Cherry Emerson Renovation Hydrant Flow Test

October 13, 2020

Ngugi Mathu

Georgia Tech Facilities

Document history and status

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1	10/13/2020	Cherry Emerson Renovation Flow Test Report	**Tom Hatcher**	**Chris Adams**		

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Cherry Emerson Physics Renovation Hydrant Flow Test

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Client Name:	Ngugi Mathu (Georgia Tech Facilities)
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Author:	Tom Hatcher
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The Georgia Institute of Technology (Georgia Tech) contracted with Jacobs Engineering Group Inc. (Jacobs) to perform a hydrant flow test near the Cherry Emerson Building at 310 Ferst Dr. NW, Atlanta, GA 30313. A new fire suppression system is being designed for this building, and it is critical to determine the available fire flow at this location. Jacobs analyzed the GIS files in the nearby area to select flow and residual hydrants for the field testing. The original flow hydrant #6344 located at Plum St NW and Ferst Dr was not operational and needs maintenance off the 12-inch line near the Cherry Emerson Building. To achieve the testing, two alternative hydrant tests were conducted on either side of the Cherry Emerson Building: 1) at hydrant #584 off the lateral on Plum St NW next to the building, and 2) at the intersection of Ferst Dr and Atlantic Dr. The testing was conducted on Wednesday, September 30, 2020, at 11:00 a.m. A water layout map is provided in Appendix A, and the fire flow results are provided in Table 1.

With Jacobs present, the City of Atlanta was required to perform the hydrant tests, and two of their staff members were present. One staff member installed the diffusers and pressure gauge on the flow hydrant while the other person measured pressures at the residual hydrant with an analog gauge. Jacobs selected the flow and residual hydrants. The selected flow hydrants are provided below:

- Test 1 (Hydrant #584): Plum St NW, Atlanta, GA 30313
- Test 2 (Hydrant #3937): Atlantic Dr and Ferst Dr, Atlanta, GA 30313

For Test No. 1, hydrant #6344 was originally selected along State St for testing due to its proximity to the Cherry Emerson Building. However, in the field, we discovered that this hydrant needs maintenance and could not be used for the field testing. Thus, the initial flow hydrant was moved from this original hydrant to hydrant #584. The updated hydrant test at Plum St was 100-150 ft southwest of the original flow hydrant. Two diffusers were utilized for the hydrant test to ensure maximum pressure drop despite proximity to the 12-inch pipe at Ferst Dr. The test generated 2,226 gpm near the Cherry Emerson building with a static pressure of 120 psi and a residual pressure of 110 psi (see Table 1 for details). The main objectives were met in generating a high flow (greater than 2,000 gpm) and a 10 psi pressure drop. These results indicate that the available fire flow is 7,300 gpm at a 30 psi residual pressure.

The flow hydrant and residual hydrant were switched in Test #2 to evaluate the fire flow at the other side of the Cherry Emerson Building. The flow hydrant for Test #2 was located at Atlantic Dr and Ferst Dr next to the 12-inch line on Ferst Dr. Two diffusers were also used in this hydrant test to maximize the fire flow and pressure drop. The second test generated a flow of 2,361 gpm and a 4 psi pressure drop. This pressure drop is below the 10 psi goal, but the result was clearly measured with the analog pressure gauge. A summary of the fire flow results is provided in Table 1.

Table 1. Fire Hydrant Testing Summary

Flow Test	Flow Hydrant	Residual Hydrant	Test Flow (gpm)	Static Pressure (psi)	Residual Pressure (psi)	Available Fire Flow (gpm)[b,c]
1	#584	#3937	2,226	120	110	7,292
2	#3937	#584	2,361	120	116	9,959

a) Static pressure and residual pressure are provided for each test at the residual hydrant.

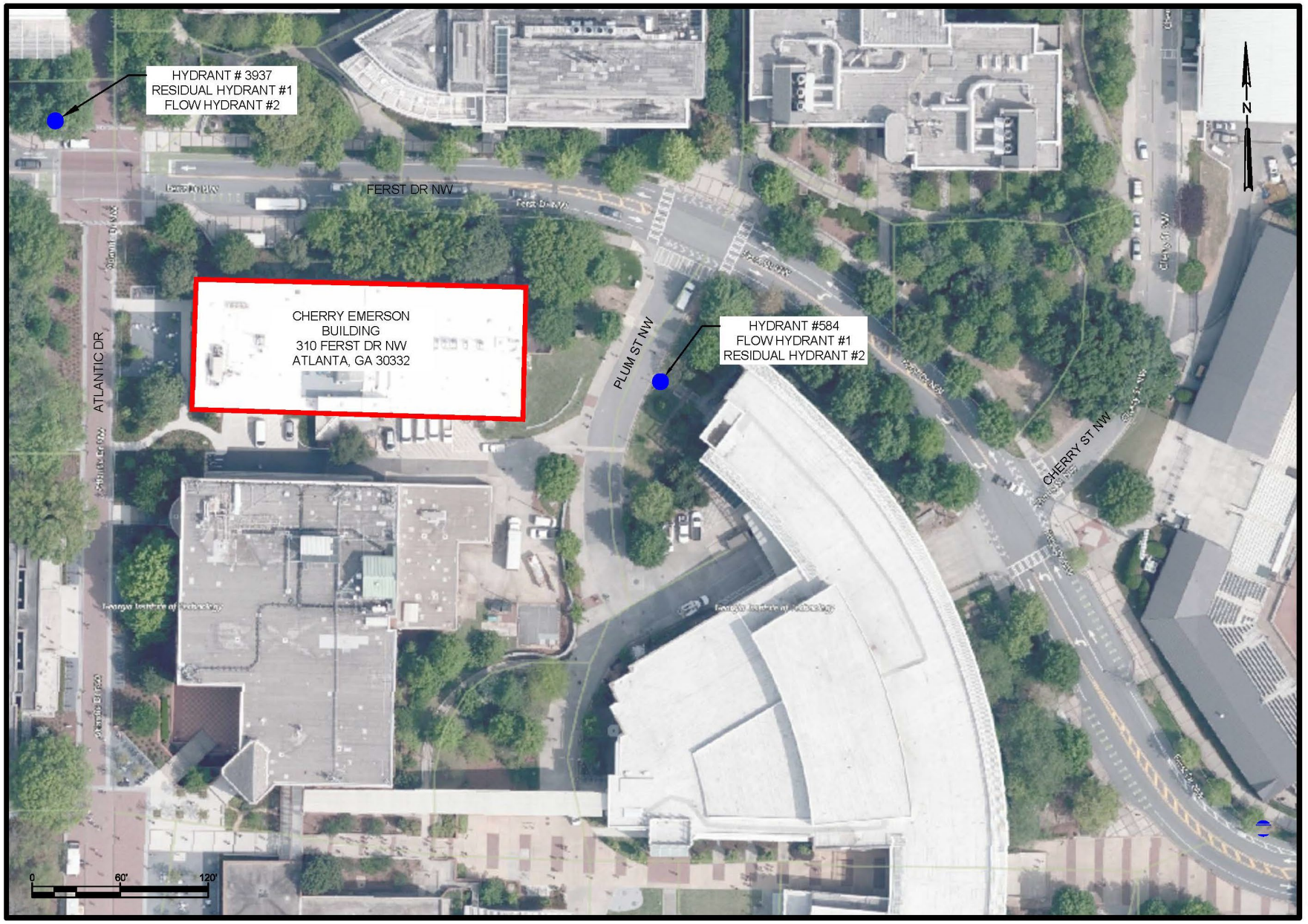
b) The available fire flow was calculated using a 30 psi residual pressure.

c) A 0.9 hydrant/nozzle coefficient was assumed for available fire flow calculations.

The theoretically available fire flows results assume that the minimum pressure occurs at the residual hydrant and does not account for other low-pressure areas in the system or under all demand conditions. Moreover, available flow calculations assumed a 30 psi residual pressure as a conservative assumption. A more thorough analysis would require using the City's hydraulic model. The abandoned hydrant (#6344) would have been another good option to test the fire flow near the Cherry Emerson Building. However, two nearby hydrants were tested on either side of this building with one hydrant located across the street. The calculated available fire flow from this testing is greater than 7,000 gpm for both hydrant tests. This theoretically available fire flow cannot be supplied at a single fire hydrant and may vary at different locations nearby due to losses in the pipes and fittings.

The 24-hr pressure testing results were conducted by the City at 313 Ferst Dr near the Cherry Emerson Building and are provided in Appendix B. The primary objective was to determine if there are significant pressure changes. Results indicate that the average pressure is maintained at 125-128 psi with little change throughout the day.

Appendix A. Water Layout Map with Hydrant Locations



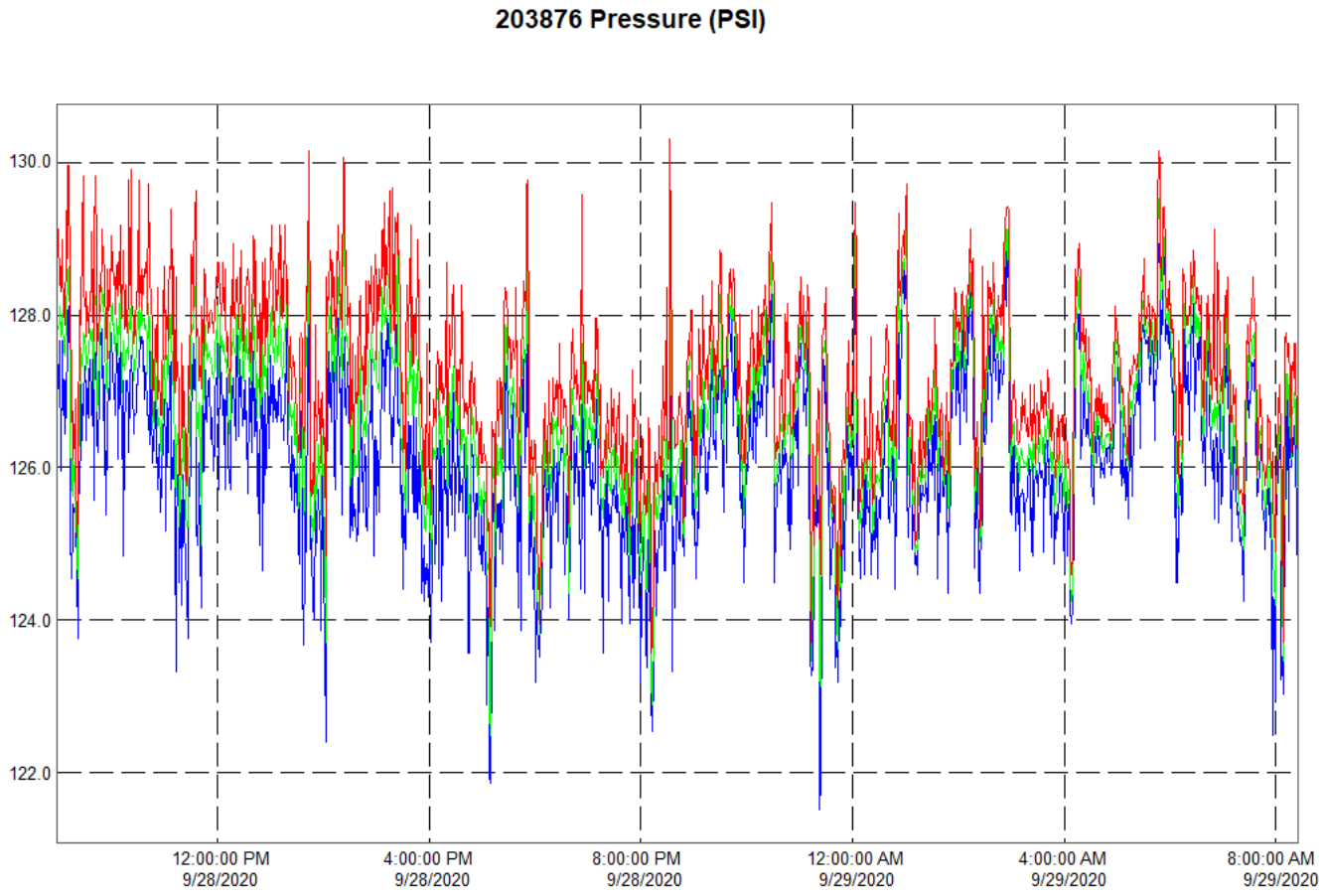
PROJECT NO.: EEX09202
DATE: 10-13-2020
SCALE: 1":60'
SHEET NO.: 1

GEORGIA TECH CHERRY EMERSON FIRE PROTECTION SYSTEM

HYDRANT TESTING EXHIBIT

JACOBS

Appendix B. 24-HR Pressure Testing


203876 Pressure (PSI)
130.0
128.0
126.0
124.0
122.0
12:00:00 PM
9/28/2020
4:00:00 PM
9/28/2020
8:00:00 PM
9/28/2020
12:00:00 AM
9/29/2020
4:00:00 AM
9/29/2020
8:00:00 AM
9/29/2020

Appendix C. Fire Test Results

CITY OF ATLANTA

KESHA LANCE BOTTOMS
MAYOR

651 FOURTEENTH STREET
ATLANTA, GEORGIA 30318
OFFICE . 404-982-1487
FAX . 404-982-1400

DEPARTMENT OF
WATERSHED MANAGEMENT
KESHA POWELL
COMMISSIONER

Date: 10/1/2020

The following report is on FIRE HYDRANT and PRESSURE TEST results.
Done by an Authorized Representative of The City of Atlanta.

Test location: 313 Ferst Drive
Plat card # 584

Test Hydrant # 3937	At Plum St. D/W
Flow Hydrant # at Plum St. D/W	3937
Static: 120	120
Residual: 110	116
Pitot: 44 – 44 using both nozzles This is 44 pitot per Nozzle.	40 – 60 using both nozzles (the lower pitot "40" is due to the elbow attachment used on the diffuser.

Flow: 44 + 44 = 88 = 1575 gpm
Flow: 40 = 60 = 100 = 1680 gpm

Comments: Flowed 2.5 inch nozzle 12 inch main 10:20 a.m.

Requested by: Jacobs Engineering
Contact: Eric Westcott
Phone: 404-580-2612

City of Atlanta-Watershed Management
Representative:
Emanuel Toles 678-878-5192
etoles@atlantaga.gov