Harper Houf Peterson Righellis Inc.

ENGINEERS ◆ PLANNERS
LANDSCAPE ARCHITECTS ◆ SURVEYORS

May 17, 2021
Job No.: PXI-001

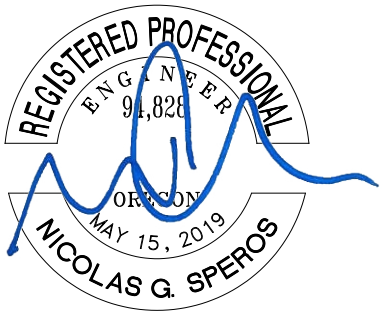
M E M O R A N D U M

TO: Erik Huffman, PE, PLS, CWRE, LEED AP
BECON, Engineer of Record, City of Sisters

FROM: Nicolas Speros, P.E., HHPR

CC: Kevin Eckert, BUILD, LLC

SUBJECT: The Woodlands (Barclay Drive and Pine Street)
Sanitary Sewer and Water Infrastructure Master Plan Impact Summary



EXPIRES: 06/30/20

INTRODUCTION AND PURPOSE

The purpose of this memo is to supplement the analysis provided with the recent re-zone of the subject property to in order to facilitate approval of the Woodlands Master Plan / Subdivision.

The subject Woodlands property has a gross area of approximately 31.56 gross acres. The property is generally bounded by Barclay Drive to the north, Pine Street to the east, USFS property to the south, and US Highway 20 to the west. After going through the re-zone process noted above and dedication of Barclay Drive and Pine Street easement areas, the property is currently a mix of zones as follows:

Open Space (OS) – 3.42 acres

Multi-Family Residential (MFR) – 23.59 acres

NSBP (North Sisters Business Park) – 2.58 acres

Downtown Commercial (DC) – 1.97 acres

Total area – 31.56 acres

The sanitary sewer and water impacts of this re-zone were previously summarized in a memo dated May 26, 2020 (Re-zone Memo) and are included by reference as part of this memo for City review.

As part of the Re-zone approval, conditions of approval were placed upon the property to mitigate the impacts of future development. The proposed Master Plan / Subdivision infrastructure impacts are substantially similar to the impacts calculated in the Re-Zone process. Minor differences are noted in the analysis below.

SANITARY SEWER ANALYSIS

The impacts calculated with the Re-Zone can be summarized as:

- EDU's allocated to property before Re-Zone = 127.4
- EDU's allocated with conditions to property after Re-Zone = 324.5
    - An increase of 197.1 EDU's

The proposed mix of residential and non-residential uses and units for the **Re-Zone** that was utilized is summarized as follows;

Cottage housing: 72 units	x 1.0	=	72.0 EDU's
Apartments: 112 units	x 0.80	=	89.6 EDU's
Townhomes with ADU: 79+79 =158 units	x 0.80	=	126.4 EDU's
Congregate Housing (80 beds @ 2 bd/rm = 40 rms	x 0.40	=	16.0 EDU's
2.6 acres of NSBP: (1 EDU per 20,000 SF)		=	5.7 EDU's
0.55 acres of DC: (1 EDU per 5,000 SF)		=	4.8 EDU's
2.3 acres of OS @ PF (1 EDU per 10,000 SF)		=	10.0 EDU's
	Total	=	324.5 EDU's

After refining the Site Plan, the updated mix of residential and non-residential uses and units for the Proposed Master Plan / Subdivision are summarized as follows;

Cottage housing: 101 units	x 1.0	=	101.0 EDU's
Apartments: 112 units	x 0.80	=	89.6 EDU's
Townhomes with ADU: 67+64 =131 units	x 0.80	=	104.8 EDU's
Congregate Housing (60 beds @ 2 bd/rm = 30 rms	x 0.40	=	12.0 EDU's
1.8 acres of NSBP: (1 EDU per 20,000 SF)		=	4.0 EDU's
NSBP Units: (3 apartment units per lot) = 15 units	x 0.80	=	12.0 EDU's
22,000 SF of DC: (1 EDU per 5,000 SF)		=	4.4 EDU's
100,272 SF of OS @ PF (1 EDU per 10,000 SF)		=	10.0 EDU's
	Total	=	337.8 EDU's

- This is an increase of 13.3 EDU's above the impact calculated in the Re-Zone.

Utilizing the City requested value of 165 gpd/EDU the new design flow is calculated as:
337.8 EDU x 165 gpd / EDU x (1 day / 1,440 minutes) x 2.4 peak factor = 92.9, rounded to 93.0 gpm.

As requested by the City, the existing 10" gravity main downstream of PS#2 in Barclay Drive is not to receive any additional flow and the entire project site needs to sewer to the south, towards the existing 18" gravity main regardless of the capacity in PS#2.

Therefore, the subject property will be required to sewer the entire project to the 18" gravity main via gravity sewer pipes, a pump/lift station, or a combination of the two.

Due to the topography of the site and the existing inverts of the 18" gravity main, it is not feasible to achieve a solely gravity sewer solution without significant grading and possible import of material which will not allow for the significant tree preservation that is intended.

From preliminary analysis, of the total 93 gpm of project peak flow, approximately 40 gpm of peak flow will need to be pumped with the remaining 53 gpm likely able to gravity flow to the 18" main south of the property.

The preferred option to pump this flow is to utilize existing PS#2 with modifications. PS#2 Modifications would include re-routing the force main to direct flow to the existing 18" gravity main instead of the 10" gravity main in Barclay Drive, upsizing of wet well storage, and a power generator. This option is preferred because it would not add an additional pump station to the City's infrastructure and it would also reduce flows to the existing 10" gravity main in Barclay Drive that is already at capacity (50% flow, d/D).

PS#2 is currently experiencing peak flows of approximately 19 gpm plus another 10 gpm from the property north of Barclay Drive is assumed. With the addition of peak flows (40 gpm) from the subject property, PS#2 will need to accommodate peak flows in the range of 19 + 10 + 40 = 69 gpm. Per the Master Plan, PS#2 has a capacity of 150 gpm, so with modifications to the sub-standard wet well and the addition of a generator, the pump station should be capable of the post-project peak flows.

City staff has indicated that reimbursement or EDU credits may be available for improvements to PS#2 that would divert flow away from the 10" gravity main and Pump Station #1 (PS#1).

In consideration of future development within the City and expansions of the Urban Growth Boundary (UGB), per the Master Plan, the City of Sisters has considered the intersection of Pine Street and the 18" gravity main as the preferred approximate location for a new "West Side" pump station. This new pump station would re-direct sewer flows, via approximately 4,400 LF of new force main, to the existing 12" force main in Locust Drive south of US Highway 20, where it will continue to be pumped to the treatment facility south of town.

The purpose of this new pump station would be to reduce flows to PS#1, which will be at or near capacity within the current planning period. In addition, this bypass of flows will create significant capacity in the system for potential future development and/or annexations on the west side of town and on the northeast side of town near the airport.

The subject property will be required to contribute a proportionate share to this new pump station and force main cost.

In summary, based on the analysis above, the post-project peak flow of approximately 93 gpm, an increase of 58 gpm above the pre-project flow of 35 gpm, can be mitigated with appropriate infrastructure improvements.

WATER ANALYSIS

This memo addresses two water service issues: available water and Water Rights.

The City's Water infrastructure is outlined in the 2017 Water Capital Facilities Plan Update (WCFPU or Master Plan), current version dated April 2017. A fire flow analysis will be provided when fire flow data is provided by the City.

Available Water – City staff has previously confirmed water is available to serve the property.

Water Rights – As required, a water volume analysis based on land use and unit counts was performed to determine the acreage of water mitigation rights necessary to be purchased by the City (or reimbursed for) and the corresponding fee required to be paid at building permit issuance to offset this City cost.

Based on the proposed uses and units counts, a new water rights calculation will determine the total volume of water rights needed for the project. The existing water rights will then be subtracted from the new total to determine the net volume required and fees due that will be payable at building permit.

Existing water rights for the property is calculated as follows:

127.4 EDU x 2.2 people/dwelling unit = 280.3 people x 300 gallons per capita per day = 84,090 gpd

84,090 gpd x 365 days / year = 30,692,850 gallons / year = 94.19 acre-ft / year.

The water rights calculated with the Re-Zone can be summarized as:

- Water rights volume allocated to property before Re-Zone = 94.19 acre-ft / year
- Water rights volume allocated with conditions to property after Re-Zone = 241.52 acre-ft / year
    - An increase of 147.33 acre-ft / year

After refining the Site Plan, the updated mix of residential and non-residential uses and units for the Proposed Master Plan / Subdivision are summarized as follows;

Cottage housing: 101 units	x 1.0	=	101.0 EDU's
Apartments: 112 units	x 0.80	=	89.6 EDU's
Townhomes with ADU: 67+64 =131 units	x 0.80	=	104.8 EDU's
Congregate Housing (60 beds @ 2 bd/rm = 30 rms	x 0.40	=	12.0 EDU's
1.8 acres of NSBP: (2,000 gallons per acre per day)		=	* see below
NSBP Units: (3 apartment units per lot) = 15 units	x 0.80	=	12.0 EDU's
22,000 SF of DC: (1 EDU per 5,000 SF)		=	4.4 EDU's
100,272 SF of OS @ PF (1 EDU per 10,000 SF)		=	10.0 EDU's
	Total	=	333.8 EDU's + NSBP

* For the NSBP area, the water volume was calculated using a value of 2,000 gallons per acre day, which yields: 1.8 NSBP acres x (2,000 gallons / acre / day) = 1,314,000 gallons / year = 4.03 acre-ft / year

333.8 EDU x 2.2 people/dwelling unit = 734.4 people x 300 gallons per capita per day = 220,320 gpd
220,320 gpd x 365 days / year = 80,416,800 gallons / year = 246.79 acre-ft / year.

Post-project water volume = 4.03 ac-ft / year + 246.79 ac-ft / year = 250.82 ac-ft / year

Net water volume required = 250.82 ac-ft / year – 94.19 ac-ft / year = 156.63 ac-ft / year

Reduce by 180 days per year (use 0.5) and 40% consumption factor ➔
(156.63 acre-ft / year) x 0.5 x 0.40 = 31.33 acre-ft / year
One acre purchased of water rights provides 1.8 acre-ft / acre / year at a cost of $6,800 / acre.
Acres needed to be purchased ➔ (31.33 acre-ft) / (1.8 acre-ft / acre) = 17.40 acres

- This is an increase of 1.03 acres above the impact calculated in the Re-Zone.

Fee Calculation ➔ 17.40 acres x ($6,800 / acre) = $118,320 total due at building permit issuance.

The fee total is for the entire project and will be divided and payable on per building permit basis.