



## CITY COUNCIL WORK SESSION

AGENDA SECTION	WORK SESSION ITEMS
MEETING DATE	MAY 3, 2021

ITEM:	Update on Sewer Modeling for Sanitary Sewer Collection District 1	
DEPARTMENT: Public Works		BY/DATE: Kevin Hansen 4/29/2021
CITY STRATEGY: (please indicate areas that apply by adding a bold “X” in front of the selected text below)		
_ Safe Community		_ Diverse, Welcoming “Small-Town” Feel
_ Economic Strength		_ Excellent Housing/Neighborhoods
_ Equity and Affordability		X Strong Infrastructure/Public Services
_ Opportunities for Play and Learning		_ Engaged, Multi-Generational, Multi-Cultural Population

**BACKGROUND:** The City of Columbia Heights has three collection districts providing sanitary sewer service for the entire city (attached). The City has previously experienced flow capacity issues in the trunk sanitary sewer system in Collection District 1, west of Central along 43<sup>rd</sup> Avenue. Issues such as size of pipe, grades or slope of the pipe, and flows exceeding the design capacity may be contributing factors reducing flow capacity. With proposed and/or potential development in Collection District 1, the City Council authorized an in-depth analysis of the primary trunk mains serving this entire district to evaluate current pipe capacity and provide recommendations to ensure sufficient future capacity for sewage flows are available, which is in progress.

After receiving the Reuters Walton development proposal, staff conducted a more localized evaluation of the sewer mainline segments that the proposed development would be discharging into. Staff evaluated the sewer segments as follows:

- Jackson St from 42<sup>nd</sup> to 43<sup>rd</sup> Ave
- 43<sup>rd</sup> Ave from Central Ave to Monroe St
- Monroe St from 43<sup>rd</sup> Ave to midblock
- Midblock Monroe St easement to Washington St
- Washington St north to 44<sup>th</sup> Ave
- 44<sup>th</sup> Ave from Washington St to 6<sup>th</sup> St

The segments were modeled for existing peak flow capacity using a peaking factor of 3.6 to 4.0 (City Comp Plan) times average base flow, as sewer sizing is determined using peak flow. In addition, two flow meters were installed on both the Jackson Street and 43<sup>rd</sup> Avenue pipes to calibrate the model with actual flows. Wet weather flow data has not been captured due to insufficient rainfall events. In most cases the peaking factor will approximate wet weather flows, unless significant I-I is present--which will lead to significantly higher peaking factors.

The following criteria was used to create the model:

Residential Flow Rate Calculation	
2010 Census Population	19,496
Total Number of Households	7,926
People/Household	2.46
Average Flow per Person (gpd)	100
<b>Residential Base Flow (gpd/household)</b>	<b>246</b>

**Table 4: Residential Flow Rate Calculation**

Residential flow rates were estimated at 246 gallons per household per day. It was assumed that this flow rate was representative of all single family homes in Columbia Heights.

Columbia Heights 2040 Comprehensive Plan, Chapter 8 Water Resources does not identify a per capita or per household assessment of residential sanitary sewer flow, but does identify service flow per area of residential land use types. Table 5 was used to estimate flow rates from all other land uses based on a generalized volume per day per acre rate.

Waste Generation Rates	
Land Use	Gal/acre-day
Apartment Unit, Condominium	2,700
Mobile Home Park	2,700
Duplex	1,575
Business	1,000
Public Facility	1,000
Park	0

**Table 5: Waste Generation Rates**

The land use based estimates identified above were used in this Model based on specific City land uses.

The pipes were then modeled with existing capacity calculated as a percentage flowing full. Full is considered 80% of design capacity. The attached Figure 3 shows existing pipe capacity, and Table 2 shows the modeled data.

The Collection District 1 modeling effort will look at the entire trunk line, provide additional flow meters and provide recommendations to accommodate future development. It is anticipated that preliminary results will be available mid to end June.

### **DEFINITIONS:**

**Infiltration and Inflow (I-I):** Inflow means water other than wastewater that enters a sewer system directly from sources such as roof leaders, foundation drains, yard drains, manhole covers, cross connections between storm sewers and sanitary sewers, catch basins, storm water runoff and other drainage structures.

Infiltration means water other than wastewater that enters the sewer system from the ground through defective pipe, pipe joints, and manholes.

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Excessive I-I means the quantity of flow during storm events that results in chronic operational problems related to hydraulic overloading of the collection system. Chronic operational problems may include surcharging, backups, bypasses, and overflows.

Peaking Factor: Peak hourly flow + I/I (normal)

**ATTACHMENT(S):** Sewer District Maps – Figure 2, Figure 3, Table 2