Gray & Osborne, Inc.
CONSULTING ENGINEERS

MEMORANDUM

TO:	BRIAN JOHNSON, WATER SYSTEM SPECIALIST
FROM:	KERRI SIDEBOTTOM, P.E.
DATE:	MAY 14, 2024
SUBJECT:	304 2ND STREET NE, FIRE FLOW AVAILABILITY CITY OF PUYALLUP, PIERCE COUNTY, WASHINGTON G&O #21415.20

Per your request, I have analyzed the available fire flow at the proposed McDonald's development at 304 2nd Street NE, located in the central part of the City's water service area. The Developer has proposed to install a new dead-end 8-inch water main extending from the existing 12-inch main on 2nd Street NE to provide water to the site, which has been analyzed in this memo. The setup of the hydraulic model and the assumptions used to determine the static pressure and available fire flow are noted as follows.

- The available fire flows and pressures are measured at two nodes corresponding to one existing hydrant and one proposed hydrant within and near to the development, shown in the attached figure.

- Water system demands are based on projected 2038 demands and reservoirs are depleted of fire suppression and equalizing storage, as established in the *2019 Water System Plan* (WSP), approved by the Department of Health (DOH). The City's water model was updated in 2021 to reflect additional system improvements since the WSP was developed.

- All pump stations are idle, and the Salmon Springs source is operating at 1,100 gallons per minute (gpm).

The development is located in Zone 1, which is supplied by Maplewood Springs and the 15th Avenue SE Reservoirs. The system was modeled with the proposed piping indicated on the attached figure.

The available pressure under 2038 peak hour demands at the hydrants is included in Table 1.

TABLE 1

Peak Hour Pressure

Node	Hydrant	Elevation, feet	Peak Hour Pressure, psi
J1330	NE002	44	51
J2284	Proposed	45	51

Available fire flow was modeled at one existing hydrant and at one proposed hydrant. The existing hydrant is located on the 12-inch pipe along 2nd Street NE, while the proposed hydrant will be located on a dead-end, 8-inch main extending from the 12-inch pipe. The results of this modeling are included in Table 2. The modeled fire flow is available at either hydrant individually, but not simultaneously.

TABLE 2

Modeled Fire Flow Availability

Node	Hydrant	Modeled Fire Flow, gpm	Residual Pressure at Modeled Fire Flow, psi	Minimum System Pressure at Available Fire Flow, psi
J1330	NE002	6,870(1)	20	20
J2284	Proposed	1,560(2)	39	28

(1) Limited by minimum system-wide pressure at service locations of 20 psi.
(2) Limited by maximum system-wide velocity of 10 feet per second (fps).

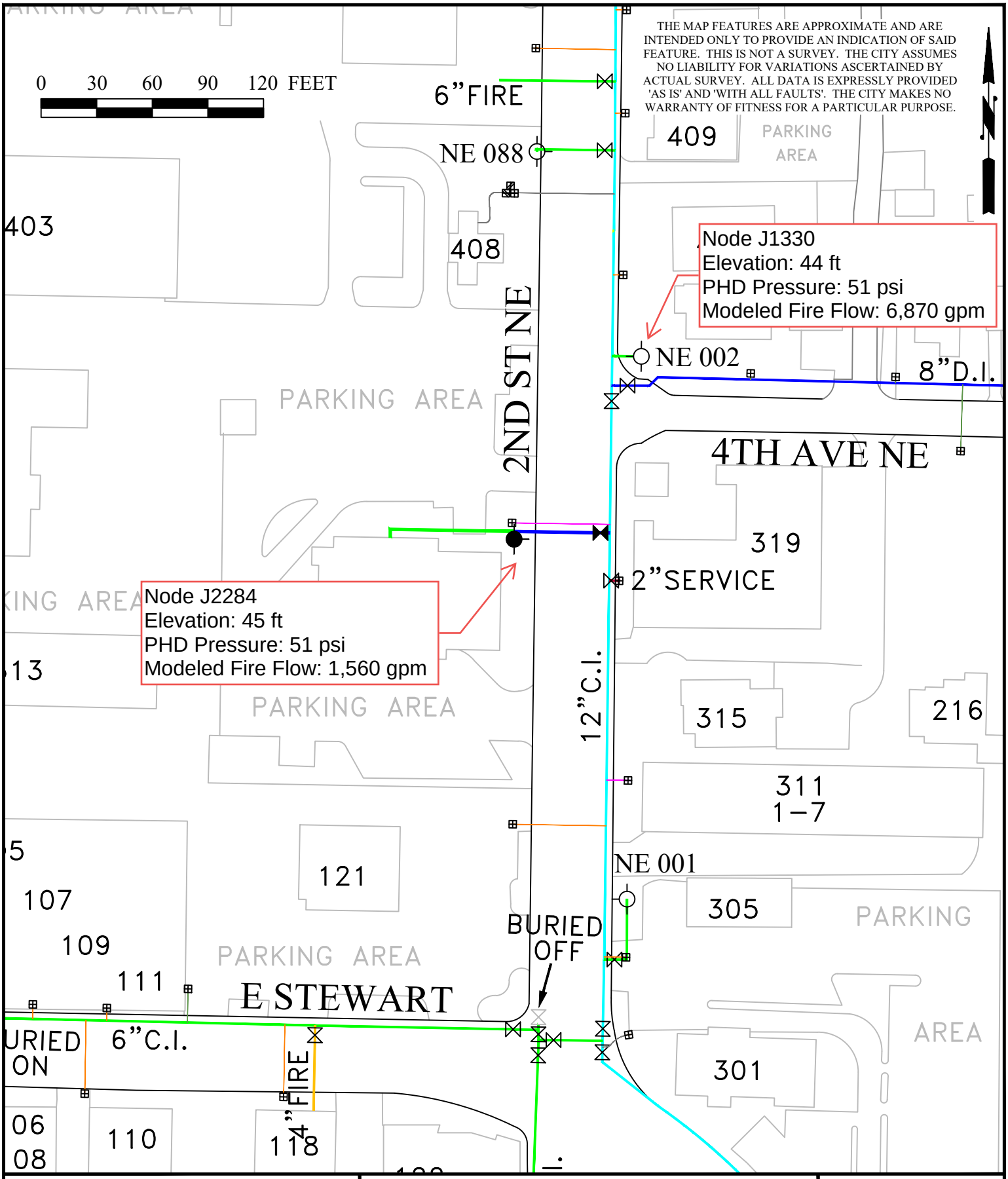
Fire flow to the proposed hydrant is limited by the 10-fps maximum velocity through the proposed 8-inch pipe, while flow to the existing hydrant is limited by the 20-psi minimum pressure.

It should be noted that the dead-end, 8-inch main within the proposed site can only provide 1,560 gpm, due to the City's 10-fps velocity limitation considered for the fire flow analysis. Therefore, if 1,500 gpm is required at the hydrant located on a dead-end main, there is essentially no additional flow available for the sprinkler system supplied by the same dead-end main, unless a larger pipe is installed.

The Department of Health and City Standards for water distribution systems are to meet the peak hourly demand of the system while providing a minimum pressure of 30 psi, system-wide. Under peak daily demand with a fire flow, the system is designed to maintain a minimum pressure of 20-psi, system-wide. Although the peak hourly demand

pressure may currently be higher than these standards, the Developer must recognize that the City may not provide pressure higher than 30 psi in the future. The flows and pressures determined in this memo are based on the approximate hydrant elevation at ground level. The Developer may design their sprinkler system for whatever pressure they wish; however, they must recognize and be responsible for conditions when the pressure may be less than currently exists.

KS/sr



CITY OF PUYALLUP
PUBLIC WORKS
WATER DIVISION

HYDRAULIC MODEL FOR 304 2ND ST NE

SCALE AS SHOWN

05/08/2024

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