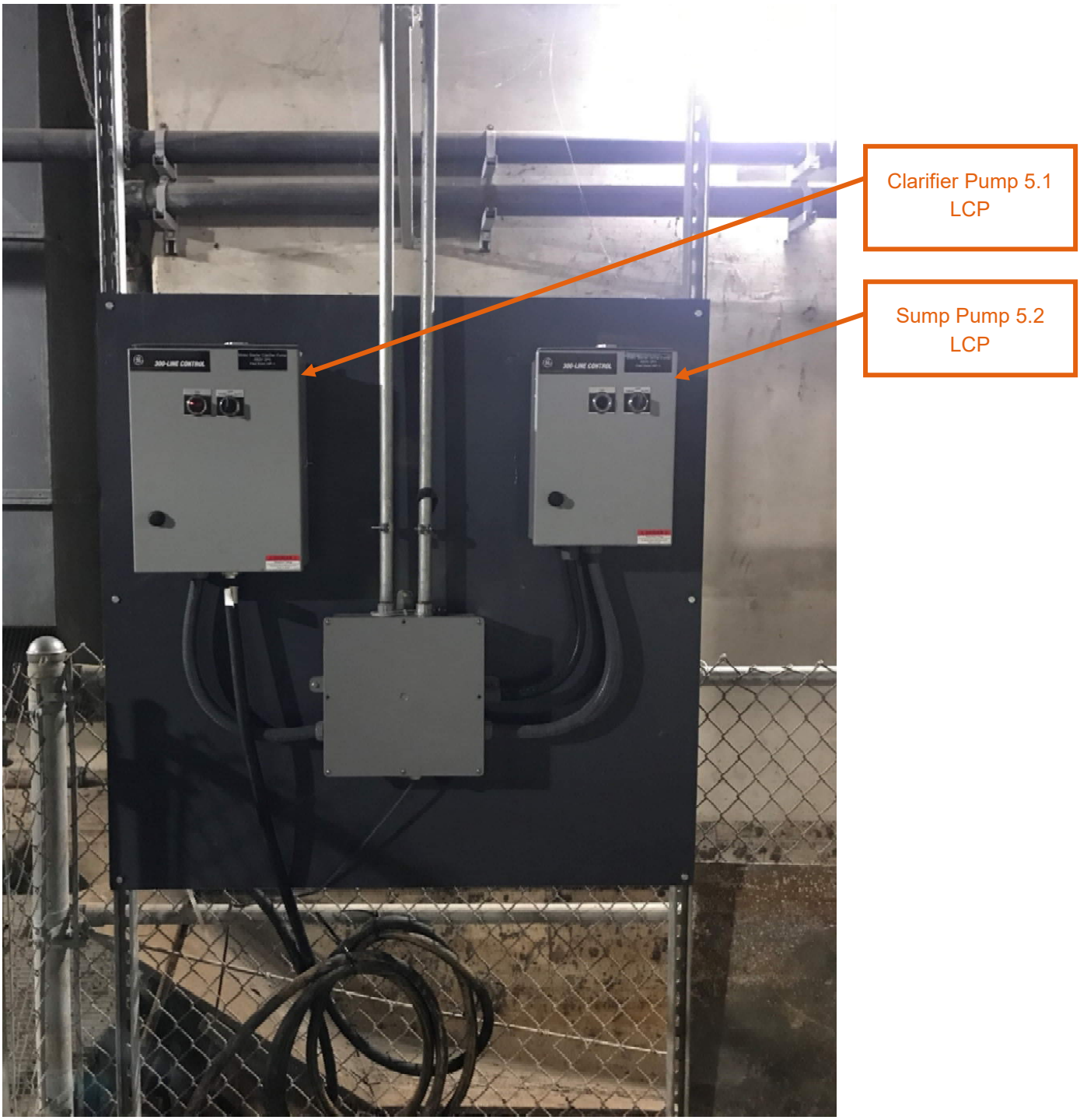

Figure 39: Clarifier Pump 5.1 and Sump Pump 5.2 Local Control Panels

Figure 40: Clarifier Pump and Sump Pump Panels LP-1 and HP-1

2.5.3 Instrumentation

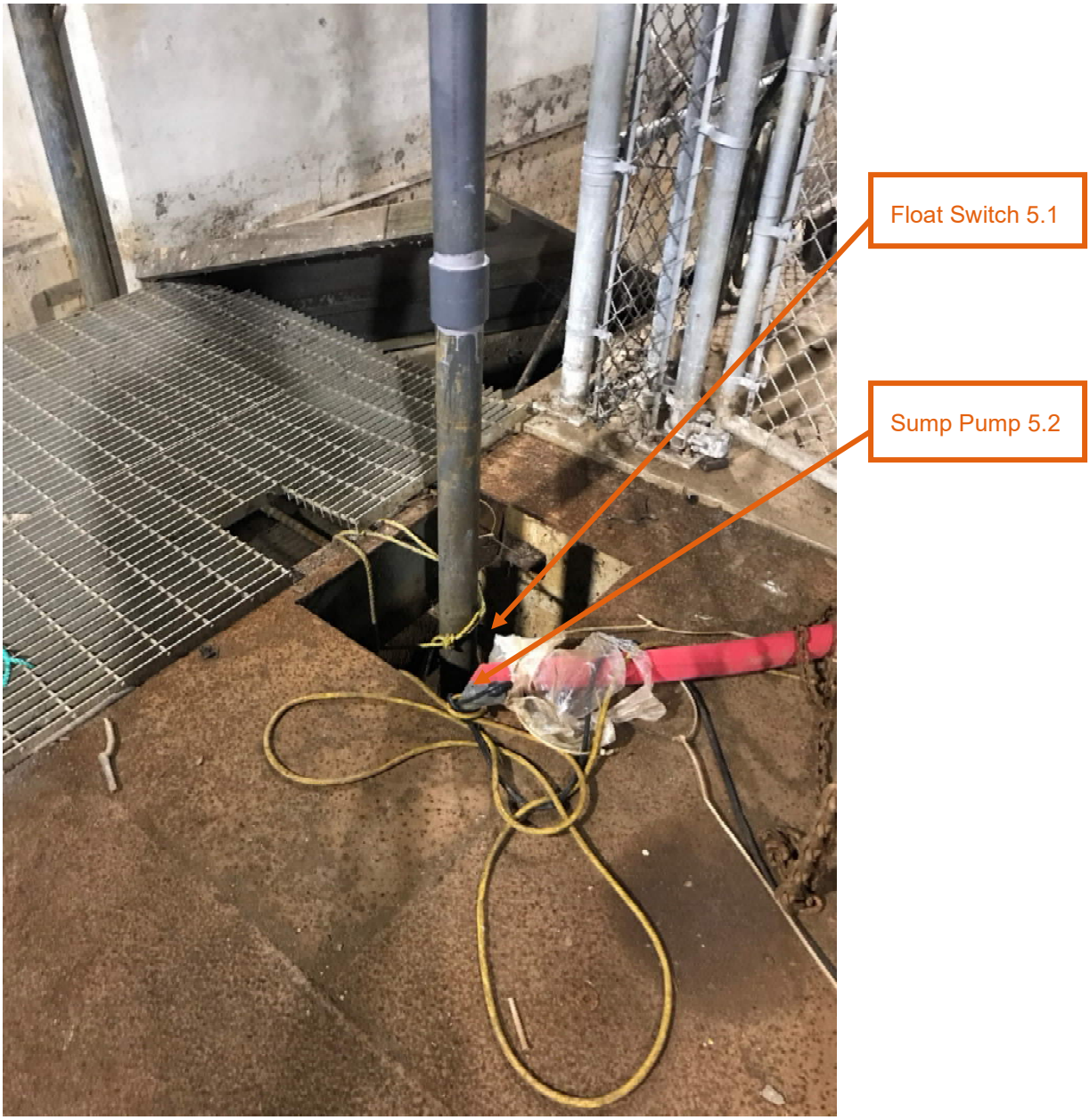

Figure 41: Float Switch 5.1

ATTACHMENT A: EXISTING ASSETS SPREADSHEET