

APPENDIX H  
SANITARY SEWER CAPACITY EVALUATION  
TECHNICAL MEMORANDUM

# TECHNICAL MEMORANDUM



## City of Daly City Wastewater Collection System Hydraulic Modeling Support

SUBJECT: Sanitary Sewer Capacity Evaluation for JUHSD Faculty and Staff Housing  
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DATE: October 25, 2019  
REFERENCE: 0011352.00, Subtask 1.5

This Technical Memorandum (TM) summarizes the evaluation of the potential sanitary sewer capacity impact of a proposed development of faculty and staff housing at the Jefferson Union High School District (JUHSD) site on Serramonte Boulevard. 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 699 Serramonte Boulevard on parcel 091-211-230. The location of the proposed development and the downstream sewers are shown in **Figure 1**. Flow from the proposed development site enters the City's system upstream of Serramonte Boulevard in 8-inch sewers and then continues north through the Serramonte Center development crossing the I-280 freeway to Junipero Serra Boulevard and north along Junipero Serra Boulevard. From there, the trunk sewers flow west and north to the NSMCSD wastewater treatment plant (WWTP). The proposed development would contribute flow to the trunk sewers requiring capacity improvements identified for the Serramonte Center area in the 2015 Model Update.

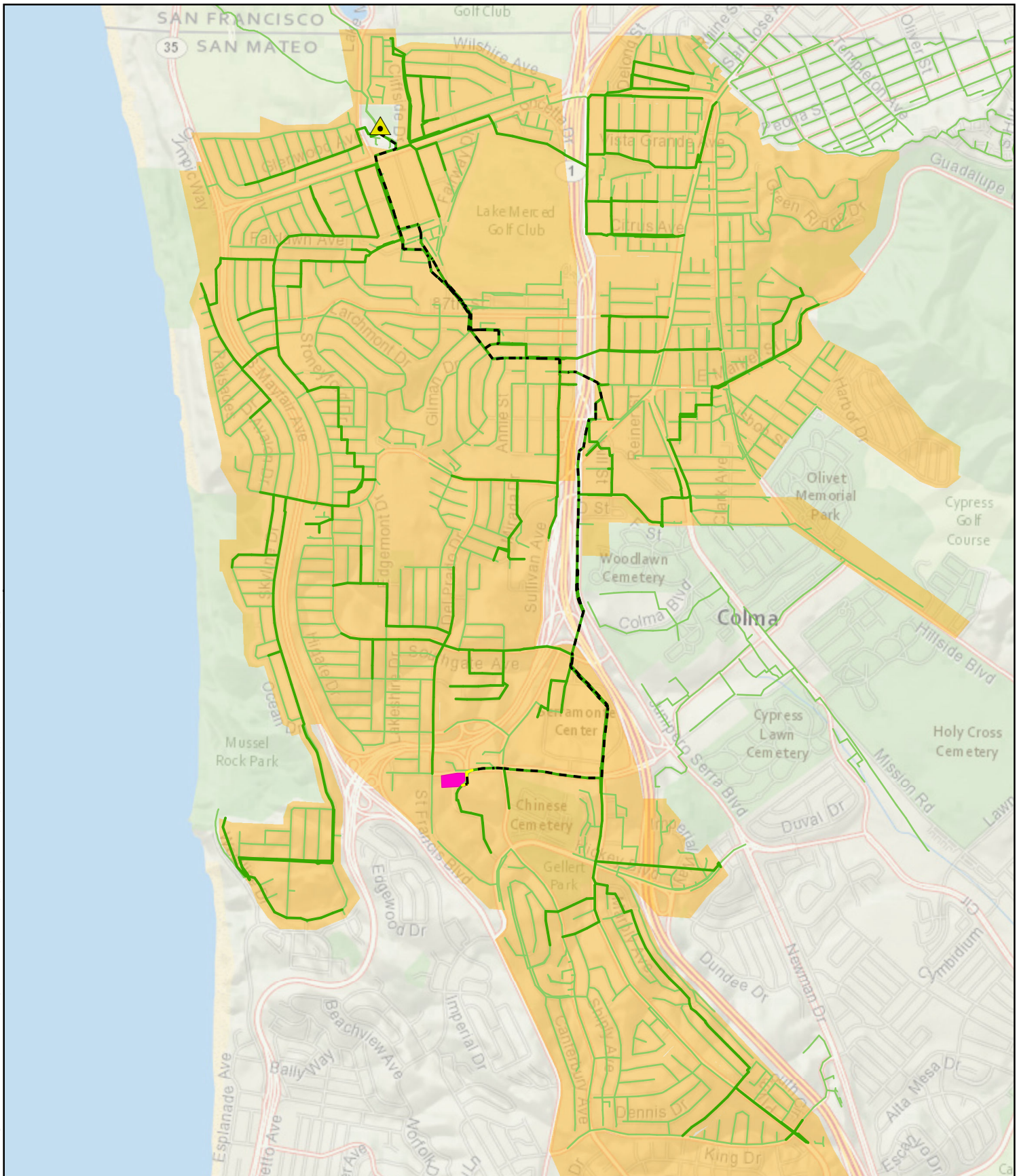
## 1. MODEL INPUT

### 1.1 Sewer Network

This analysis used the City's existing model of the trunk sewer network that was updated in 2015. However, some pipe improvements and updates for recent developments have been added to the model since that time as part of other sewer capacity evaluations. The proposed development includes the relocation of the existing 8-inch pipe segment currently running through the development area. The proposed relocated pipe is a 10-inch sewer, which connects back to the existing system downstream at MH-C10-030. These changes were incorporated for evaluation in this study, as shown in **Figure 2**.

### 1.2 Sewer Loads

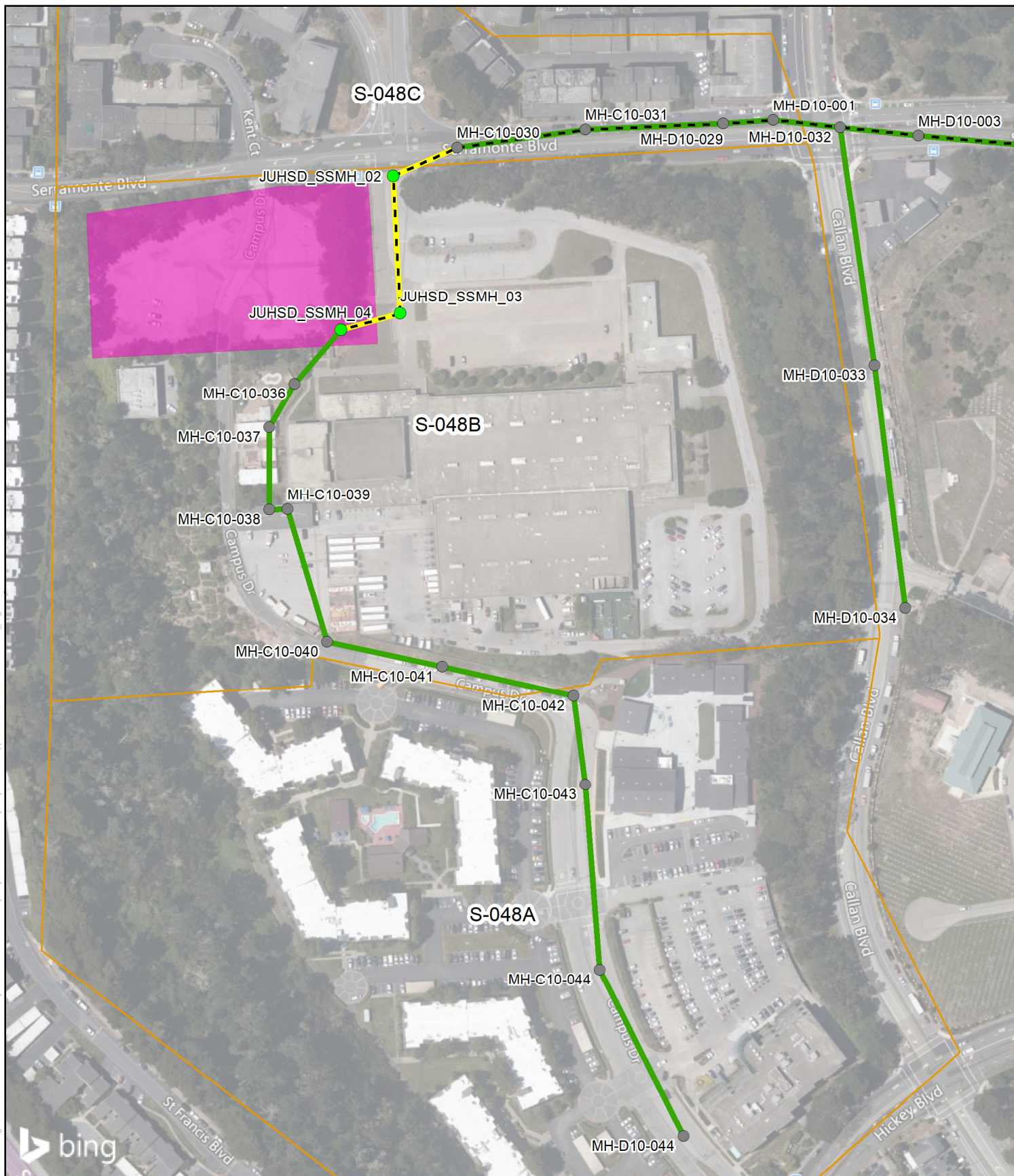
The 2015 Model Update evaluated the sewer system under two planning scenarios: Existing and Future. The Existing Scenario was considered to represent 2015 flows, and the Future Scenario was developed to represent 2030 conditions by incorporating future residential and commercial projects that would potentially be implemented between 2015 and 2030. The 2015 Model Update identified a potential future development at the parcel identified in this study. This potential future development, identified as "Serramonte Del Rey" in the 2015 study, was projected to include 175 multi-family residential uses units. At the time, this development was intended to represent the future JUHSD housing, so it was removed from the model for this study.



<h2>Figure 1: Proposed Development Location</h2> <p>JUHSD Faculty and Staff Housing Daly City, CA</p>	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li> Wastewater Treatment Plant</li> <li> Pipes added to model</li> <li> Pipes downstream of development</li> <li> Modeled Pipes</li> <li> Unmodeled Pipes</li> </ul>	<ul style="list-style-type: none"> <li> Proposed Development</li> <li> Service Area</li> </ul>	<div style="text-align: center;">   <b>WOODARD &amp; CURRAN</b>              Project #: 0011352.00              Map Created: October 2019         </div>
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## Figure 2: Development Site

JUHSD Faculty and Staff Housing  
Daly City, CA

Legend

- Nodes added in model
- Modeled Nodes
- Pipes downstream of development
- Pipes rerouted in model
- Modeled Sewers
- Proposed Development
- S-048 Subcatchments\_S-048

0 55 110 220 Feet



Project #: 0011352  
Map Created: October 2017

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The proposed development includes 122 units of faculty and staff housing at the JUHSD site. The proposed development also includes approximately 4,600 square feet of tenant amenities including a children's room, co-working, community, and fitness space, as well as management office space. The proposed development includes both residential and non-residential loads. The 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	122	Dwelling Unit (DU)	170 gpd/DU	20,740	0.02074
Amenities	4,600	Square Feet (sq.ft)	0.1 gpd/ sq.ft	460	0.00046

The proposed development is located in model subcatchment S-048, 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 existing loading for parcel 091-211-230 was determined to be 204 gpd or (.000204 mgd). This existing loading is assumed to remain the same with the proposed development. The proposed project includes the removal of four existing modular classroom units, however these are assumed to not contribute significant loads.

The proposed development is located in subcatchment S-048, discharging to the 10-inch sewer on Serramonte Boulevard at manhole MH-C10-030. For this study, the subcatchment was split into 3 different subcatchments discharging to the revised manholes and pipe segments in the model network (**Figure 2**). The proposed development was added as its own subcatchment loading to proposed relocated manhole JUHSD\_SSMH\_04 (**Figure 2**). As stated previously, the future potential development called Serramonte del Rey that was included in the 2015 Model Update for Subcatchment S-048 (now S-048B) was removed from the future scenario. This potential loading was estimated at approximately 38,000 gpd (0.038 mgd). The updated average BWF loading for these subcatchments are shown in **Table 2**.

**Table 2: Average BWF Sewer Loads for Modeled Subcatchments**

Subcatchment	Load Manhole	Residential Flow (mgd)	Non-residential Flow (mgd)	Total Flow (mgd)
S-048A	MH-C10-044	0.04120	0.00611	0.04731
S-048B	MH-C10-036	0	0.00020	0.00020
S-048C	MH-C10-030	0.02446	0	0.02446
Dev_JUHSD	JUHSD_SSMH_04	0.02074	0.00046	0.02120

### 1.3 Design Flow Parameters

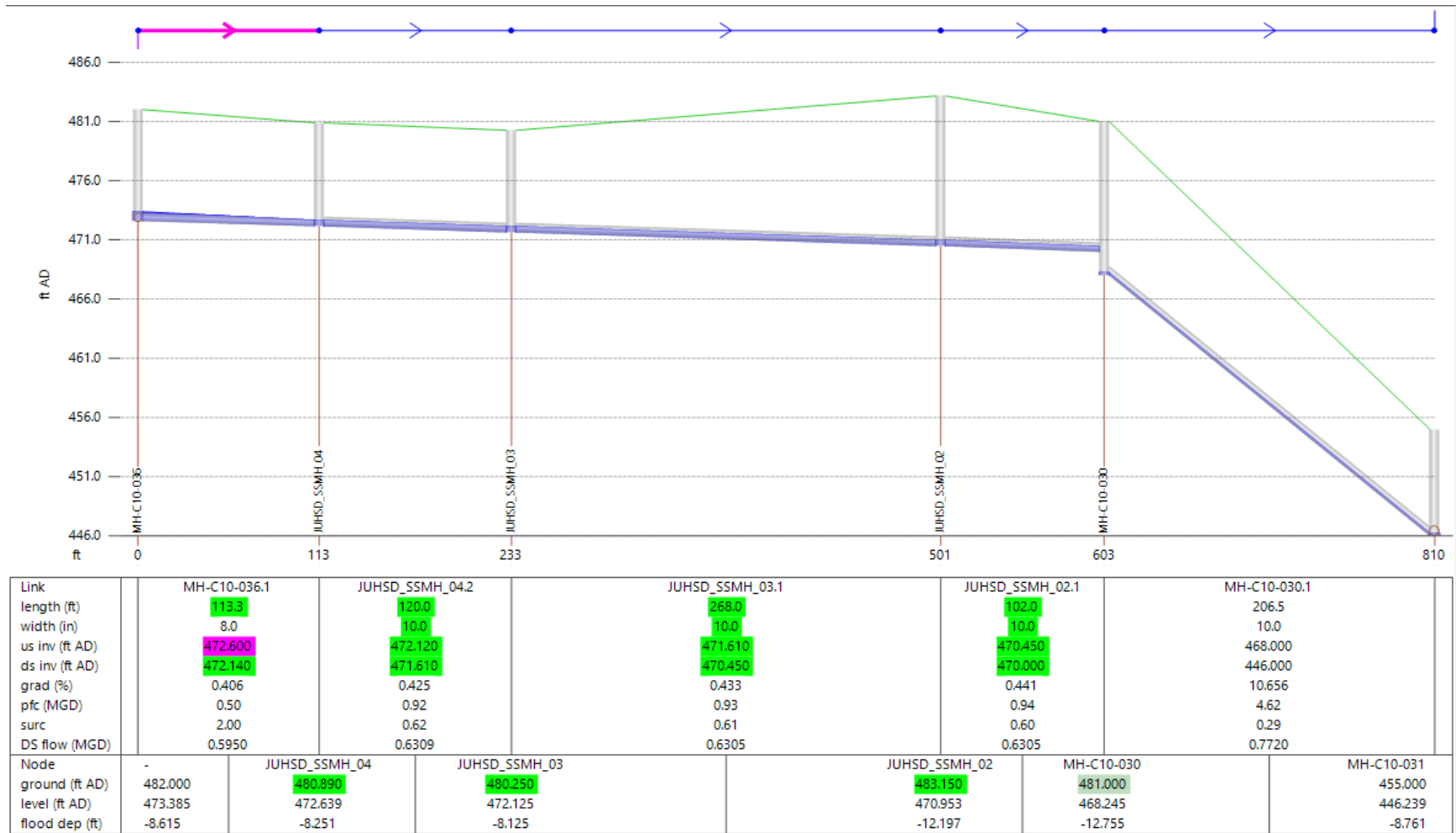
System capacity was evaluated based on the ability of the sanitary sewer system to convey future peak wet weather flow (PWWF) under design storm conditions. The analysis for this study used the same diurnal curves for residential and non-residential flows, as well as the same rainfall-dependent inflow 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

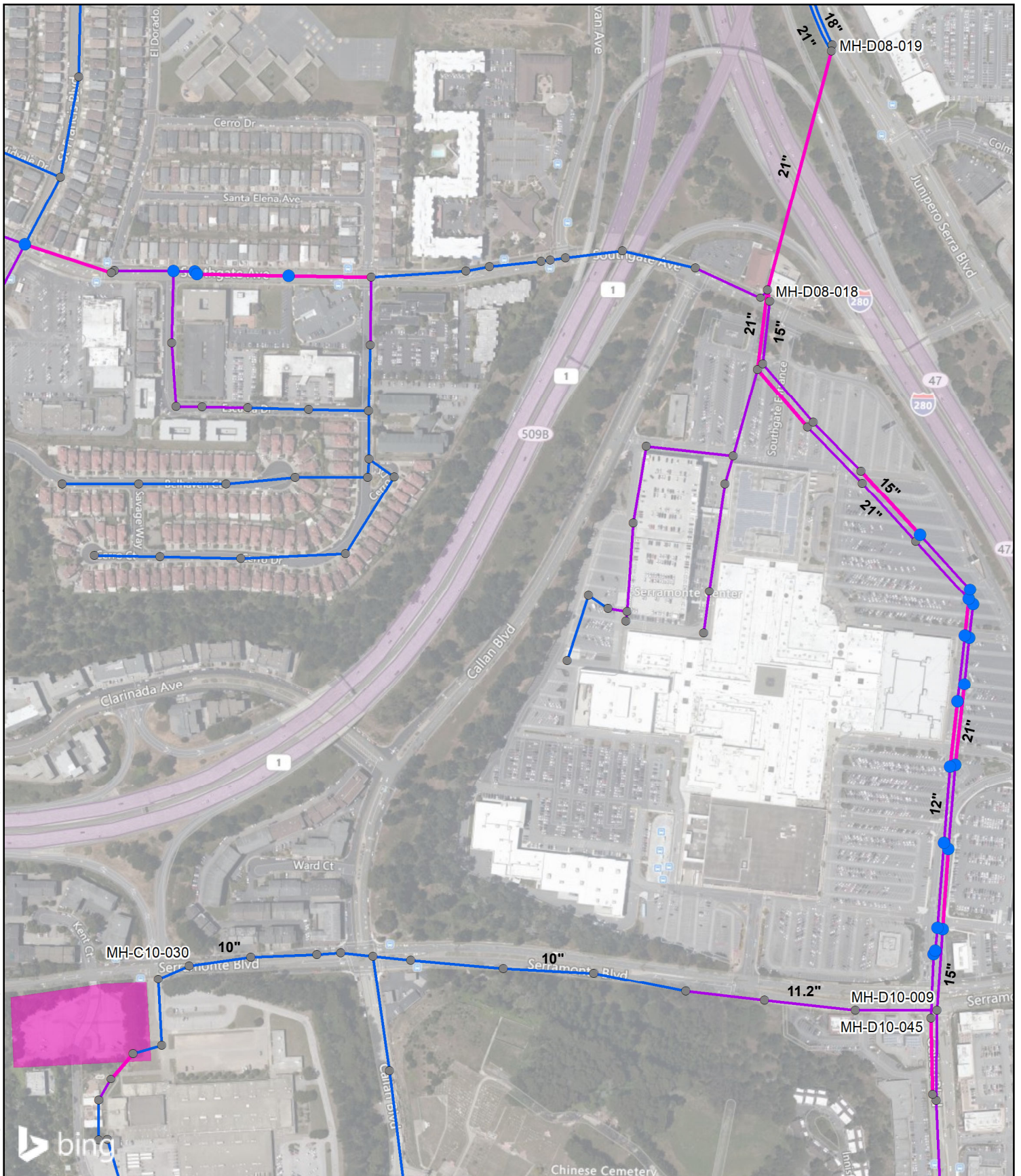
The model was run for PWWF conditions including the proposed development and the rerouted and upsized 10-inch sewer. The model results were evaluated to identify any predicted surcharge under design PWWF in the sewers downstream of the proposed development. The results indicated that the development would not cause any capacity deficiencies in the rerouted sewers or in the sewers on Serramonte Boulevard downstream of the development, as shown in the model profile of the 10-inch sewer rerouted through the JUHSD property to Serramonte Boulevard (**Figure 3**). However, as noted previously, the development flows would contribute to capacity deficient sewers in the Serramonte Center and the 21-inch trunk sewer crossing highway I-280 to Junipero Serra Boulevard (**Figure 4**). The figure indicates sewers predicted to be surcharged due to “throttle” conditions (peak flow exceeding full pipe capacity) and those surcharged due to backwater from downstream throttle conditions. **Figure 5** and **Figure 6** show model profiles of the parallel 21-inch and 12/15-inch sewers through the Serramonte Center, indicating significant predicted surcharge in these sewers under design PWWF conditions.

The solution to the surcharge issues in the 12-, 15-, and 21-inch sewers in the Serramonte Center, as recommended in the 2009 Collection System Evaluation, is a 30-inch relief sewer parallel to the 21-inch sewer crossing highway I-280. Therefore, since the JUHSD development contributes flow to the capacity-deficient sewers that would be relieved by this project, it should contribute a proportional fair share of the new 30-inch relief sewer. The fair share contribution should be based on the JUHSD development flows relative to the additional capacity needed for the new I-280 crossing as determined by the Department of Water and Wastewater Resources.

Figure 3: Model Profile with Proposed Development MH-C10-036 to MH-C10-031







## Figure 4: Downstream Sewer Model Results

JHSD Faculty and Staff Housing  
Daly City, CA

Legend

- Model Freeboard < 5 ft
- Modeled Nodes
- Modeled Sewers**
  - Not surcharged
  - Backwater surge
  - Throttle surge
- Proposed Development

0 115 230 460 Feet



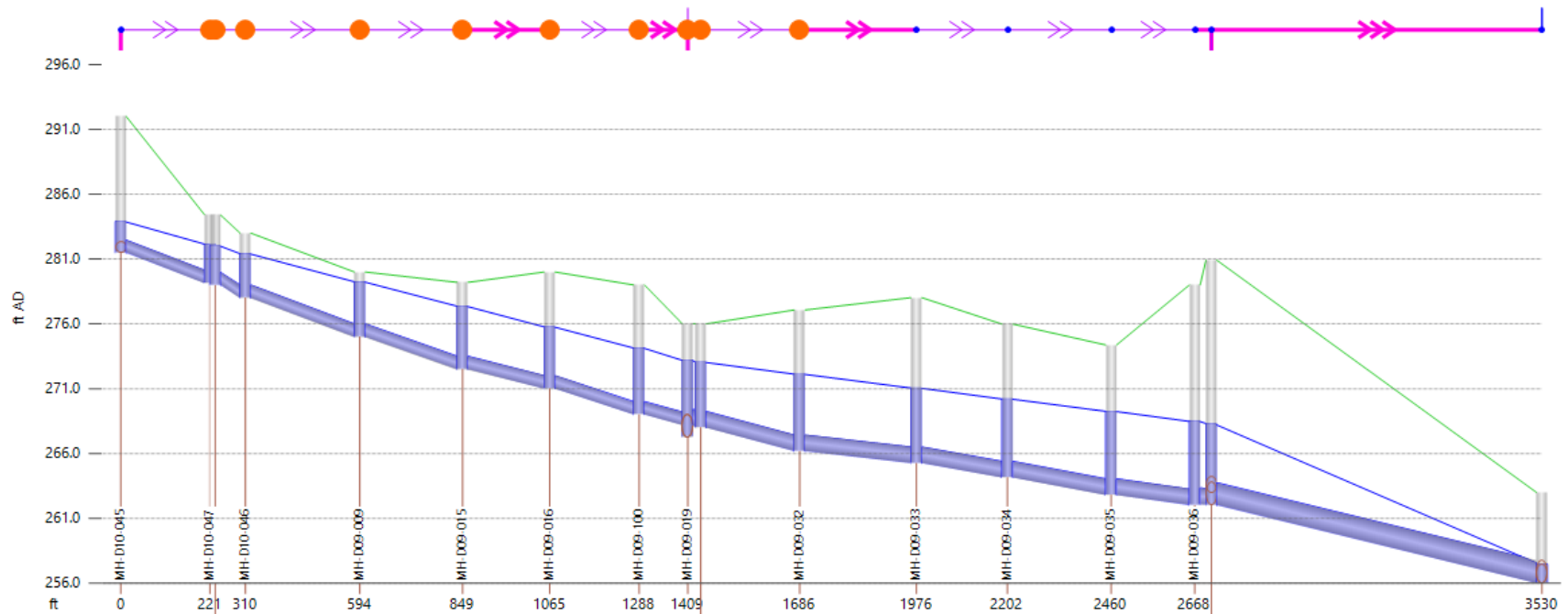
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Figure 5: Model Profile of Downstream 21-inch Sewer MH-D10-009 to MH-D08-019



Figure 6: Model Profile of Downstream 12/15-inch Sewer MH-D10-045 to MH-D08-019



Link	-	-	MH-D10-046.1	-	-	-	-	-	MH-D09-032.1	-	-	-	-	MH-D08-018.1	
length (ft)	221.4	-	284.0	255.3	216.2	222.2	121.0	245.5	289.8	226.2	257.5	207.7	-	821.1	
width (in)	12.0	-	12.0	12.0	12.0	12.0	12.0	15.0	15.0	15.0	15.0	15.0	-	21.0	
us inv (ft AD)	281.460	-	278.000	275.000	272.500	271.000	-	268.000	266.170	265.250	264.150	262.800	-	262.000	
ds inv (ft AD)	279.141	-	275.000	272.500	271.000	269.000	-	266.170	265.250	264.150	262.800	262.000	-	256.000	
grad (%)	1.047	-	1.056	0.979	0.694	0.900	0.661	0.745	0.317	0.486	0.524	0.385	-	0.731	
pfc (MGD)	2.36	-	2.37	2.28	1.92	2.19	1.87	3.61	2.35	2.91	3.02	2.59	-	8.76	
surc	1.00	-	1.00	1.00	2.00	1.00	2.00	1.00	2.00	1.00	1.00	1.00	-	2.00	
DS flow (MGD)	2.0678	-	2.0545	2.0660	2.0776	2.0960	2.1890	2.5220	2.5143	2.5086	2.5038	2.5009	-	11.6312	
Node	-	-	-	MH-D09-009	-	-	-	-	MH-D09-032	MH-D09-033	-	-	-	MH-D08-018	MH-D08-019
ground (ft AD)	-	-	283.000	280.000	279.200	280.000	279.000	-	277.070	278.020	275.980	274.370	-	280.910	263.000
level (ft AD)	-	-	281.409	279.240	277.354	275.764	274.131	-	272.119	271.047	270.205	269.251	-	268.311	257.480
flood dep (ft)	-	-	-1.591	-0.760	-1.846	-4.236	-4.869	-	-4.951	-6.973	-5.775	-5.119	-	-12.599	-5.520