City of Tracy

Wastewater System Analysis for Corral Hollow Road & Lammers Road

Prepared for

City of Tracy

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Executive Summary

The City of Tracy has been requested by project proponents to allow a development called the Avenues on current vacant land located along Valpico Road, west of the intersection of Valpico Road and Corral Hollow Road within the City of Tracy city limits. The purpose of this report is to develop future wastewater flows from the above parcel and determine the necessary wastewater infrastructure that is required to receive and treat future wastewater flows. Future wastewater flows were projected based on the most current land use planning data available and wastewater generation factors.

The proposed development contributes wastewater flows equivalent to 453 equivalent single-family dwelling units. Based on the location of the above parcel, future wastewater flows from the above project must be discharged to the existing Corral Hollow wastewater system, that is currently being upgraded. According to the analysis presented in this technical report, supported by the City of Tracy Wastewater Master Plan (2012), wastewater flows from the Avenues project can be discharged to the wastewater system if

1. Proposed new sewer lines along Corral Hollow Road from Node 3W (south of Valpico) to Node 4W.1 is constructed.
2. Flow from Avenues project is diverted to future Lammers Road sewer system.
3. Tracy WWTP Expansion is completed.

City of Tracy may TEMPORARILY allow discharge of wastewater from Avenues project to the existing Corral Hollow Road sewer system (north of Parkside Drive) since City of Tracy recently completed a parallel sewer line along Corral Hollow Road from I-205 to Fieldview Drive (Phase 1 of Corral Hollow sewer system upgrade). The above upgrade provided capacity for approximately 5,000 EDUs. However, the existing sewer line from Fieldview Drive to Parkside Drive must be completed in order to receive flows from new developments south of Parkside Drive.

There is approximately 500 to 550 EDUs of temporary capacity is available in the existing Corral Hollow sewer system between Fieldview Drive and Parkside Drive. It is up to the City of Tracy to allocate the above temporary capacity.

Acronyms and Abbreviations

ADWF	average dry weather flow
DU	dwelling unit
gal	gallon(s)
gal/ac-day	gallon(s) per acre per day
gpcd	gallon(s) per capita per day
gpd	gallon(s) per day
HD	high density
LD	low density
MD	medium density
mgd	million gallon(s) per day
PDWF	peak dry weather flow
PF	Peaking Factor
PWWF	peak wet weather flow
VLD	very low density

Introduction

The City of Tracy has been requested by project proponents to allow a residential project called the Avenues on current vacant land located at the south side of Valpico Road, west of the intersection of Valpico Road and Corral Hollow Road within the City of Tracy city limits. The Aveunes project is located in the southwest portion of Tracy and it is shown as SOI Project 19 on Figure 1.

The purpose of this report is to develop future wastewater flows from the above parcel and determine the necessary wastewater infrastructure that is required to receive and treat future wastewater flows. A hydraulic capacity analysis was performed based on the Tracy Wastewater Master Plan (2012) including the added flow from the Avenue development. To analyze the impact of the Avenue development on wastewater conveyance facilities, three phases of the Corral Hollow sewer system and the entire Lammers Road sewer system (proposed) were studies in detail. Figure 1 shows these 4 sections and their locations:

Table 1: Pipeline Analysis Phases and Locations

Phase	Node Locations	Purpose
1+2	4W.1 – Corral Hollow & I-205 Intersection	To verify whether existing Corral Hollow sewer line has sufficient capacity
3	1W - 4W.1	To verify whether proposed Corral Hollow sewer line has sufficient capacity
4	4W.1 - 11W	To verify whether proposed Lammers Road sewer line has sufficient capacity

Table 2 shows the parcel number, gross area and associated land use for the proposed (Avenue) project.

Table 2: Parcel Number and Land Use Data

Parcel Number	Number of Units	Land Use
240-140-05 & 240-140-06	453	Residential

Source: Avenue Specific Plan, 2016

Future Flows

The future flow from the Avenues development was determined as follows.

Future wastewater flows were projected based on the most current land use planning data available and wastewater generation factors. The following wastewater generation factors are taken from the City of Tracy Wastewater Master Plan approved by the City Council in 2013.

Table 3. Wastewater Generation Factors

Flow Parameter	Wastewater Master Plan Values
Industrial Flow	1,056 gal/acre/day
Office, Retail and Commercial Flow	1,140 gal/acre/day
Residential Flow – VLD	264 gpd/unit
Residential Flow – LD	264 gpd/unit
Residential Flow – MD	216 gpd/unit
Residential Flow – HD	176 gpd/unit

Source: City of Tracy Wastewater Master Plan, CH2MHILL, 2012.

The above wastewater generation factors are used to develop average dry weather flows (ADWF) from the 453 dwelling units in the proposed project. The previously completed Wastewater Master Plan recommends the following peak wet weather flow (PWWF) factors.

PWWF is the most important criteria used for hydraulic considerations (for example, collection systems, pumping stations, and treatment processes dependent upon hydraulic loading). The objective of this portion of the study is to estimate the maximum quantity of wastewater generated at buildout. The PWWF used in this planning effort is based peak dry weather flow (PDWF) plus groundwater infiltration, plus rainfall induced inflow/infiltration.

PDWF rates were computed using the following criteria:

Table 4. Peaking Factors for PDWF Rate Determination

Development Type	Average Dry Weather Flow Peaking Factor
Industrial	3.0
Office	3.0
Retail	2.5
Commercial	3.0
Residential	$2.5*(\text{Population}/1000)^{-0.211275}$

The ADWF peaking factor for residential developments was used. 453 dwelling units have an average of 3.3 residents per dwelling unit, resulting in an equivalent population of 1,495 in the development and a peaking factor of 2.4.

The following tables show the determination of average dry weather flow and peak wet weather flow for the Avenues development.

Table 5. Average Dry Weather Flow

Number of Dwelling Units		**Gross Area (acres)**
453		122
	ADWF (gpd)	**119,592**

Table 6. Peak Wet Weather Flow

Source	**PDWF (gpd)**
Residential Development	285,729
Infiltration	5,980
Inflow	48,695
PWWF	**340,404**

Sewer System Capacity Analysis

Based on the location of the above parcel, future wastewater flows from the above project must be discharged to the proposed Corral Hollow sewer system near the intersection of Valpico and Corral Hollow Road (see Figure 1).

As shown in Table 4, the estimated peak wet weather flow from the proposed project is 340,404 gallons per day (0.34 mgd).

The hydraulic capacity was analyzed in 4 phases of sewer sections: Phases 1 and 2 (Node 4W.1 to Manhole 15), Phase 3 (Node 4W to Node 4W.1), Phase 4 (Node 4W.1 to 11W). Figure 1 shows the phases, nodes, and planned future developments.

Corral Hollow Road Parallel Sewer (Phases 1 and 2)

Phase 1 sewer line has been upgraded recently by installing a parallel sewer line from Fieldview Drive to I-205. This upgrade provides approximately 5,000 EDU capacity. City of Tracy will decide on how and when to allocate this capacity to future projects. It should be noted that majority of the future projects will connect upstream (in Phase 2 portion) of the existing Corral Hollow sewer line. Therefore, Phase 2 must be completed before the above capacity can be allocated to any new project proposed south of Fieldview Drive.

Future Phase 2 proposes to install a parallel sewer line from Fieldview Drive to Parkside Drive (node 4W.1). However, the exact timing of this phase is currently unknown.

Upon completion of Phase 2, the parallel sewer will be able to capture 4,753 EDUs with the planned additional flow of 3.55 mgd (WWMP 5.3.2.2). Any future development beyond the above number would be diverted to the Lammers system from node 4W.1 (Parkside and Corral Hollow Road intersection).

Proposed Corral Hollow Road Utility Improvements Sewer Pipeline Design (Phase 3)

City of Tracy is planning to install new gravity sewer lines between Parkside Drive to Tracy Hills. Figure 2 shows a portion of the above gravity sewer line. This section is analyzed assuming it is Phase 3 of the upgrade project. Hydraulic capacity of the proposed gravity sewer along Corral Hollow Road from Peony Drive to Parkside Drive are based on the following:

Table 7. Hydraulic Capacity Along Corral Hollow Road, Phase 3, Node 2W to 4W.1

	From	To	From	To	From	To
Nodes	2W	3W	3W	4W	4W	4W.1
Street Intersecting Corral Hollow Road	Peony Drive	Valpico Road	Valpico Road	Kagehiro Drive	Kagehiro Drive	Parkside Drive
Pipe Diameter	20 inches		21 inches		24 inches	
Slope	0.0120		0.0120		0.0075	
Hydraulic Capacity (mgd)	8.46		11.29		10.87	
Estimated Future PWWF (mgd) without Avenues	7.19		7.99		8.17	

Based on developments that are anticipated to connect to the Phase 3 portion of the proposed Corral Hollow Road sewer line, the estimated future PWWF is 7.19 mgd to 8.17 mgd (mainly from Tracy Hills, Ellis, Kagihiro and other infill projects).

Since PWWF from the proposed Avenues project is 0.34 mgd, the estimated future PWWF and hydraulic capacity is as follows:

Sewer Line	Hydraulic Capacity	Future PWWF (including Avenues)
From Peony Dr to Valpico Road	8.46 mgd	7.53 mgd
From Valpico Road to Kagehiro Dr	11.29 mgd	8.33 mgd
From Kagehiro Dr to Parkside Dr	10.87 mgd	8.51 mgd

Therefore, there is sufficient capacity in the proposed wastewater gravity sewer line along Corral Hollow Road. It should be noted that both Phase 2 and Phase 3 of the Corral Hollow sewer upgrade must be completed for Avenues to connect to the existing Corral Hollow sewer line.

Lammers Road (Phase 4)

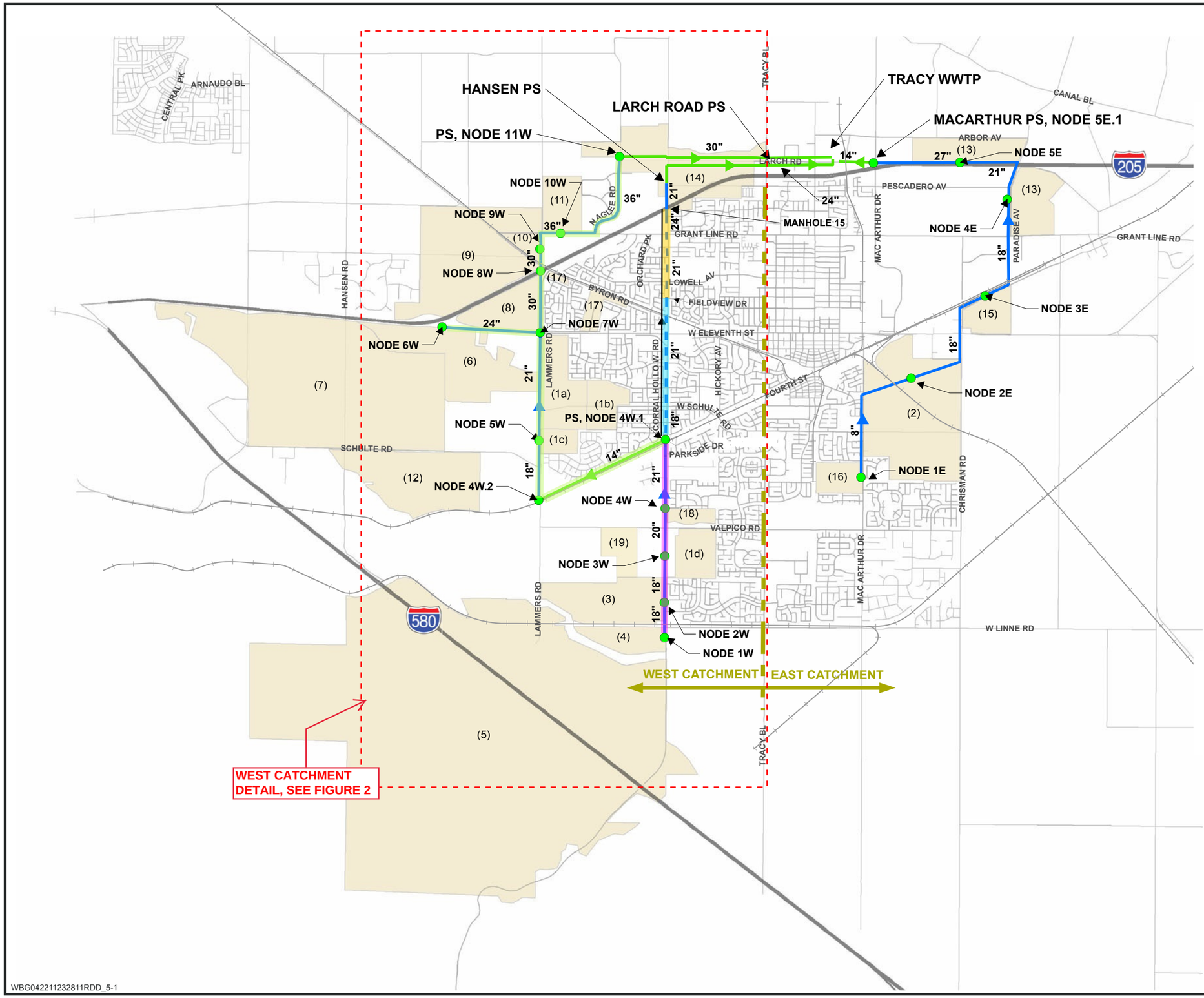
Phase 4 hydraulic analysis was completed from Node 4W.1 to Node 11W (see Figure 1). Using the Tracy Wastewater Master Plan, the planned pipeline diameters were analyzed and no changes are needed to accommodate the additional 0.34 mgd flow from the Avenue development. In other words, sewer line sizes developed during the previous 2012 Master Plan is sufficient to convey additional wastewater flows from the Avenues project.

Reference Documents Used in Analysis

The documents used in the analysis include the following:

1. City of Tracy Wastewater Master Plan, CH2MHILL, 2012

Figures



LEGEND

- Future SOI Projects
- Node # (point of wastewater contribution)
- Proposed Force Main
- Proposed Gravity Main
- Proposed Gravity Main, Parallel Pipe
- Existing Gravity Main
- 18" Pipe Diameter (See pipe schedule)

PROJECT PHASES

- Phase 1
- Phase 2
- Phase 3
- Phase 4

FUTURE SOI PROJECTS INDEX

(1a) UR 5 (Bright)
(1b) UR 7 (Bright)
(1c) UR 8 (Fahmy)
(1d) UR 9 (Keenan)
(2) UR 1 (Alvarez & others)
(3) UR 10 (Ellis)
(4) South Linne
(5) Tracy Hills
(6) Gateway (excluding Phase 1)
(7) Cordes Ranch
(8) Bright
(9) Catellus
(10) Filios
(11) I-205 Expansion
(12) Westside Industrial
(13) Eastside Industrial
(14) Larch Clover
(15) Chrisman Road
(16) Rocha
(17) Berg/Byron
(18) Kagehiro
(19) Avenues

ABBREVIATIONS

EXST	EXISTING
FM	FORCE MAIN
PS	PUMP STATION
WWTP	WASTEWATER TREATMENT PLANT

N

0 0.5 1
Miles

FIGURE 1
MAJOR WASTEWATER CONVEYANCE FACILITIES
CITY OF TRACY WASTEWATER SYSTEM ANALYSIS FOR CORRAL HOLLOW ROAD & LAMMERS ROAD

CH2MHILL®

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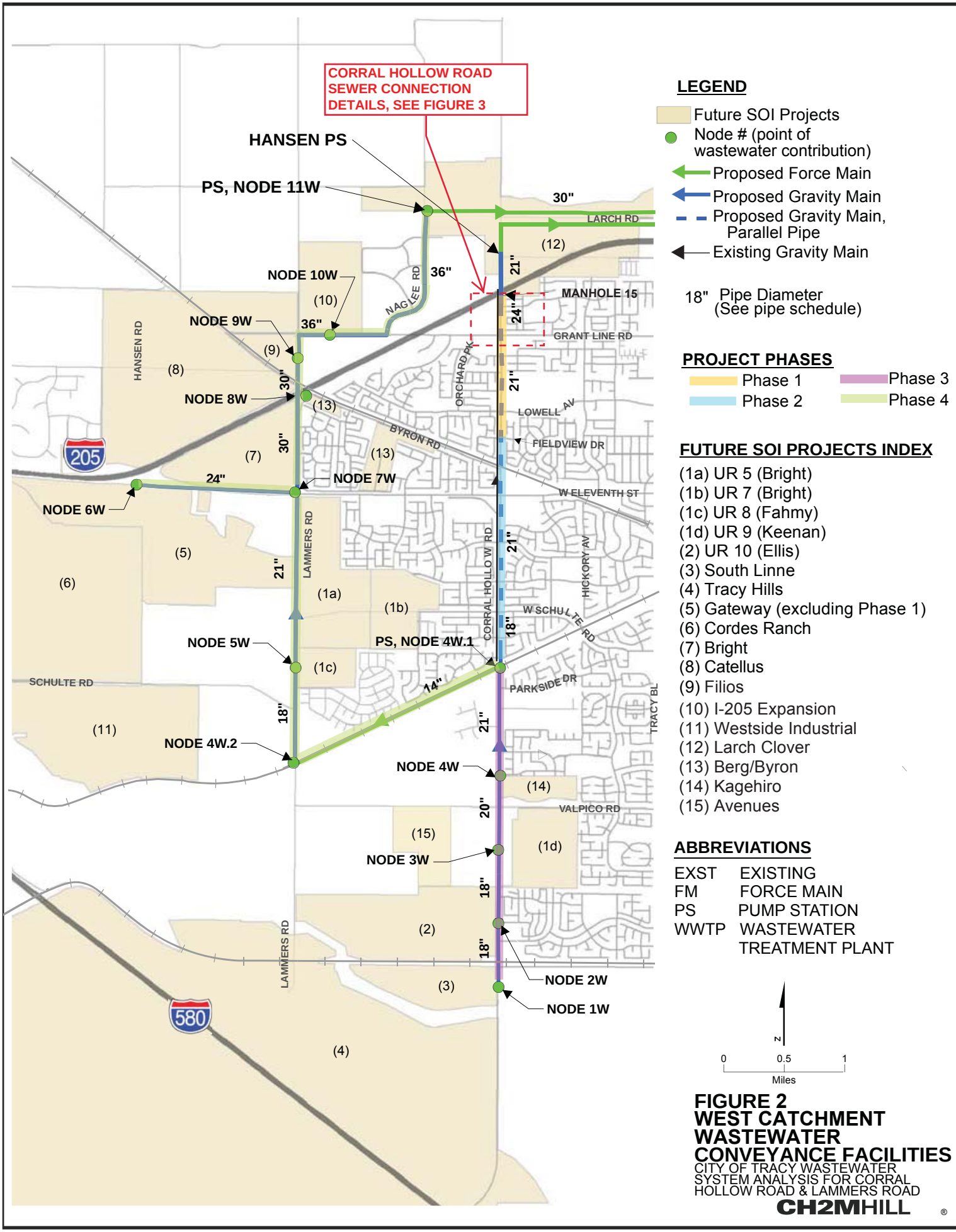

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(15) Avenues

ABBREVIATIONS

EXST	EXISTING
FM	FORCE MAIN
PS	PUMP STATION
WWTP	WASTEWATER TREATMENT PLANT

N

0 0.5 1
Miles

FIGURE 2
WEST CATCHMENT WASTEWATER CONVEYANCE FACILITIES

CITY OF TRACY WASTEWATER SYSTEM ANALYSIS FOR CORRAL HOLLOW ROAD & LAMMERS ROAD

CH2MHILL

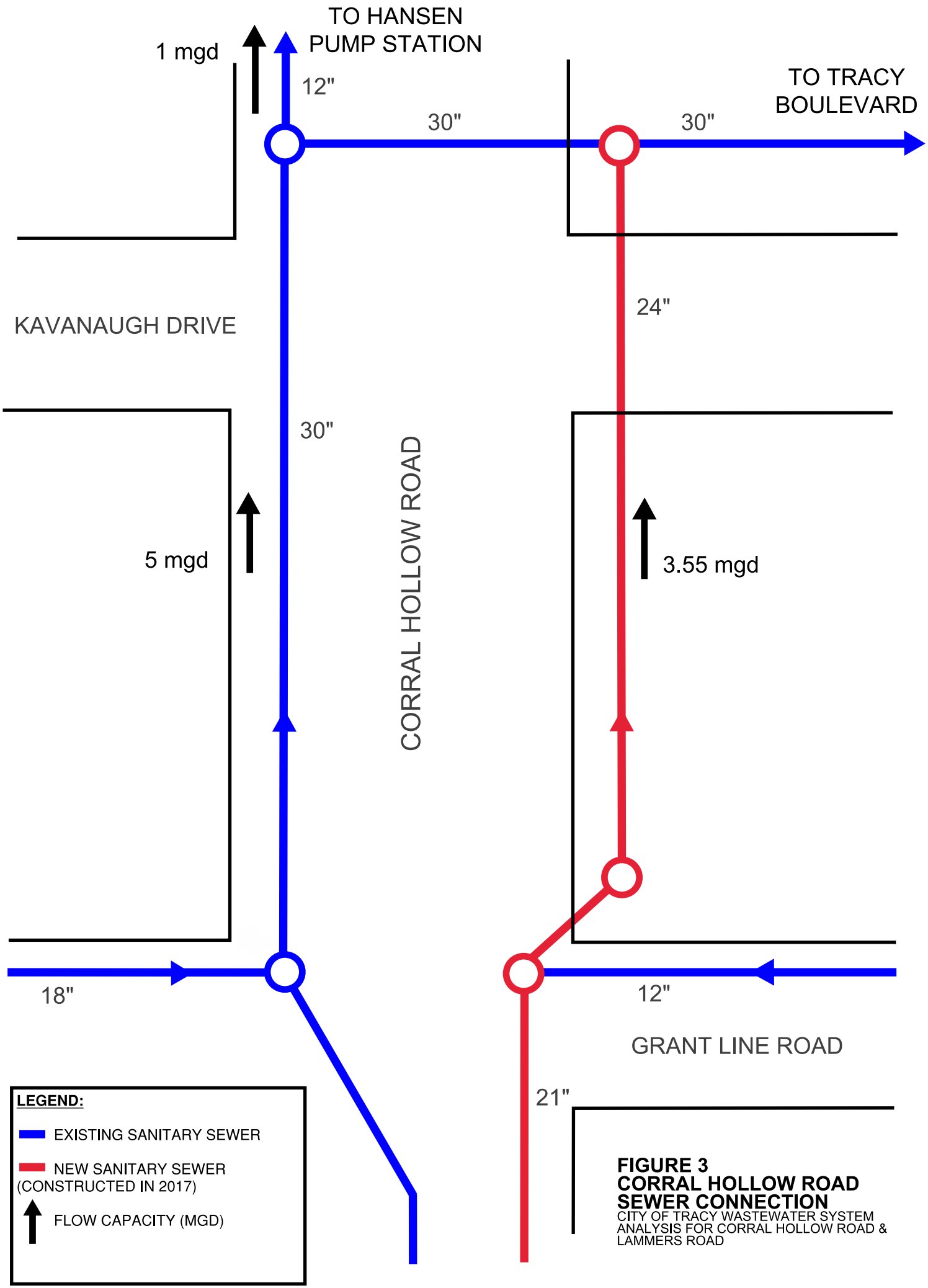

FIGURE 3
CORRAL HOLLOW ROAD
SEWER CONNECTION
CITY OF TRACY WASTEWATER SYSTEM
ANALYSIS FOR CORRAL HOLLOW ROAD &
LAMMERS ROAD