

APPENDICES

to the

DESIGN-BUILD CONTRACT
FOR THE HEADWORKS FACILITY (CPMS NO. 7701)
AT THE
SAN JOSE – SANTA CLARA
REGIONAL WASTEWATER FACILITY

between

THE CITY OF SAN JOSE, CALIFORNIA,
as administering agency of
The Regional Wastewater Facility

and

CH2M HILL Engineers, Inc.

Dated

_____, 2018

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APPENDIX 1
HEADWORKS FACILITY, HEADWORKS FACILITY SITE AND RELATED PROJECTS
DESCRIPTION

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APPENDIX 1

HEADWORKS FACILITY, HEADWORKS FACILITY SITE AND RELATED PROJECTS DESCRIPTION

1.1. PURPOSE

The purpose of this Appendix is to describe the Existing Headworks Facility and the Headworks Facility, show the location and boundaries of the Headworks Facility Site, and identify Related Projects and previous studies, reports and other documents relevant to the Project.

1.2. EXISTING HEADWORKS FACILITY

The San José–Santa Clara Regional Wastewater Facility is an advanced wastewater treatment facility jointly owned by the cities of San José and Santa Clara and operated by the City of San José’s (City) Environmental Services Department (ESD). The RWF serves eight South Bay cities and four special districts including: San José, Santa Clara, Milpitas, Cupertino Sanitary District (Cupertino), West Valley Sanitation District (Campbell, Los Gatos, Monte Sereno, and Saratoga), County Sanitation Districts 2-3 (unincorporated), and Burbank Sanitary District (unincorporated).

The RWF was originally constructed in the 1950s and received various major upgrades in the 1960s, 1970s, 1980s, and 2000s. These upgrades were implemented to increase capacity, meet more stringent discharge requirements, and improve efficiency. In 2014, the City began a 10-year Capital Improvements Program (CIP) to upgrade the aging infrastructure and equipment at the RWF. The Project is one of the major and high priority CIP projects.

The Existing Headworks Facility provides screening and grit removal for raw sewage entering the RWF and consists of two headworks facilities. Existing Headworks 1 (HW1), was originally constructed under two separate contracts, in 1961 and 1970. HW1 includes four single-rake bar screens, two aerated grit chambers, two detritors, screenings and grit handling facilities, and Raw Sewage Pump Station No. 1 (RSPS1). Existing Headworks 2 (HW2), which was commissioned in 2008, consists of three multi-rake bar screens, three vortex grit removal units, screenings and grit handling facilities, and Raw Sewage Pump Station No. 2 (RSPS 2). HW1 is currently used as the duty headworks facility, while HW2 is used as a backup headworks facility and provides extra capacity during wet weather flows. Effluent from HW1 and HW2 is pumped to the primary treatment facilities.

Figure 1-1 shows the RWF major treatment processes with existing HW1 and HW2 located on the western side of the site. The existing influent conveyance and preliminary treatment facilities are shown in **Figure 1-2**. An enlarged site plan of the area around the headworks facilities, including electrical duct banks, is provided in **Figure 1-3**. A process flow diagram of the influent conveyance and preliminary treatment facilities is provided in **Figure 1-4**.

As shown by the dashed line in **Figure 1-2**, there is an environmentally sensitive drainage area located between the Emergency Basin Overflow Structure (EBOS) and the HW2 area. The existing 120-inch pipeline between EBOS and HW2 runs through this drainage feature. Any work within the footprint of the drainage feature will be subject to environmental permitting requirements that will not be in place prior to completion of the Preliminary Services Period. Therefore, no work can occur in this area prior to completion of the Preliminary Services. There is also the potential for burrowing owls to nest in the area near EBOS and the Emergency Basin, where new pipelines are proposed. Any work in this area must be in compliance with the Santa Clara Valley Habitat Conservation Plan.

Figure 1-1 RWF Site Plan – Major Treatment Processes

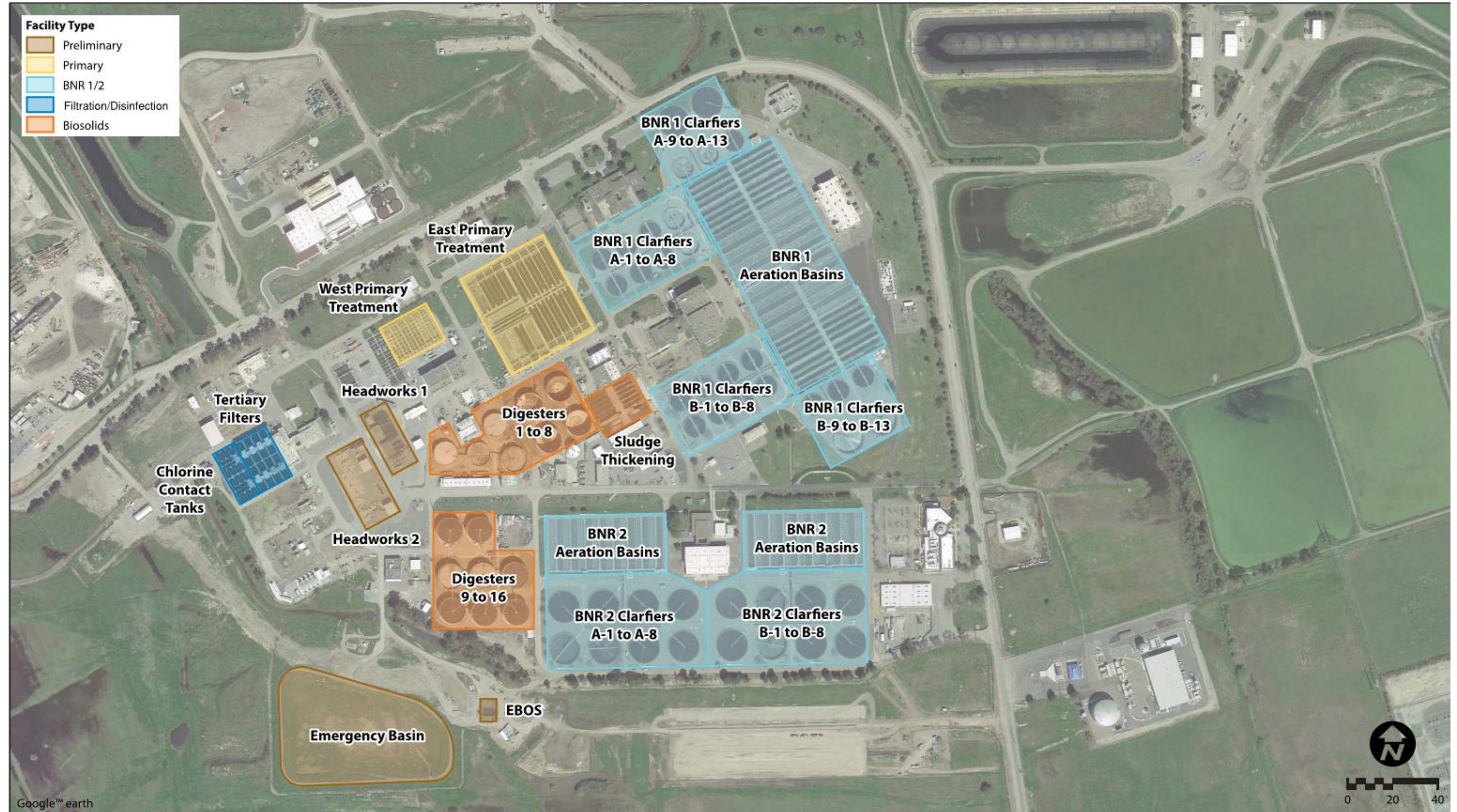
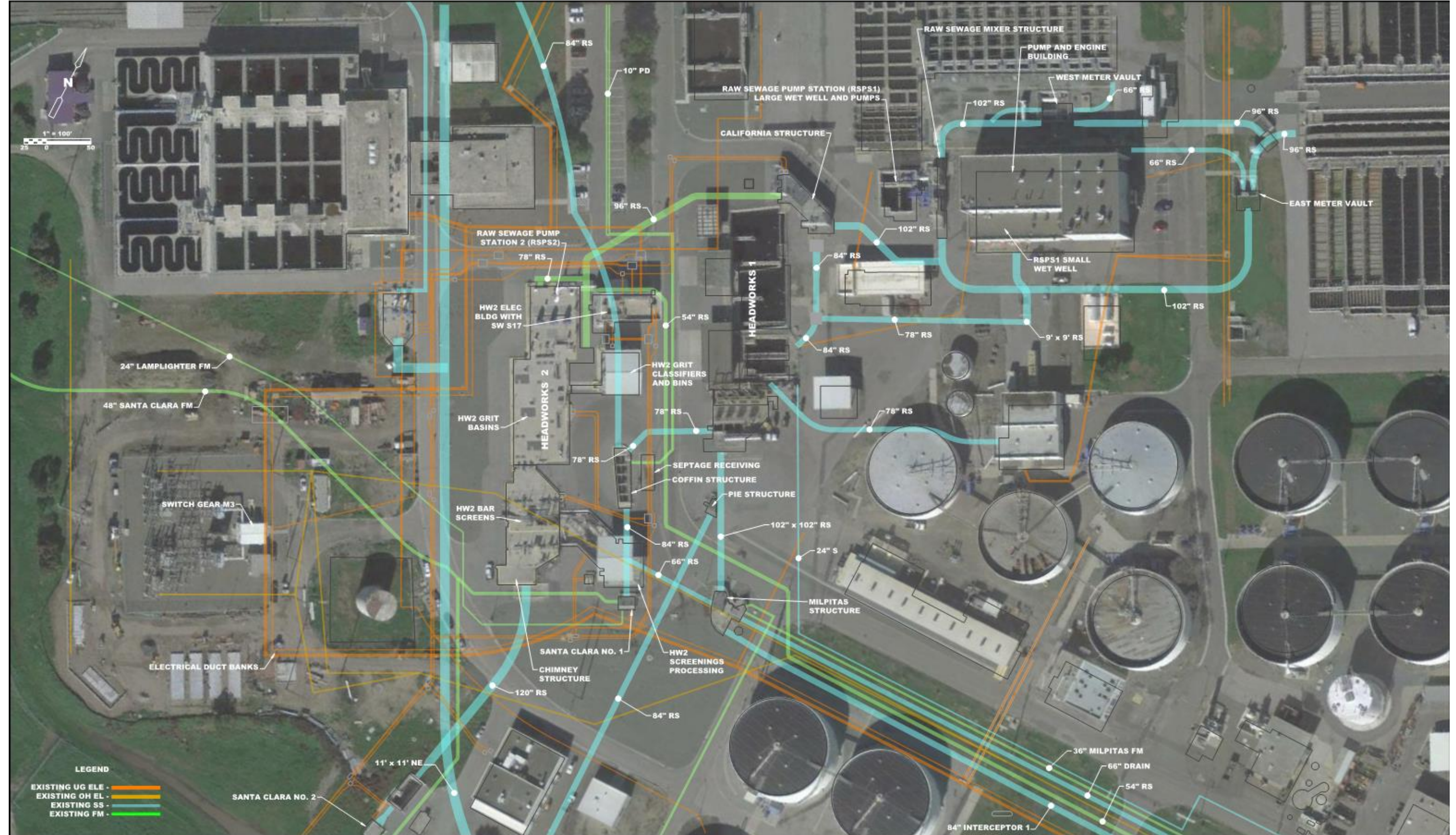


Figure 1-2 RWF Site Plan – Existing Influent Conveyance and Preliminary Treatment Facilities

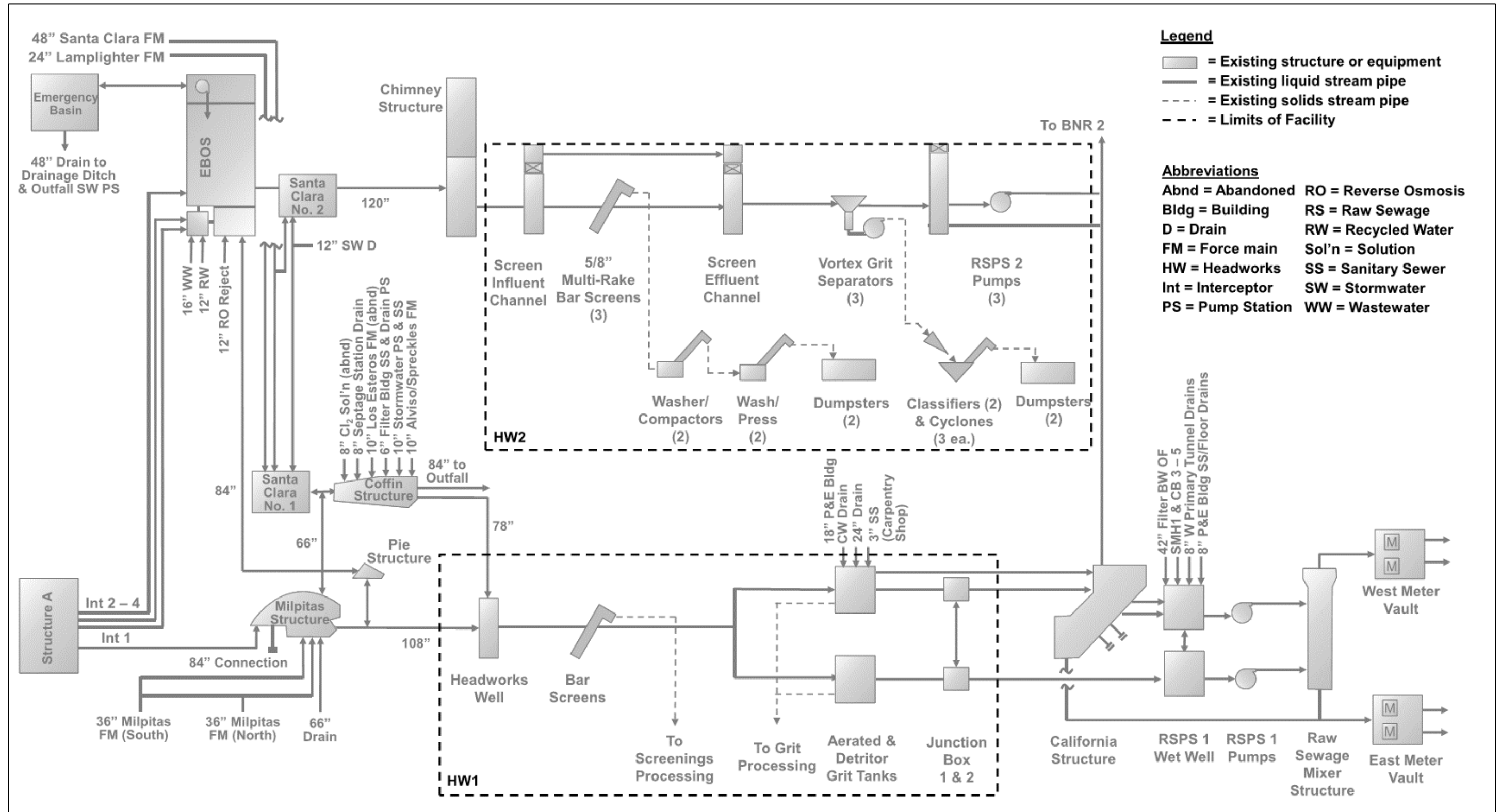


Figure 1-3 Enlarged RWF Site Plan – Existing Influent Conveyance Pipelines and Structures, Preliminary Treatment Facilities, and Electrical Duct Banks



DRAFT--Contact the Office of the City Clerk at (408) 535-1260 or CityClerk@sanjoseca.gov for final document.

Figure 1-4 Process Flow Diagram – RWF Influent Conveyance and Preliminary Treatment Facilities



1.2.1 Influent Conveyance Facilities.

Raw sewage is conveyed to the RWF through a network of gravity interceptors, force mains, and junction structures, as shown in the previous figures and described below:

- Gravity Interceptors – Four 84-inch gravity interceptor pipelines (Interceptors 1 – 4) run north beneath Zanker Road from the City of San José’s collection system to the RWF. These interceptors carry approximately 78% of the influent flows to the RWF. At the southern border of the RWF, Interceptors 2, 3, and 4 turn west, run along the southern border of the RWF, and discharge into the EBOS. Interceptor 1 runs further north under Zanker Road, turns west near the middle of the RWF site, runs west through the site, and discharges into the Milpitas Structure. The City’s collection system, including the four interceptors, is operated and maintained by the City’s Department of Transportation (DOT) and Department of Public Works (DPW) up to the influent structures.
- Santa Clara Force Main – The 48-inch Santa Clara force main enters the west side of the RWF and continues into the site towards HW2 where it discharges into Santa Clara Structure Number 1 and/or Number 2.
- Lamplighter Force Main – The 24-inch Lamplighter force main enters the west side of the RWF, just north of the Santa Clara Force Main. The force main runs toward the inlet to HW2, alongside the Santa Clara Force Main, and discharges into Santa Clara Structure Number 1.
- Milpitas Force Mains – There are two 36-inch Milpitas force mains that enter the east side of the RWF. The force mains connect into a common header that runs along Zanker Road, which splits into two 36-inch branches. One branch runs through the center of the RWF alongside Interceptor 1 and discharges into the Milpitas Structure. The other branch runs along the south side of the RWF, past EBOS, and then turns north, running past the Digesters and discharging into the Milpitas Structure.
- Supernatant/Drain Line – There is a 30-inch supernatant pipe that enters the RWF site from the northeast corner of the site. The pipe, which conveys supernatant from the storage lagoons and drying beds, runs south along Zanker Road, where it connects to a 66-inch drain line. The 66-inch drain line runs through the center of the site, alongside Interceptor 1, and discharges into the Milpitas Structure.

- Junction Structures – The following junction structures receive flow from the pipelines described above and direct the combined flow to HW1 and/or HW2:
 - Structure A – This structure is part of the City’s collection system and is located near the intersection of Zanker Road and Tasman Road about one mile south of the RWF. This structure receives flow from upstream structures in the collection system and directs it through Interceptors 1 – 4 to the RWF.
 - EBOS – This facility receives flow from Interceptors 2 – 4 and directs it to either: 1) HW1 via an 84-inch pipe, 2) HW2 via a 120-inch pipe, or 3) to the Emergency Basin via a 96-inch pipe.
 - Milpitas Structure – This structure receives flow from Interceptor 1, the two Milpitas Force Mains, and the 66-inch Drain Line. The structure conveys the flow into either: 1) a 108-inch pipe that directs flow to HW1, or 2) a 66-inch pipe that directs flow toward the Influent Overflow Junction Structure (also known as the “Coffin” structure due to its shape).
 - Intertie Junction (or “Pie”) Structure – When HW1 is in operation, this structure receives flow from EBOS and conveys it to HW1 through the 108-inch pipe from the Milpitas structure. When HW1 is offline, this structure receives flow from the Milpitas structure and conveys it to EBOS.
 - Influent Overflow Junction (or “Coffin”) Structure – This structure receives flow from Santa Clara Structure #1, other miscellaneous force mains, and recycle flows and conveys it either to HW1 or the Pie Structure. The Coffin Structure has an overflow weir, which allows discharge to the effluent slough (no longer used due to permit requirements).
 - Santa Clara Structure #1 – This structure receives flow from the Santa Clara Force Main and the Lamplighter Force Main and conveys it to the Coffin Structure or the Milpitas Structure.
 - Santa Clara Structure #2 – This structure receives flow from the Santa Clara Force Main and conveys it into the pipeline between EBOS and HW2.
 - “Chimney Structure” – This structure is part of HW2 and is a chimney-shaped vertical shaft which receives flow from the 120-inch pipe from EBOS and conveys it to the HW2 screen channels. This vertical shaft is needed because the 120-inch pipe

discharges into the Chimney Structure at an elevation approximately 25 feet below the bottom of the HW2 screen channels. The pipe discharges into the structure at this elevation because when it was constructed it needed to be installed below the existing 11-foot x 11-foot rectangular Nitrified Effluent conduit which runs past HW2.

- Septage Receiving Station – Tanker trucks carrying septage use the Septage Receiving Station to discharge their contents into the headworks facilities at the RWF. The station consists of a concrete truck pad with an opening in it and a sump below the opening. Septage is discharged into the sump through the opening in the pad. Septage is conveyed from the sump to into the Coffin Structure through an 8-inch pipe. A second, similar, septage discharge facility is located immediately adjacent to the HW1 bar screens inlet well.

1.2.2 Existing Headworks Facility.

HW1 and HW2 have a combined capacity of 400 million gallons per day (mgd). The facilities can be operated individually or in parallel.

HW1 is currently used as the duty headworks facility and is typically the only headworks in operation during dry weather flows. HW1 consists of the following components:

- Four single-rake climber bar screens with 5/8-inch openings
- Two aerated grit tanks
- Two grit detritor tanks
- A screenings handling facility, which consists of a belt conveyor and a screenings press.
- Grit Handling Facility, which consists of two screw conveyors, two grit washer-conveyors, and three grit pumps, each with 150 gallon per minute (gpm) capacity.
- RSPS1, which accepts flow from Junction Box 2 or from the California Structure. RSPS1 includes one large and one small wet well, connected by a 60-inch pipe. Three pumps are designated for use for flows exiting the large wet well, and four pumps for flows exiting the small wet well. The seven pumps have capacities ranging from 23,610 gpm to 83,310 gpm.

- Piping from HW1 to the Raw Sewage Flow Distribution (or “California” Structure) – Flows from HW1 enter the California Structure through a 84-inch raw sewage pipe connected to the Detritor tanks and through a 108-inch pipe from Junction Box 1.

HW2 can be used as a backup headworks during dry weather conditions, while HW1 is down for maintenance, or it can be brought online during wet weather conditions to provide additional capacity. HW2 consists of the following components:

- Three multi-rake bar screens with 5/8-inch openings.
- Three 32-foot diameter vortex grit removal basins with grit slurry pumps located in the basement below the vortex grit basins.
- A screenings handling facility, which consists of a sluice, two screenings washer-compactors, two shaftless screw conveyors, and two dumpsters
- A grit handling facility, which consists of three dual cyclones with grit classifiers and three tilt bins.
- RSPS2, which consists of a wet well and three variable speed-driven pumps with a capacity of 55,550 gpm, each. The wet well is connected to the California Structure by a 96-inch pipe.
- Piping from HW2 to the California Structure – Flows from HW2 can either flow by gravity or be pumped into the California Structure.

1.2.3 Electrical & Instrumentation Control Systems.

The electrical one-line diagram for the major power distribution at the RWF is presented in **Figure 1-5** and the Control System Diagram for HW2 is presented in **Figure 1-6**.

Power for the site loops through Switchgear M3 located on the west side of the RWF site. Switchgears M3 and M5 provide power to Switchgear S17, which in turns powers the variable frequency drives (VFDs) and motor control centers (MCCs) for HW2. 4160 Volt (V) Switchgear S17 and the VFDs and MCCs for HW2 are housed within the Electrical Building located just to the east of RSPS2. Provisions for main and bypass starters for four future raw sewage pumps are located in Switchgear S17. Floor space was also allocated within the Electrical Building for four future 4160V raw sewage pump VFDs and a 480V MCC for future equipment.

In addition to the duct banks running between Switchgear M3 and S17, there are also major duct banks running between Switchgear M3 and M1, which is located northeast of HW1 and HW2, and between Switchgear M3 and M5, which is located east of HW1 and HW2.

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Figure 1-5 RWF Electrical Single Line Diagram

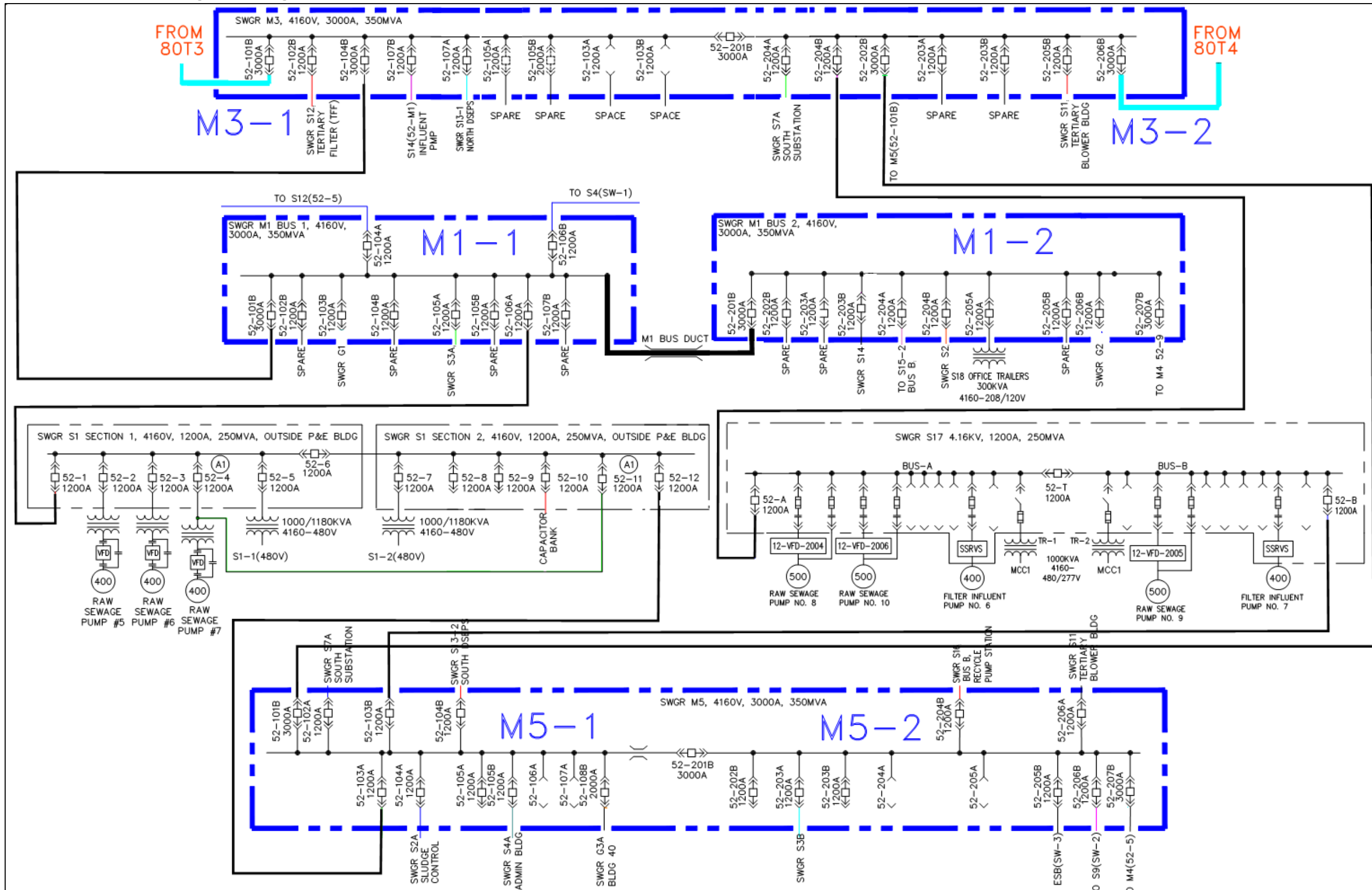
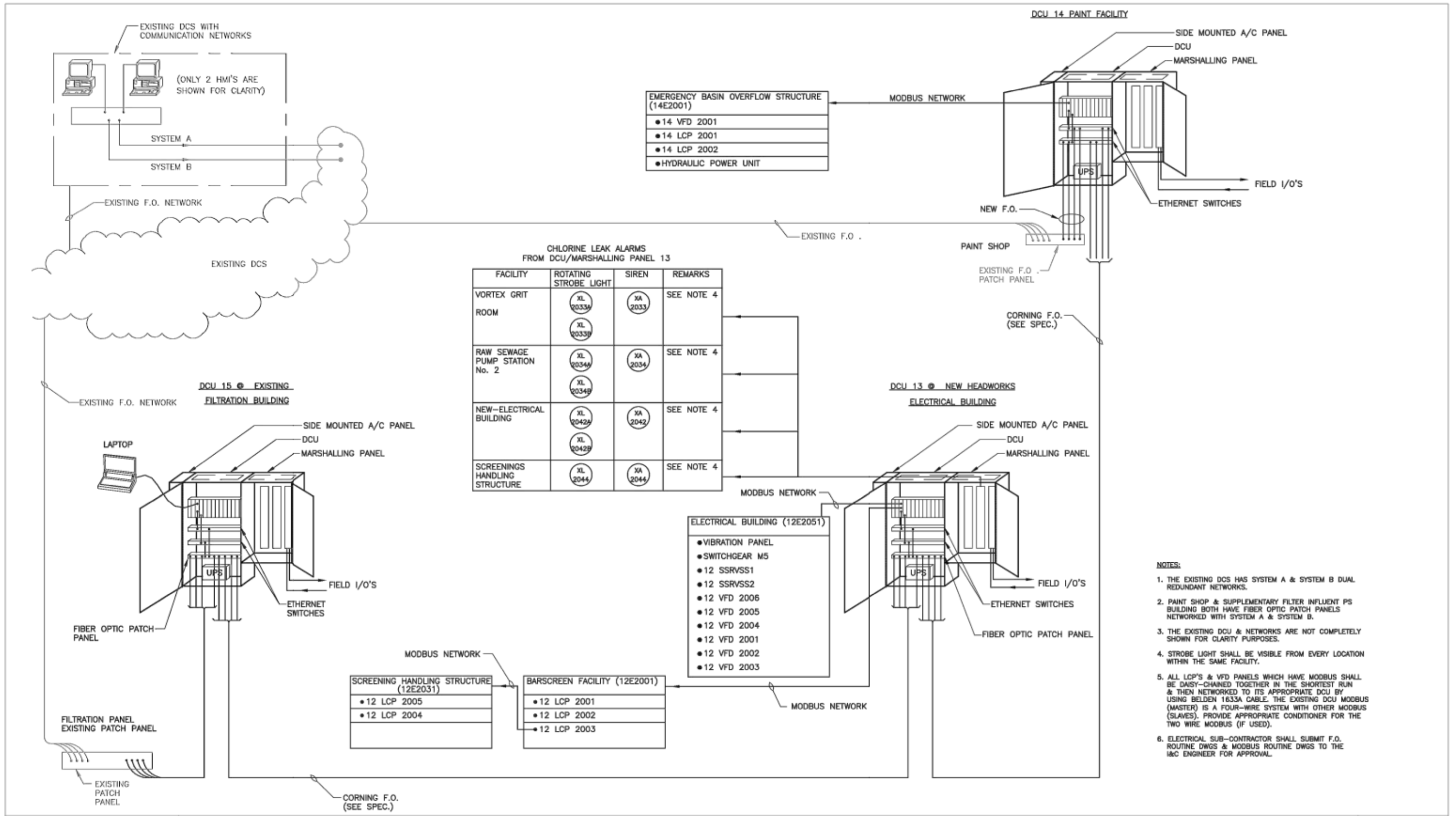


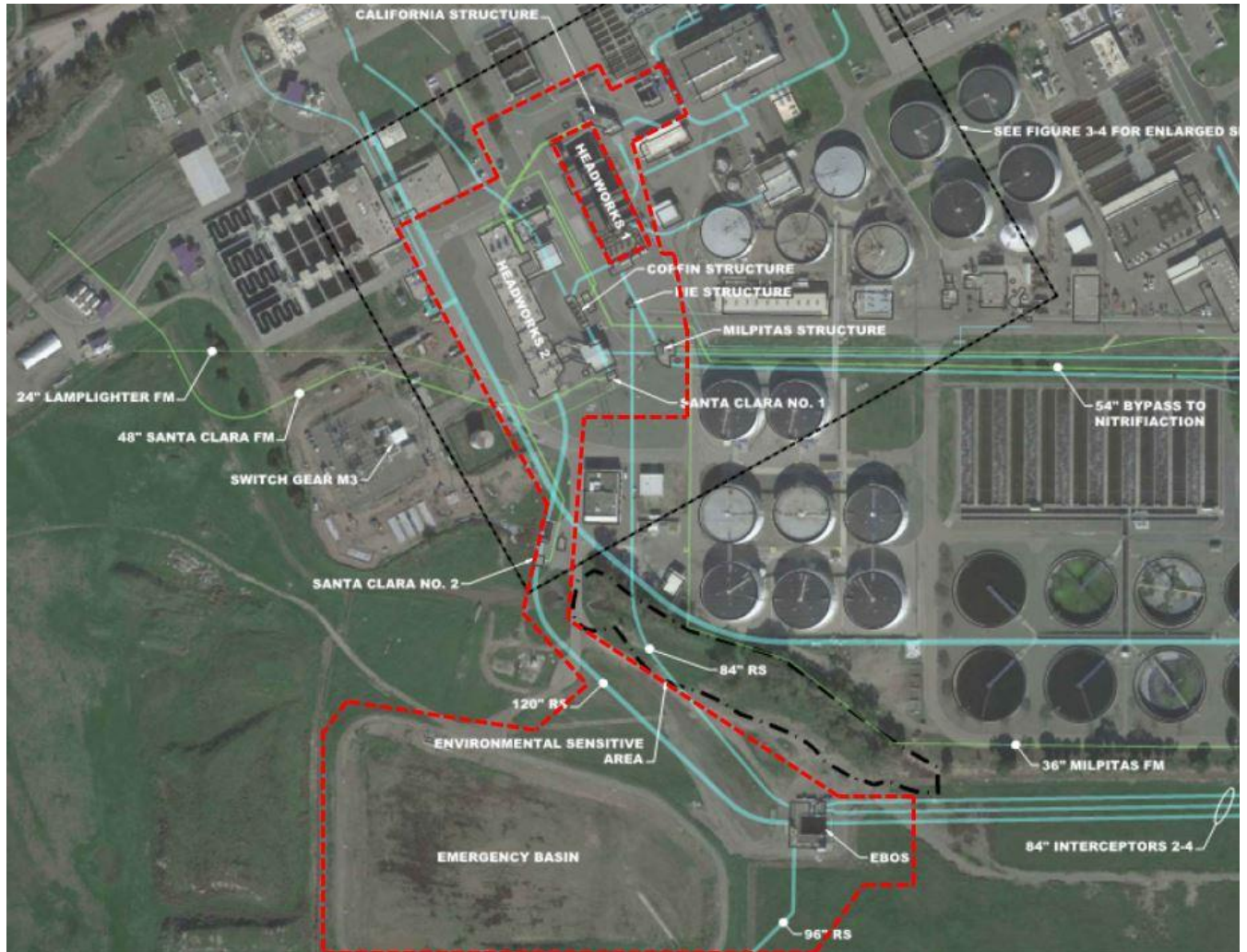
Figure 1-6 RWF Control System Diagram



1.3. HEADWORKS FACILITY SITE

The Regional Wastewater Facility is located at 700 Los Esteros Road, San Jose, California. The Headworks Facility Site is outlined by the dashed red line in **Figure 1-7** below. The Headworks Facility Site excludes the area surrounding Headworks 1 as this part of the facility will be excluded from the Project, and also excludes, prior to obtaining necessary environmental permits, the environmentally sensitive drainage area located between the Emergency Basin Overflow Structure (EBOS) and the HW2 area. **[Note: The Design-Builder has identified an alternative site which will be evaluated as part of the Preliminary Services. In the event the City and the Design-Builder determine to move the Headworks Facility to the alternative site, the parties will enter into a Contract Administration Memorandum pursuant to Section 18.6 of this Design-Build Contract, whereby this Appendix 1 and other applicable section(s) of this Design-Build Contract will be modified, and the description of the Headworks Facility and the Headworks Facility Site will be updated accordingly. The ultimate Headworks Facility Site description will be further developed as part of the Preliminary Services, and all changes shall be memorialized in the Definitive Contract Amendment.]**

Figure 1-7 Headworks Facility Site



1.4. PROPOSED HEADWORKS FACILITY

Since the commissioning of HW2, several condition and operational assessments have been conducted on the Headworks Facility. As a result of these studies, the City has determined that HW1 should be removed from service and a new HW3 should be constructed.

The Headworks Project will consist of the new HW3, improvements to HW2 to improve reliability and functionality, and improvements and expansions to the influent conveyance piping and junction structures. As currently envisioned, HW3 will serve as the duty headworks and HW2 will operate as the wet-weather and backup headworks. HW3 will be situated adjacent to and on the west side of HW2. The new HW3 will include raw sewage screening,

screenings processing, grit removal, grit processing, raw sewage pumping, and an odor control system. HW1 will be abandoned in place and all influent piping, recycle piping, drain piping, and stormwater piping currently directed to HW1 will be re-routed to HW2 and HW3.

1.4.1 Indicative Design.

The Indicative Design presented in this section, is excerpted from the complete Indicative Design that has been provided in the PDR. The Indicative Design outlines the baseline concept and scope of the Project that was developed during the planning stages of the Project to assist in obtaining environmental permits and funding approval. The Indicative Design should be used as guidance, but it is not intended to prescribe to the Design-Builder the final design of the Project. The BDR and the final design for the Project will be developed by the Design-Builder by advancing the Indicative Design to incorporate the results of the Design-Builder's preliminary investigations (e.g. condition assessments, geotechnical investigations, grit sampling, etc.) and to address changes made subsequent to the completion of the Indicative Design.

Figures 1-8, 1-9, and 1-10 present the overall site plan, enlarged site plan, and process flow diagram for the Indicative Design. As shown in the figures, the Indicative Design includes construction of HW3 adjacent to the existing HW2, modifications to HW2, modifications to EBOS, and installation of several new pipelines which are needed to route flows into and out of HW2 and HW3. The Indicative Design also includes improvements to the Emergency Basin, a new odor control system, electrical system improvements, and other miscellaneous improvements.

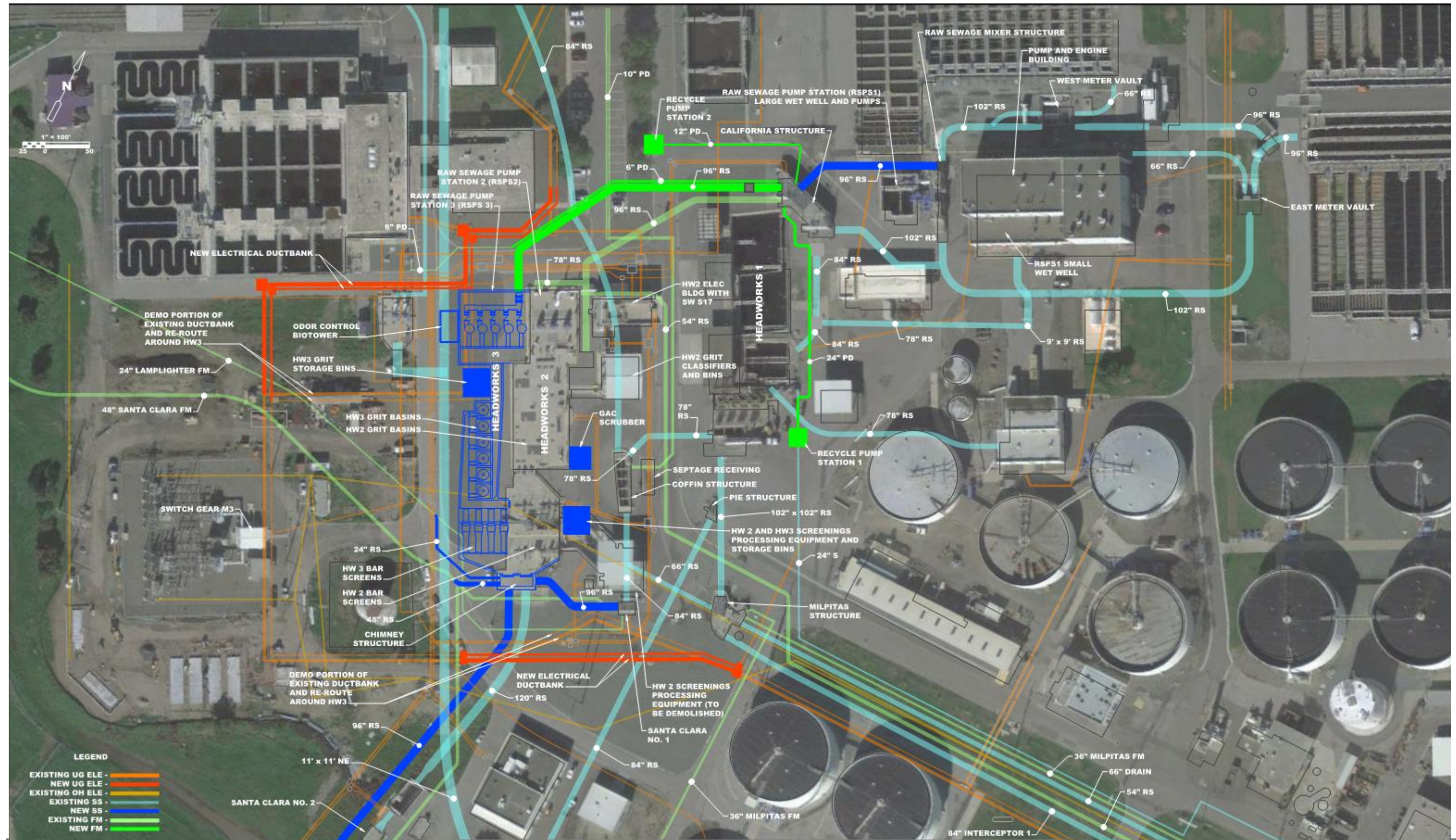
Several alternative locations were considered for HW3 during the Alternative Analysis Phase of the Project. Based on evaluations of these alternative locations, the City has selected the location shown in **Figures 1-8 and 1-9** as the location for HW3. The Design-Builder will assume that this is the location to be used for the new HW3 unless significant financial, technical, or constructability concerns are identified that may cause the Design-Builder to recommend to the City that this decision be revisited.

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Figure 1-8 RWF Site Plan – Indicative Design of Influent Conveyance and Preliminary Treatment Improvements

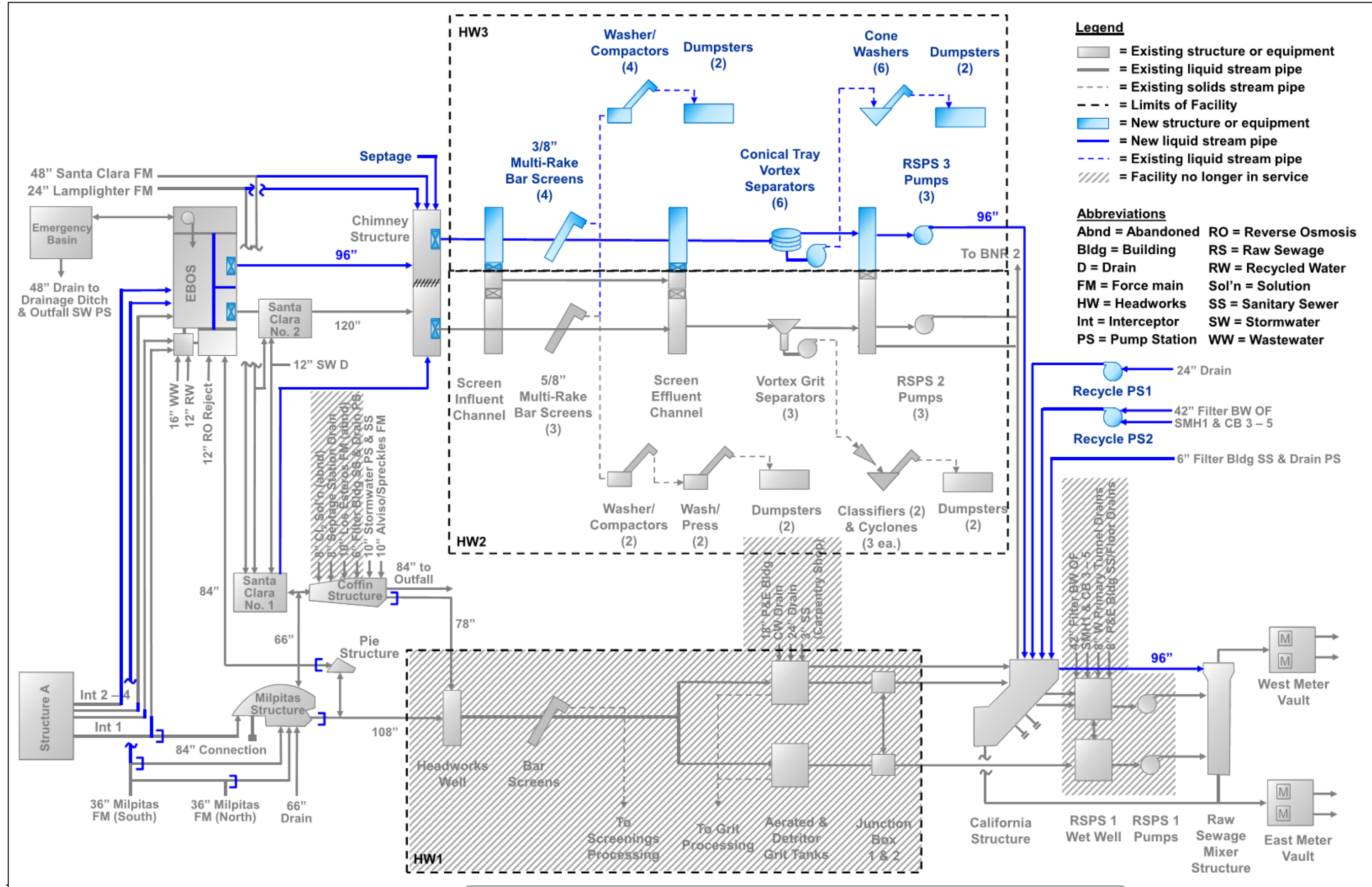


Figure 1-9 Enlarged RWF Site Plan – Indicative Design of Influent Conveyance and Preliminary Treatment Improvements



DRAFT--Contact the Office of the City Clerk at (408) 535-1260 or CityClerk@sanjoseca.gov for final document.

Figure 1-10 RWF Process Flow Diagram – Indicative Design of Influent Conveyance and Preliminary Treatment Improvement



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Subsequent to the development of the Indicative Design, the following changes have been made by the City:

1. The 2040 Extreme Peak Hour Wet Weather Flow (EPHWWF) rate has been increased to be 396-mgd.
2. The combined HW2/HW3 complex will be designed to treat the entire 396 mgd.
3. Improvements to the EBOS and Emergency Basin will still be implemented, however, raw sewage influent flows will not be equalized prior to the Headworks.
4. The combined HW2/HW3 complex will be operated as a single unit with N+1 redundancy. The Indicative Design uses an N+2 redundancy concept and presumes that HW2 and HW3 are operated independently of each other.
5. Interceptor 1 will not be realigned to discharge to EBOS but will remain in its current configuration and continue to discharge to the Milpitas Structure. With this change, no work is required upstream of EBOS or upstream of the Milpitas Structure.
6. Metering of raw sewage will occur upstream of influent pumping to facilitate operations by avoiding spikes in the meter readings due to pumps turning on and off.

While advancing the design to incorporate these changes, the Design Builder will need to work within the following constraints:

- Once HW3 is online, HW1 will be decommissioned and will no longer be used. Decommissioning and demolition of HW1 is not a part of this project.
- HW2 will remain operational and will be used in one of two ways: 1) HW2 shall be brought online during wet weather conditions, or 2) HW2 will be operated in parallel with HW3.
- A minimum of 4.5 feet of freeboard (equivalent to a maximum water surface elevation of 11.83 feet on the NAVD 88 datum) must be maintained at Structure A under all flow conditions
- The minimum water surface elevation in the RSPS2 wet well must be maintained to sustain proper functioning of the HW2 facilities

- Improvements will be made to EBOS to minimize grit deposition in the structure during dry weather conditions
- No raw sewage will be discharged from the RWF to any receiving waters.
- All sewage may be screened and de-gritted prior to pumping.
- There will be no adverse noise or odor impacts to the future commercial development planned for the area south of EBOS
- Construction of this Project will not adversely impact construction of other projects occurring at the RWF
- Interconnection of new facilities with existing facilities and temporary shutdown of existing facilities will be done in conformance with City requirements
- Construction will be performed in compliance with all environmental permitting requirements.

1.5. RELATED PROJECTS AND BACKGROUND STUDIES AND INFORMATION

The Project is part of the overall CIP established to rebuild and revitalize the RWF. A number of studies, tasks, plans and projects under the CIP will have bearing on the Project. The following lists the studies, tasks, plans and projects that potentially will interface with the Project. The following is provided for reference and shall not limit or excuse the Design-Builder’s performance of the Contract Services.

1.5.1 Related Projects.

The table below contains a list of Related Projects with which the Design-Builder will need to coordinate during the Preliminary Services Period (including any Early Work Packages) and Design-Build Period.

Related Projects	
1	Headworks Critical Improvements Project – Coordinate with new improvements to HW2 facilities
2	Digester and Thickener Facilities Upgrade – Adjacent construction
3	Facility Wide Water Systems Improvements – Identify battery limit for new water line to HW
4	Digested Sludge Dewatering Facility – Coordinate on location of new centrate pipeline
5	Filter Rehabilitation – Coordinate on location of new filter backwash pipeline
6	Yard Piping and Road Improvements – Adjacent construction

1.5.2 Background Studies and Information.

The following memoranda, studies, plans, specifications and data have been provided separately by the City to the Design-Builder as background information related to the Project.

Previous Studies		
1	RWF Flow Management Study (San Jose CIP)	Jul-17
2	Final Report on Alternatives Analysis - 2 volumes, 10 memorandums (CDM Smith)	Jan-17
3	Final Flood Protection Summary Report (San Jose CIP)	Apr-16
4	Final Flood Protection Alternatives (San Jose CIP)	Apr-16
5	Flood Protection Study Internal Stormwater Drainage System Report (San Jose CIP)	Dec-15
6	Flood Protection Study Data Review and Existing Conditions Summary Report (SJ CIP)	Oct-15
7	Odor and Corrosion Control Study (CH2M Hill)	Aug-15
8	Yard Piping Risk-Based Condition Assessment Plan (Black & Veatch)	Jun-15
9	Grit Characterization Study (AECOM)	Jun-15
10	Strategic Heating and Cooling Plan (B&C)	May-15
11	Summary of Existing and Preliminary Future Heating and Cooling Systems Demand and Supply (B&C)	Apr-15
12	Yard Piping Risk Analysis Technical Memorandum (Black & Veatch)	Mar-15
13	Process Risk Assessment Technical Memorandum and Risk Management Framework (San Jose CIP)	Jan-15
14	Headworks Expansion Feasibility and Operational Review (AECOM)	Apr-14
15	The Plant Master Plan (City of San Jose)	Nov-13
16	Geotechnical Study for the Phase 1 Headworks Enhancement Project (Fugro)	Dec-11
17	PM 3.5 Capacity Rating of Existing Facilities (Carollo)	Nov-09
18	PM 3.4 Master Plan Design/ Standby Criteria (Carollo)	Jul-09
19	Headworks Condition Assessment Project (Carollo)	Jul-09
20	PM 3.8 Projected Wastewater Flows and Characteristics (Carollo)	Jul-09
21	Sanitary Sewer Master Plan Capacity Assessment (RMC, MWH, B&C)	Oct-04
22	Sanitary Sewer Master Plan Capacity Assessment Phase II and Update of Phase 1 (RMC)	Oct-04
23	Geotechnical Engineering Report for the Wet Weather Reliability Project (URS)	Nov-03
Previous Plans & Specifications		
1	Headworks Enhancement Project - Phase 1 (Carollo)	Nov-12
2	WPCP Reliability Improvements Project (Carollo)	Apr-05
3	Headworks Redundancy Modifications Project - Phase III Specifications (CH2M Hill)	Dec-95
4	Headworks Redundancy Modifications Project - Phase III Plans (CH2M Hill)	Sep-94

5	Construction of Fourth Interceptor Phase III and IIIA (JMM)	May-92
6	Construction of the Route 237 Zanker Rd Interceptor Relocation (JMM)	Apr-92
7	Construction of Phase II of the Fourth Major Interceptor (JMM)	Apr-89
8	Construction of Phase 1A of the 60-inch RCP Replacement Interceptor (JMM)	Apr-89
9	Fourth Major Interceptor Phase I (JMM)	Feb-88
10	Influent Screening Facilities Plans	Apr-85
11	Influent Screening Facilities Specifications	Apr-85
12	Primary and Secondary Treatment Additions Division B Plans (CTA)	Oct-70
13	Primary and Secondary Treatment Additions Division Specifications (CTA)	Oct-70
14	Sewage Treatment Works Improvements Division D Plans and Specifications (CTA)	Oct-61
Plant Performance Data		
1	SJ/SC RWF 2016 Annual Self-Monitoring Report	Dec-16

1.6. HEADWORKS FACILITY SITE ACCESS AND SECURITY

Primary access to the Headworks Facility Site shall be from Zanker Road via a secure gate located on the southeastern side of the Headworks Facility Site. See **Figure 1-8** for the location of the Construction Enabling Site that will be used for Contractor trailers and laydown areas. Secondary access to the site shall be via the main gate for the RWF that is located off of Los Esteros Road.