

Technical Memorandum

Date: November 2, 2021

Project: 20-2737.0409

To: Mr. Tony Doran, Engineering Associate
City of Tualatin

From: Claire DeVoe, PE

Reviewed By: Brian Ginter, PE

Re: Water System Capacity Analysis – Plambeck Gardens (CPAH)



Introduction

As requested, this memorandum has been prepared to present the findings of our analysis for the water service to the proposed 116 Unit Plambeck Gardens located at 23500 & 23550 SW Boones Ferry Road. This development is also known as CPAH, Community Partners for Affordable Housing. Work for this analysis was partially completed during the Water System Master Plan (WSMP) update. This memorandum assumes that CPAH is developed prior to completion of the Autumn Sunrise development located to the south and east, thus limiting hydraulic looping, as illustrated in Figure 1. This memorandum presents the findings of this analysis for the City's use in determining the water system improvements necessary to meet fire flow and pressure requirements.

Background

The City's water system hydraulic model was used to perform a hydraulic analysis of pressure and fire flow performance in the City's water system under maximum day demand conditions with fire flow events evaluated at the site boundary along SW Boones Ferry Road. The hydraulic model was updated to include a proposed 12-inch line along SW Boones Ferry Road connecting to the existing 12-inch along SW Norwood Road. The proposed development is zoned as multifamily, as shown in the design drawings by Carlton Hart Architecture (CHA) dated September 9, 2021. The proposed development is located within the City's existing Pressure Zone C, served by the C level reservoirs at a nominal hydraulic grade (HGL) of 507.5 feet above mean sea level (msl), and the C Level Pump Station. Figure 1 illustrates the development site and adjacent water system infrastructure.

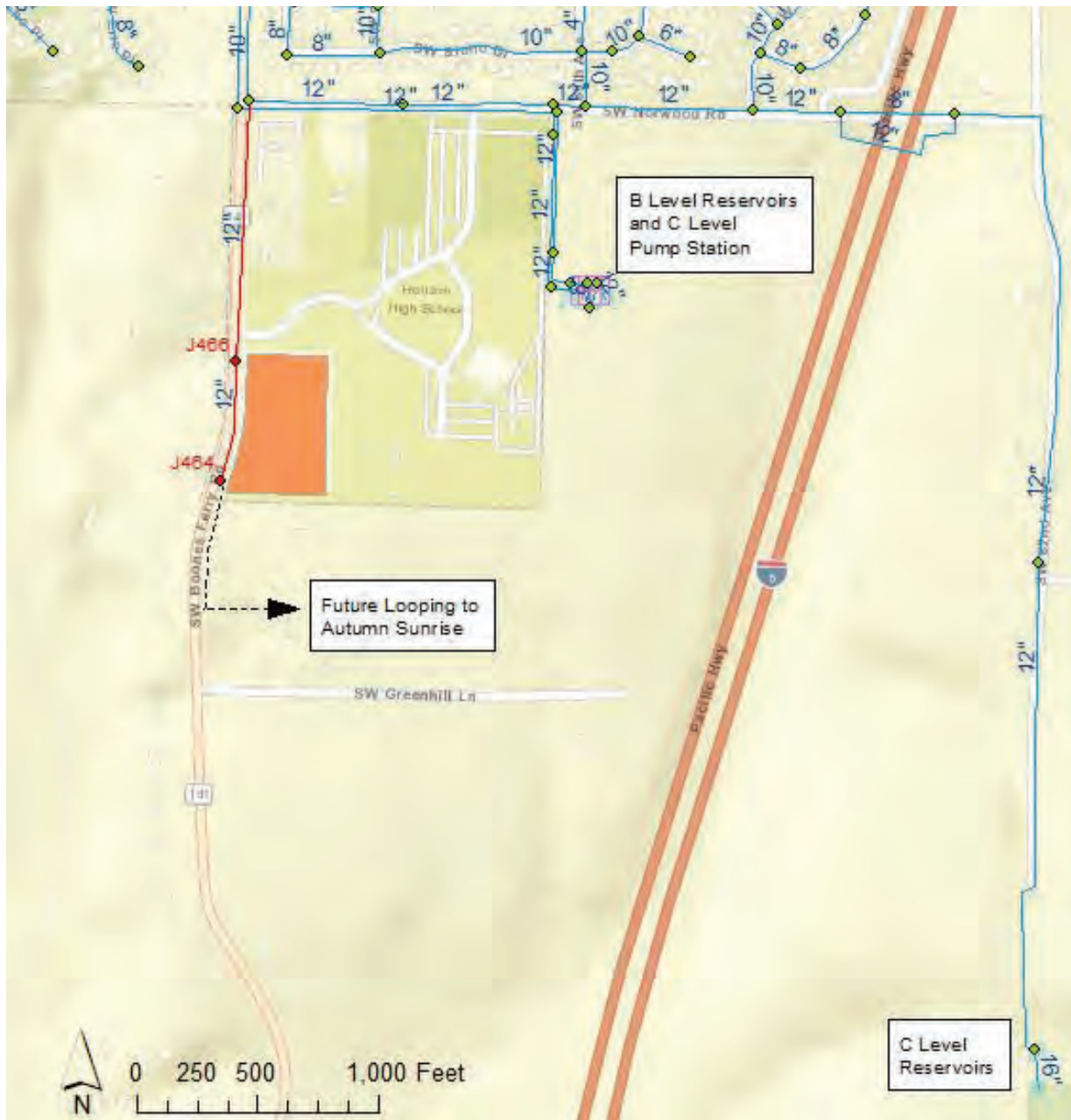


Figure 1. Proposed Development Site and Existing Water System Infrastructure

Site Demands

Site demands were calculated based on design drawings from CHA and demands developed in the WSMP. Fire flow demands were calculated based on the 2019 Oregon Fire Code and building type and material listed in the design drawings. All buildings in the development are anticipated to have fire suppression sprinkler systems. No sprinkler demand was available at the time of this memorandum and so a demand of 250 gpm was assumed. Domestic demands were calculated based on proposed unit count and demand factors developed in the WSMP. Table 1 presents these demands.

Table 1 – Site Demands

Demand Type	Demand	Description	Source
Fire Flow	1,500	Minimum of 25% of 4,500 gpm (60,000 sf, Type V-A building) or 1,500 gpm	2019 Oregon Fire Code, Appendix B, Table B105.1(2) and Table B105.2 footnote 2
Sprinkler	250 gpm	Assumed	Murraysmith
MDD Domestic	27 gpm	(116 units) x (0.75 Multifamily Units/ERU) x (231 gpd/ERU) x (1.9 MDD:ADD)	2021 WSMP Draft
Total	1,800 gpm		

Analysis and Findings

The hydraulic model was updated as described above and fire flow performance tested.

A summary of specific model conditions for this analysis is presented below. The C Level is relatively isolated from the A and B Levels, therefore only C Level settings are shown.

System Demand Conditions: 2040 Maximum Day Demand

Site Demand (including Fire Flow): 1,800 gpm

Reservoir Levels: Operational, Equalization, and Fire Storage depleted (C Level Reservoirs at 20 ft, 478.5 ft HGL)

Portland Supply Valves: Do not impact C Level, assume sufficient MDD supply to A and B Levels

C Level Pump Station: Tested at both 1 pump active and off

Physical Condition: Existing facilities plus proposed connections

The model nodes representing the proposed connections, the fire flow capacity tested, and the calculated minimum pressure within the area influenced by the fire flow in Pressure Zone C are summarized in Table 2 below:

Table 2
Fire Flow Analysis Results

Model Node ID	Location	Elevation (ft)	Fire Flow Rate (gpm)	C Level Pump Station OFF		C Level Pump Station ON	
				Static Pressure (psi)	Residual Pressure (psi)	Static Pressure (psi)	Residual Pressure (psi)
J466	SW Boones Ferry Rd, North entrance	325	1,800	60	2	74	53
J464	SW Boones Ferry Rd, South entrance	332	1,800	57	-2	71	49

Based on the findings of this analysis and a review of overall system improvement needs presented in the WSMP, C Level Pump Station upgrades including a trigger for at least one pump when pressures in the C Level drop below 35 psi must be completed prior to development of Plambeck Gardens to adequately provide domestic and fire service. A 12-inch diameter main along SW Boones Ferry Road is adequate assuming these upgrades at the pump station. Connecting the proposed 12-inch diameter main on SW Boones Ferry to the proposed Autumn Sunrise development will improve local pressures during fire flow events but without additional upsizing and looping along the C Level transmission between the Norwood Site and the C Level Reservoirs, C Level Pumping is still required for adequate pressure during fire flow events.

It is the developer’s responsibility to size internal (private) fire and domestic mains for adequate service pressure, private hydrants, and fire suppression sprinkler systems as these facilities are outside the scope of this analysis.

Please do not hesitate to contact us if you have any questions or comments in this regard. We would be happy to meet with you personally to discuss the findings presented in this memorandum.