Appendix I – Sanitary Sewer Capacity Evaluation

TECHNICAL MEMORANDUM

City of Daly City
Wastewater Collection System Hydraulic Modeling Support

SUBJECT: Sanitary Sewer Capacity Evaluation for Westlake South

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REFERENCE: 0011352.00, Subtask 1.10

This Technical Memorandum (TM) summarizes the evaluation of the potential sanitary sewer capacity impact of a proposed mix-use development, Westlake South, on Southgate Avenue. The evaluation used the City's sanitary sewer hydraulic model developed as part of the 2009 North San Mateo County Sanitation District's (NSMCSD, District) Collection System Evaluation/Assurance, Management and Improvement Plan (2009 Collection System Evaluation) and updated in 2015 for the Collection System Model Update and Flow Impact Study for Proposed Serramonte Center Expansion (2015 Model Update).

The proposed development is located at 99 Southgate Avenue on parcel 002-201-570. The location of the proposed development and the downstream sewers are shown in **Figure 1**. Flow from the proposed development site would connect to the City's system on a 6-inch sewer in Southgate Avenue and a 30-inch trunk sewer on Lake Merced Boulevard, then continue north on Lake Merced Boulevard to the NSMCSD wastewater treatment plant (WWTP). The proposed development would not contribute flow to the trunk sewers requiring capacity improvements identified in the 2015 Model Update, as none of these improvements are located downstream of the development.

1. MODEL INPUT

1.1 Sewer Network

This analysis used the City's existing model of the trunk sewer network that was updated in 2015. The proposed development includes a connection to a smaller diameter sewer that was not originally included in the model. The 6-inch sewer on Southgate Avenue immediately west of Palmcrest Drive, as well as the 12-inch sewer connecting to the 30-inch sewer on Southgate Avenue at MH-C04-153, were added to the model as shown in **Figure 2.**

1.2 Sewer Loads

The 2015 Model Update evaluated the sewer system under two planning scenarios: Existing and Future. The Existing Scenario was considered to represent 2015 flows, and the Future Scenario was developed to represent 2030 conditions by incorporating future residential and commercial projects that would potentially be implemented between 2015 and 2030. The 2015 Model Update did not identify any potential future development in the area immediately downstream of the proposed developments. Therefore, because the Existing and Future Scenarios from the 2015 Model Update would result in the same sewer loading in these subcatchments, this analysis only evaluated the proposed developments under the Future Scenario. The existing model does not include any loads for the parcel.

The proposed development is a mixed-use project including 10,800 SF of retail commercial space and a 214-unit apartment complex. Therefore, the proposed development includes both residential and non-residential loads. The

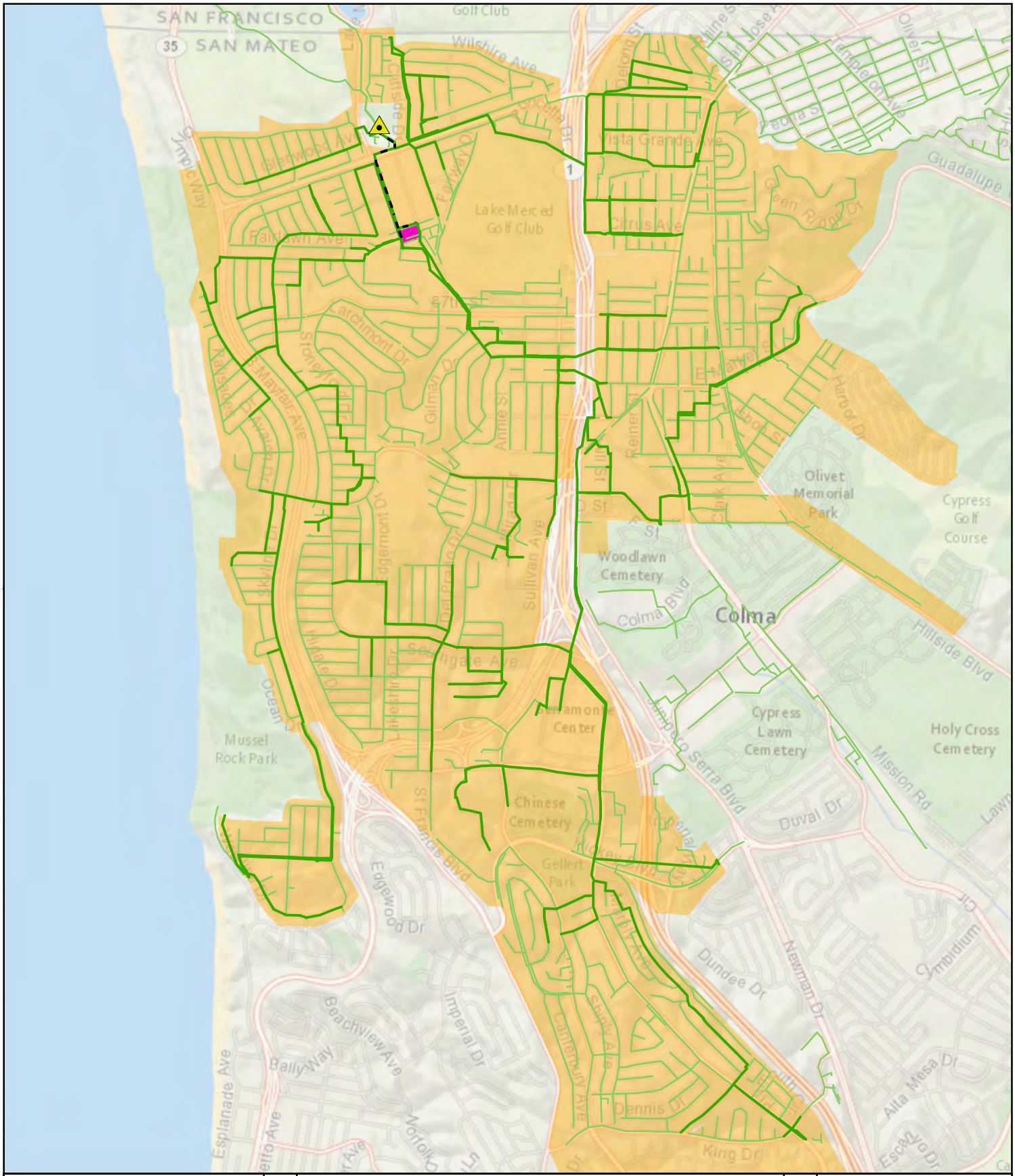

Figure 1: Proposed Development Location

Westlake South Development
Daly City, CA

Legend

- Wastewater Treatment Plant
- Pipes downstream of development
- Modeled Pipes
- Unmodeled Pipes
- Proposed Development
- Service Area

0 0.125 0.25 0.5 Miles

N

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Project #: 0011352.00
Map Created: March 2021

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Figure 2: Development Site

Westlake South Development
Daly City, CA

Legend

- Nodes added to model
- Modeled Nodes
- Unmodeled Manholes
- Modeled Sewers
- Pipes added to model
- Pipes downstream of development
- Unmodeled Sewers
- S-094A Subcatchments

0 30 60 120 Feet

N

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residential loads were estimated based on an apartment unit flow factor of 170 gallons per day (gpd) per dwelling unit (DU), as used in the 2015 Model Update. The non-residential loads were estimated based on a non-residential unit flow factor for general commercial, retail, and offices uses. The development quantities and estimated base wastewater flow (BWF) sewer load from the development are shown in **Table 1** below.

Table 1: Average BWF Sewer Load for the Proposed Development

Type	Amount	Unit	Rate	Flow (gpd)	Flow (MGD)
Apartment	214	Dwelling Unit (DU)	170 gpd/DU	36,380	0.03638
Retail	10,800	Square Feet (sq.ft)	0.1 gpd/ sq.ft	1,080	0.00108

The proposed development is located in model subcatchment S-094, as shown in **Figure 2**. The existing loads for the subcatchment were determined based on average water billing data from 2012 to 2015 for each parcel. The water billing data indicated no existing loading for parcel 002-201-570, but the other parcels in subcatchment S-094 are assumed to have the same loading as determined in the master plan.

In the existing model, flows from subcatchment S-094 discharge to the 21-inch sewer on Palmcrest Drive at manhole MH-C04-156. For this study, the subcatchment was split into three parts, identified as new subcatchments S-094A, S-094B, and S-094C, discharging to the revised manholes and pipe segments in the model network (**Figure 2**). The proposed development was added as two subcatchments, one for the commercial development and one for the residential development, loading to two separate locations. The residential development subcatchment, S-094A, loads to MH-C05-172 on the 30-inch trunk sewer in Lake Merced Boulevard on the west side of the development. The commercial development subcatchment, S-094B, connects to the 6-inch sewer between MH-C04-155 and MH-C04-154 on Southgate Avenue, added to the model for this study. The other parcels in the previous subcatchment S-094 are now a part of subcatchment S-094C loading to MH-C04-156. The updated average BWF loading for these subcatchments are shown in **Table 2**.

Table 2: Average BWF Sewer Loads for Modeled Subcatchments

Subcatchment	Load Sewer/Manhole	Residential Flow (mgd)	Non-residential Flow (mgd)	Total Flow (mgd)
S-094A (Westlake South Residential)	MH-C05-172	0.03638	0	0.03638
S-094B (Westlake South Commercial)	MH-C04-155/MH-C04-154	0	0.00108	0.00108
S-094C	MH-C04-156	0.03877	0.0051	0.04387

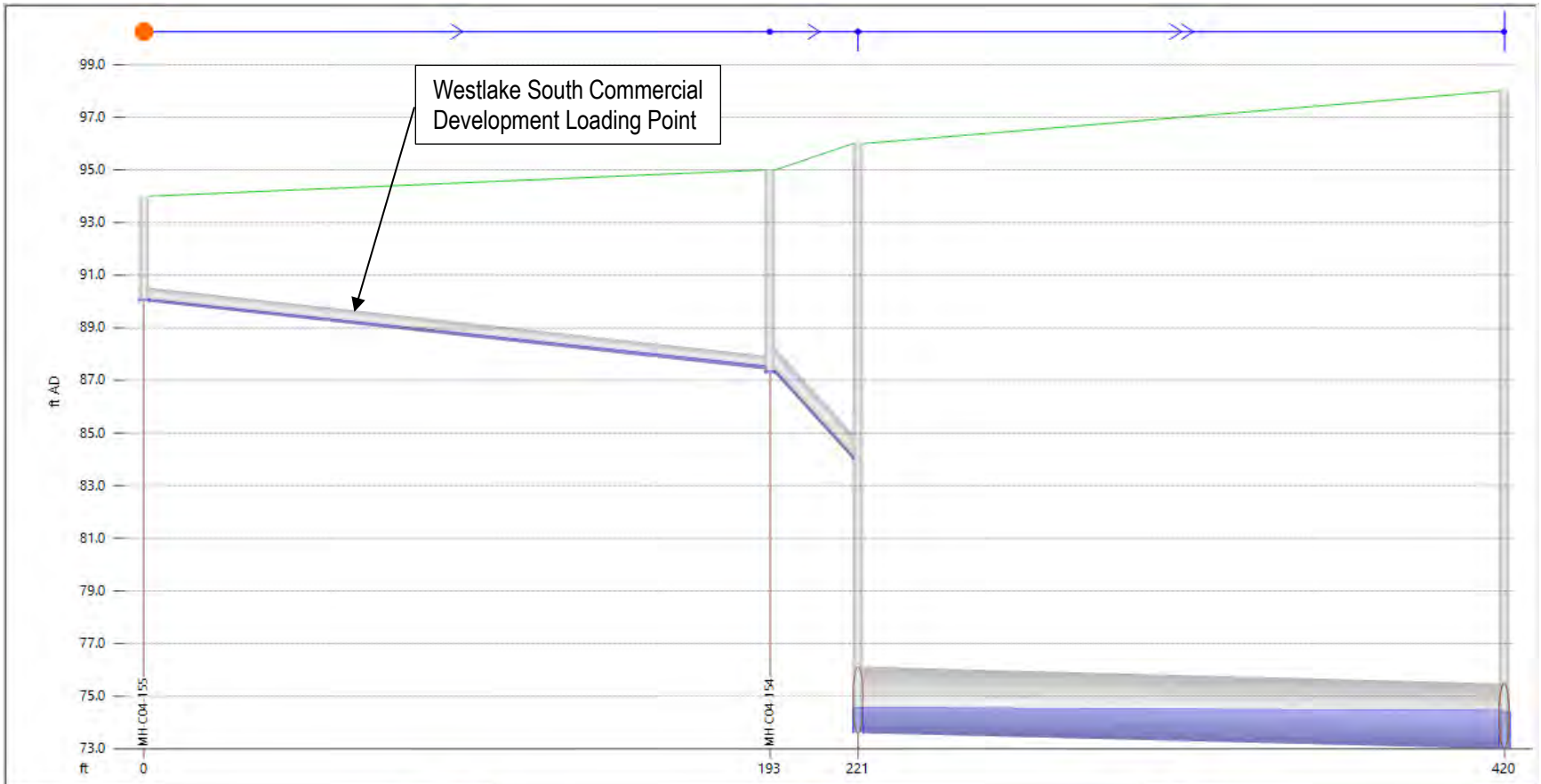
1.3 Design Flow Parameters

System capacity was evaluated based on the ability of the sanitary sewer system to convey future peak wet weather flow (PWWF) under design storm conditions. The analysis for this study used the same diurnal curves for residential and non-residential flows, as well as the same rainfall-dependent inflow and infiltration (RDI/I) for this area applied to the 5-year return period design event, as used in the 2009 Collection System Evaluation and 2015 Model Update.

2. MODEL RESULTS

The model was run for PWWF conditions including the proposed development. The model results were evaluated to identify any predicted surcharge under design PWWF in the sewers downstream of the proposed development. The results indicated that the commercial portion of the development would not cause any capacity deficiencies in the sewers on Southgate Avenue, as shown in the model profile of the 6-inch, 12-inch, and 30-inch sewers in **Figure 3.** The residential portion of the development would also not cause any capacity deficiencies in the sewer on Lake Merced Boulevard, as shown in the model profile in **Figure 4**.

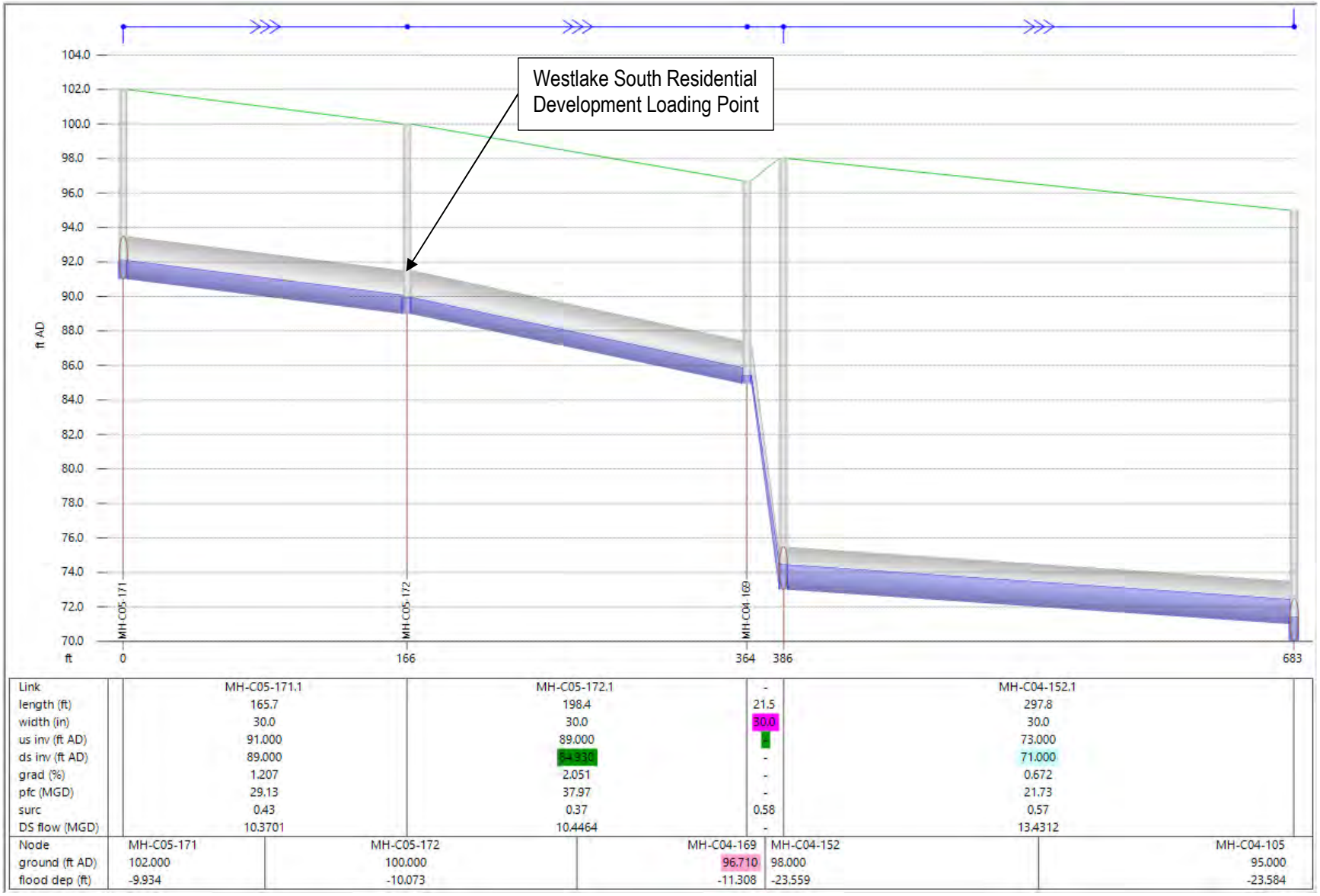
Figure 3: Model Profile of Southgate Avenue Sewer from MH-C04-155 to MH-C04-152



Link	MH-C04-155.1	-	MH-C04-153.1
length (ft)	193.4	27.1	199.6
width (in)	6.0	12.0	30.0
us inv (ft AD)	90.000	87.250	73.600
ds inv (ft AD)	87.430	84.000	73.000
grad (%)	1.329	11.987	0.301
pfc (MGD)	0.42	7.97	14.54
surc	0.22	0.11	0.58
DS flow (MGD)	0.0315	0.0315	2.9964

Node	MH-C04-155	MH-C04-154	MH-C04-153	MH-C04-152
ground (ft AD)	94.000	95.000	96.000	98.000
flood dep (ft)	-3.933	-7.640	-21.444	-23.559

Figure 4: Model Profile of Lake Merced Boulevard Sewer MH-C05-171 to MH-C04-105



Link	MH-C05-171.1	MH-C05-172.1	-	MH-C04-152.1
length (ft)	165.7	198.4	21.5	297.8
width (in)	30.0	30.0	30.0	30.0
us inv (ft AD)	91.000	89.000	[illegible]	73.000
ds inv (ft AD)	89.000	84.930	-	71.000
grad (%)	1.207	2.051	-	0.672
pfc (MGD)	29.13	37.97	-	21.73
surc	0.43	0.37	0.58	0.57
DS flow (MGD)	10.3701	10.4464	-	13.4312

Node	MH-C05-171	MH-C05-172	MH-C04-169	MH-C04-152	MH-C04-105
ground (ft AD)	102.000	100.000	96.710	98.000	95.000
flood dep (ft)	-9.934	-10.073	-11.308	-23.559	-23.584