



**Updated: December 5, 2018**

May 10, 2017

Ryan Carstensen  
Frontier Real Estate Investments  
610 Newport Center Drive, Suite 400  
Newport Beach, CA 92660

**Reference: Analysis of City of San Juan Capistrano Sewer System to Accommodate the Proposed River Street Marketplace Project**

Dear Mr. Carstensen:

Tetra Tech has completed the hydraulic model analysis for the proposed River Street Marketplace Project in accordance with the requirements of the City of San Juan Capistrano. This analysis reviews the impact of the wastewater flows generated by the proposed development on the City's sewer collection system.

The River Street Marketplace development is located at 31825 Los Rios Street in the City of San Juan Capistrano. The project will consist of a commercial development including a 20,200 square foot Marketplace, 18,800 square foot combined Mercantile and Office Space Building, 4,600 square foot Farmstead a 4,600 square foot Green House and a 7,500 square foot Red Barn. The proposed development site is currently occupied by Ito Nursery.

The 2016 updated version of the City's sewer hydraulic model of the sanitary sewer system was used to evaluate the impact of the estimated flows from the development. The results from the model were used to assess the sewer capacity, pipe velocities and d/D ratios within the City's collection system downstream of the development as well as any potential impact to the City's allocated treatment plant capacity as presented in the City's 2004 Sanitary Sewer Master Plan.

Please note that this evaluation did not include the hydraulic modeling of any new or proposed sewer lines that will be constructed as part of the developer's on-site system. Tetra Tech only evaluated the effects of the development flows on the City's existing collection system downstream of the proposed manhole connection points. Estimated flows from the development were evaluated with existing system dry-weather and wet-weather flows as well as the ultimate master plan conditions.

The developer proposes to tie in a new 8-inch diameter sewer line into existing manhole D10138 (per the hydraulic model) at the existing 8-inch sewer trunk line along Paseo Adelanto, and approximately 230 feet north of Del Obispo Street. A location map is presented in Figure 1.

**SEWER FLOWS**

Tetra Tech was provided with information from the developer's engineer, Valley Civil Design Group, and included a preliminary utility plan, the proposed manhole tie in point, and anticipated wastewater flow data. The following wastewater average and peak flow generation rates and assumptions were provided as follows:

- Restaurant: 25 gpcd x 750 = 18,750 gpd
- Commercial: 100 employees x 42 gpcd = 4,200 gpd
- Office: 75 employees x 10 gpcd = 750 gpd
- Average flow: 23,700 gpd
- Peak Flow:  $2.4 \times Q_{ave}^{0.89}$  (in cfs)
- Peak flow: 81,823 gpd

The design criteria used in generating wastewater flows including the unit flow factors and peak flow factors are consistent with the criteria presented as part of City of San Juan Capistrano Municipal Code Sec. 9-4.523. The proposed wastewater flows appear to be a reasonable estimate for the development. The City's Land Use Map classifies this area as low density commercial in accordance with the Specific Plan/Precise Plan 78-01 and appears to be consistent with the proposed development.

## **HYDRAULIC MODEL**

The H20MAP Sewer hydraulic computer model of the City's sanitary sewer system was used to evaluate the estimated flows from the development. The hydraulic modeling and evaluation was performed using the following scenarios:

### Baseline Scenarios:

- Existing Dry Weather Flow Baseline Conditions
- Existing Wet Weather Flow Baseline Conditions
- Master Plan Dry Weather Flow Baseline Conditions
- Master Plan Wet Weather Flow Baseline Conditions

### Proposed Development Scenarios:

- Existing Dry Weather Flow Conditions with River Street Marketplace Flows
- Existing Wet Weather Flow Conditions with River Street Marketplace Flows
- Master Plan Dry Weather Flow Conditions with River Street Marketplace Flows
- Master Plan Wet Weather Flow Conditions with River Street Marketplace Flows

Proposed wastewater flows from the River Street Marketplace were input into the hydraulic model at manhole D10138. The dry weather and wet weather diurnal flow curve for the proposed commercial development was assumed to generate flows from about 6 a.m. to 11 p.m. daily as noted in the previous section, and little to no flows during the overnight hours. Figure 2 presents the hydraulic profile of the immediate upstream and downstream sewer system pipes at the manhole of the flow addition under peak flow conditions.

It should be noted that the elevations for the sewer inverts and manholes shown on the developer's utility plans were based on as-built information but the elevations included in the hydraulic model are roughly 2.2 feet lower. There is a possibility that different datums may have been used. As an example, using NAVD 88 vs NGVD 29 results in a vertical datum difference of about 2.2 feet +/-, so this may explain the discrepancy in elevations. Regardless, it does not impact the results of the hydraulic modelling or pipe capacities.

## **EVALUATION**

A City sewer is found to be hydraulically deficient if it exceeds the maximum depth to diameter ration based on Master Plan criteria. For pipes 12 inches and less, the d/D ratio for the dry weather design flow should not exceed 0.5, and for sewer lines 15 inches and larger, the maximum ratio is 0.75. For wet weather flows, the maximum sewer capacity is a depth of flow (d) equal to or less than 100% of the diameter (D), i.e. a d/D ratio less than or equal to 1.0 (depth of 8 inches for an 8-inch diameter sewer). Note that wet weather flow is the rain water that enters the sewer from a 4-year storm event as monitored for the 2004 Master Plan.

Each hydraulic model scenario was evaluated using the 48-hour flow hydrograph with peaking factors and diurnal flow curve as previously described. An extended period simulation was performed for the hydraulic analysis.

Tetra Tech reviewed the capacity and hydraulic conditions in the existing 8-inch downstream sewer line immediately downstream of the flow input along Paseo Adelanto, Del Obispo Street and for the remainder of the trunk line along San Juan Creek. Average and peak flows as well as d/D ratios for both dry weather and wet weather conditions were reviewed.

Ryan Carstensen  
May 10, 2017

For the City's existing sewer system, Table 1 summarizes the hydraulic model results at three locations including under existing baseline conditions and for the proposed River Street Marketplace flows:

- 8-inch sewer line segment immediately downstream of the manhole connection point
- 8-inch sewer on Camino Capistrano at the junction of the 8-inch sewer from Del Obispo Street
- 24-inch sewer trunk line as the last City segment running parallel to San Juan Creek

For the ultimate master plan conditions, Table 2 summarizes the model analysis for both the average and peak flows and d/D ratios at this pipe segment comparing both baseline conditions and River Street Marketplace flows.

The results indicate that the existing sewer system appears to be capable of accommodating the additional sewer flows from the River Street Marketplace development. For the 8-inch sewer lines immediately downstream of the flow connection point, the d/D ratio will increase by about 0.15 for the current and master plan peak daily dry weather flow conditions, and therefore, does not appear to be a significant impact on the system.

Pipe segment 15704, (between manholes D10135 and D11155) which is the 8-inch sewer line that combines flows from Camino Capistrano and Del Obispo Street was identified in the 2004 Sewer Master Plan as having exceeded the d/D ratio of 0.5 for peak dry weather flows. The River Street Marketplace flows will result in an increase in the d/D ratio in peak flow from 0.70 to 0.76. However, the average flows would result in a d/D ratio increase from 0.44 to 0.48 for this segment, which is slightly less than the 0.5 ratio limit. Therefore, the pipeline appears to be satisfactory for the proposed development.

While this pipe segment (approximately 160 feet length) was not part of the original hydraulic system improvements in the 2004 Master Plan, if any additional flows or future development/redevelopment occurs that would raise the d/D above 0.5 in this section, the City may wish to consider upsizing this segment from an 8-inch to a 12-inch sewer line at that time.

The remainder of the City's downstream trunk sewer line did not indicate any issues with either the pipe capacity or the d/D ratios.

## TREATMENT PLANT

SOCWA operates the Jay B. Latham Regional Treatment Plant (Treatment Plant), which is a conventional activated sludge wastewater treatment with secondary treatment design liquid treatment capacity of 13.0 million gallons per day (mgd). The City of San Juan Capistrano, which is one of four member agencies that own treatment capacity in the Treatment Plant, owns 4.0 mgd of this capacity. For the current existing conditions, the average daily City wastewater flow to the treatment plant is estimated at 3.63 mgd. The proposed River Street Marketplace flows will add an average daily flow of 0.02 mgd to the City's total capacity or a total flow of 3.65 mgd.

If you have any questions regarding the analysis, please do not hesitate to call if you have any questions.

Sincerely,



Steve Ellis, P.E.  
Senior Project Manager

SE/cg

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Attachments

**Table 1**  
**Summary of Flows and Depths – Existing System (a)**

		Existing System – Baseline Conditions				Existing System – River Street Marketplace Flows			
Pipe Location	Diam. (in.)	Dry Weather		Wet Weather		Dry Weather		Wet Weather	
		Flow (mgd)	d/D (in.)	Flow (mgd)	d/D (in.)	Flow (mgd)	d/D (in.)	Flow (mgd)	d/D (in.)
Pipe 156DB D10136/D101351	8	0.01	0.06	0.02	0.13	0.03	0.13	0.05	0.18
		0.02	0.13	0.04	0.19	0.09	0.28	0.11	0.30
Pipe 15704 D10135D111551	8	0.16	0.44	0.27	0.70	0.18	0.48	0.30	0.70
		0.32	0.70	0.53	1.00	0.35	0.76	0.56	1.00
Pipe 15704 D10135D111551	12 <sup>(b)</sup>	--	--	--	--	0.18	0.26	0.30	0.34
		--	--	--	--	0.35	0.38	0.56	0.50
Pipe 12520 B17105/B171021	24	3.63	0.41	5.00	0.51	3.65	0.42	5.03	0.51
		5.98	0.57	8.58	0.75	6.01	0.58	8.61	0.75

(a) Top values reflect average flows and depths; bottom values reflect peak flows and depths.

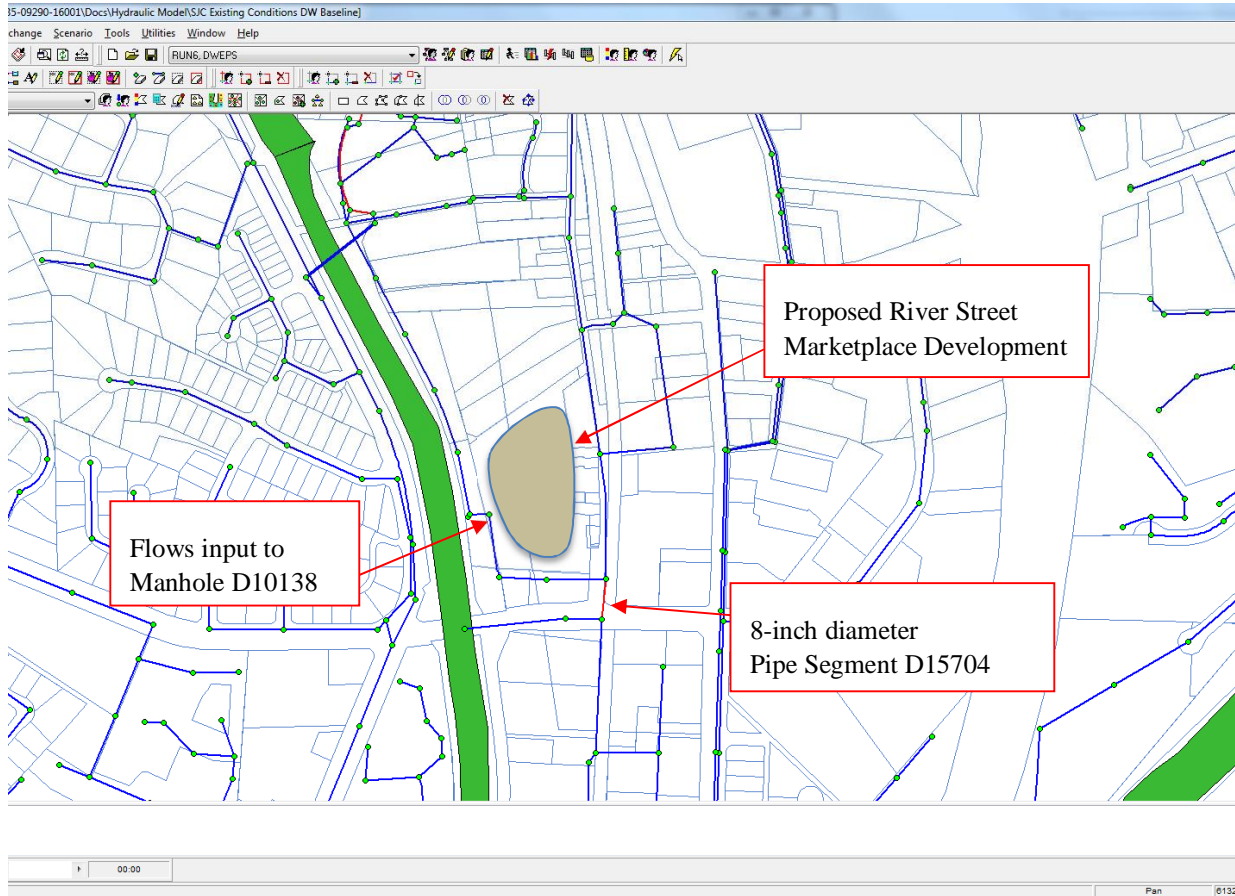
(b) Potential future increase in pipe size from 8-inch to 12-inch diameter.

**Table 2**  
**Summary of Flows and Depths – Master Plan System (a)**

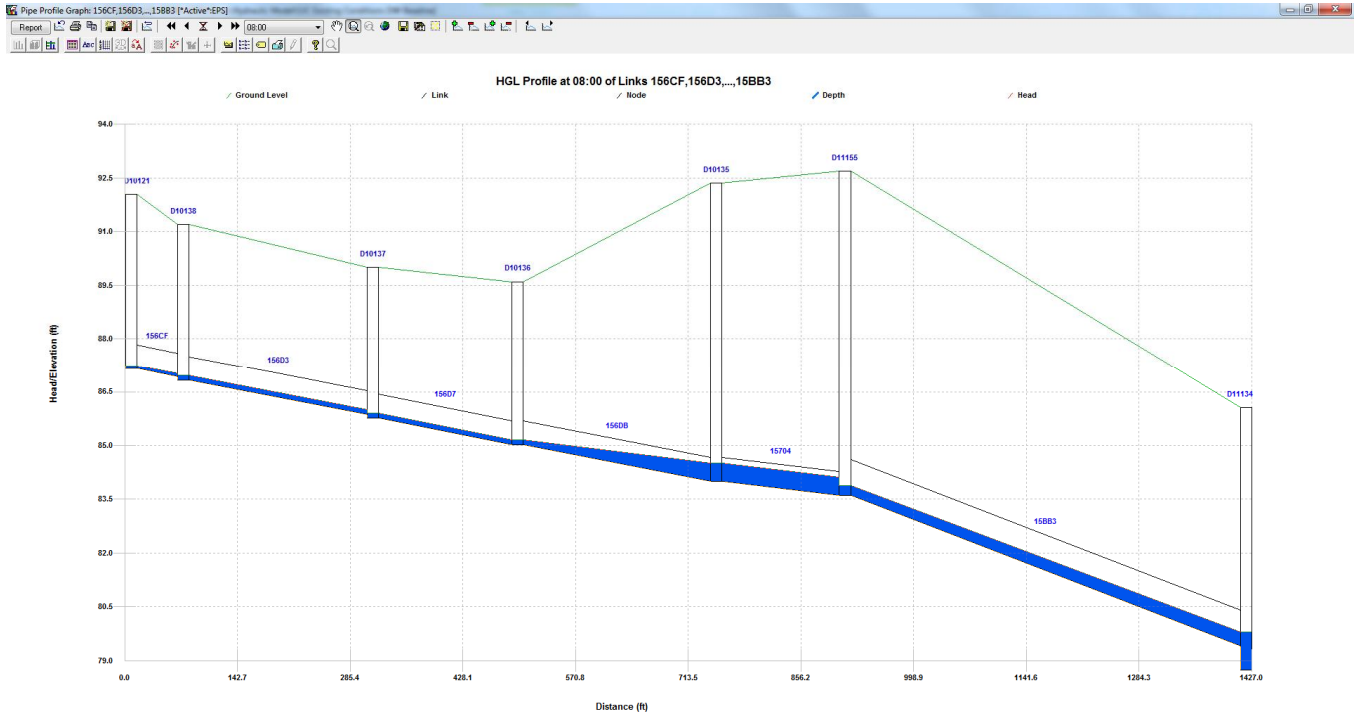
		Master Plan System – Baseline Conditions				Master Plan System – River Street Marketplace Flows			
Pipe Location	Diam. (in)	Dry Weather		Wet Weather		Dry Weather		Wet Weather	
		Flow (mgd)	d/D (in.)	Flow (mgd)	d/D (in.)	Flow (mgd)	d/D (in.)	Flow (mgd)	d/D (in.)
Pipe 156DB D10136/D101351	8	0.01	0.08	0.03	0.146	0.038	0.15	0.05	0.19
		0.03	0.16	0.05	0.214	0.11	0.30	0.12	0.32
Pipe 15704 D10135D111551	8	0.18	0.48	0.28	0.70	0.18	0.48	0.30	0.70
		0.35	0.76	0.54	1.00	0.34	0.76	0.56	1.00
Pipe 15704 D10135D111551	12 <sup>(b)</sup>	--	--	--	--	0.18	0.26	0.30	0.34
		--	--	--	--	0.34	0.38	0.56	0.50
Pipe 12520 B17105/B171021	27	4.27	0.38	5.72	0.45	4.29	0.38	5.74	0.45
		7.20	0.53	9.55	0.63	7.23	0.53	9.58	0.64

(a) Top values reflect average flows and depths; bottom values reflect peak flows and depths.

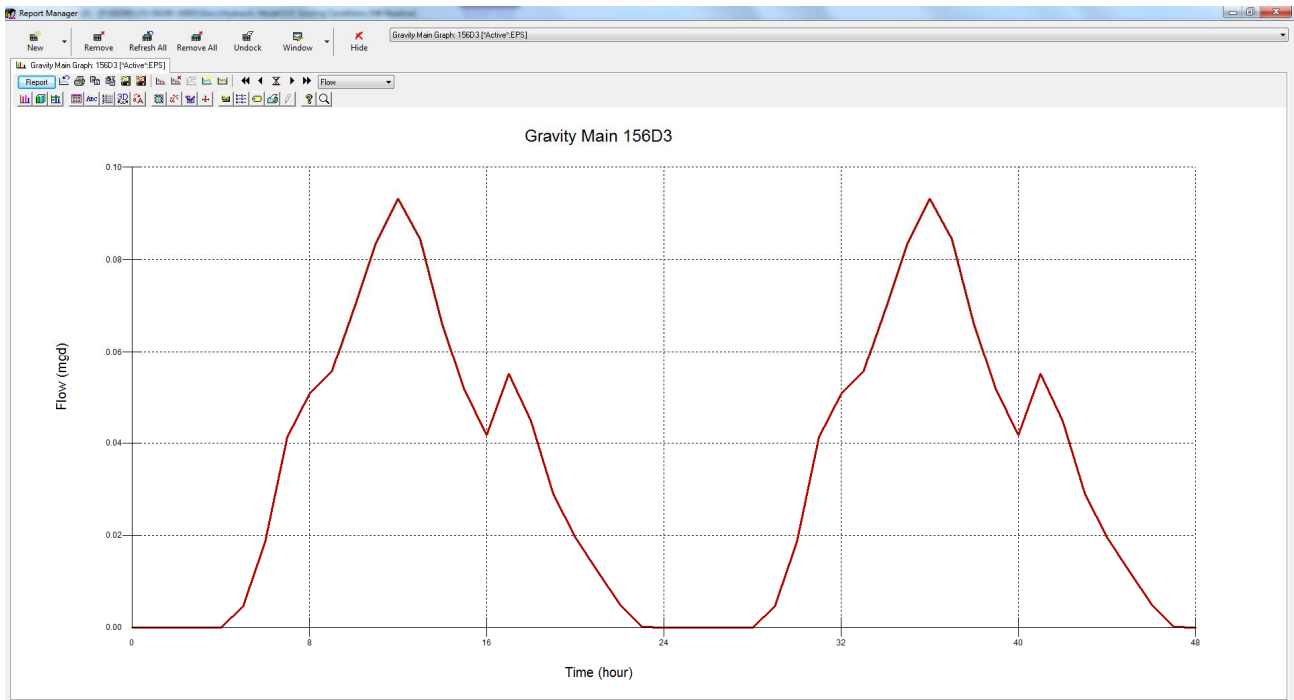
(b) Potential future increase in pipe size from 8-inch to 12-inch diameter.



**Figure 1. Project Vicinity Map**



**Figure 2. Pipe Profile Segment from Flow input at Manhole D10138 through 12-inch segment along Camino Capistrano**



**Figure 3. Assumed Diurnal Flow Curve for River Street Marketplace**