HARMONY GROVE VILLAGE SOUTH

APPENDIX Q

SEWER MASTER PLAN

for the

FINAL ENVIRONMENTAL IMPACT REPORT

PDS2015-GPA-15-002
PDS2015-SP-15-002
PDS-REZ-15-003
PDS2018-TM-5626
PDS2015-MUP-15-008
Log No.: PDS2015-ER-15-08-006

JULY 2018

Prepared for:
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HARMONY GROVE VILLAGE SOUTH
SEWER MASTER PLAN

April 2017

4-10-17

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TABLE OF CONTENTS

PAGE NO.

TABLE OF CONTENTS

PAGE NO.

LIST OF TABLES

PAGE NO.

LIST OF FIGURES

PAGE NO.

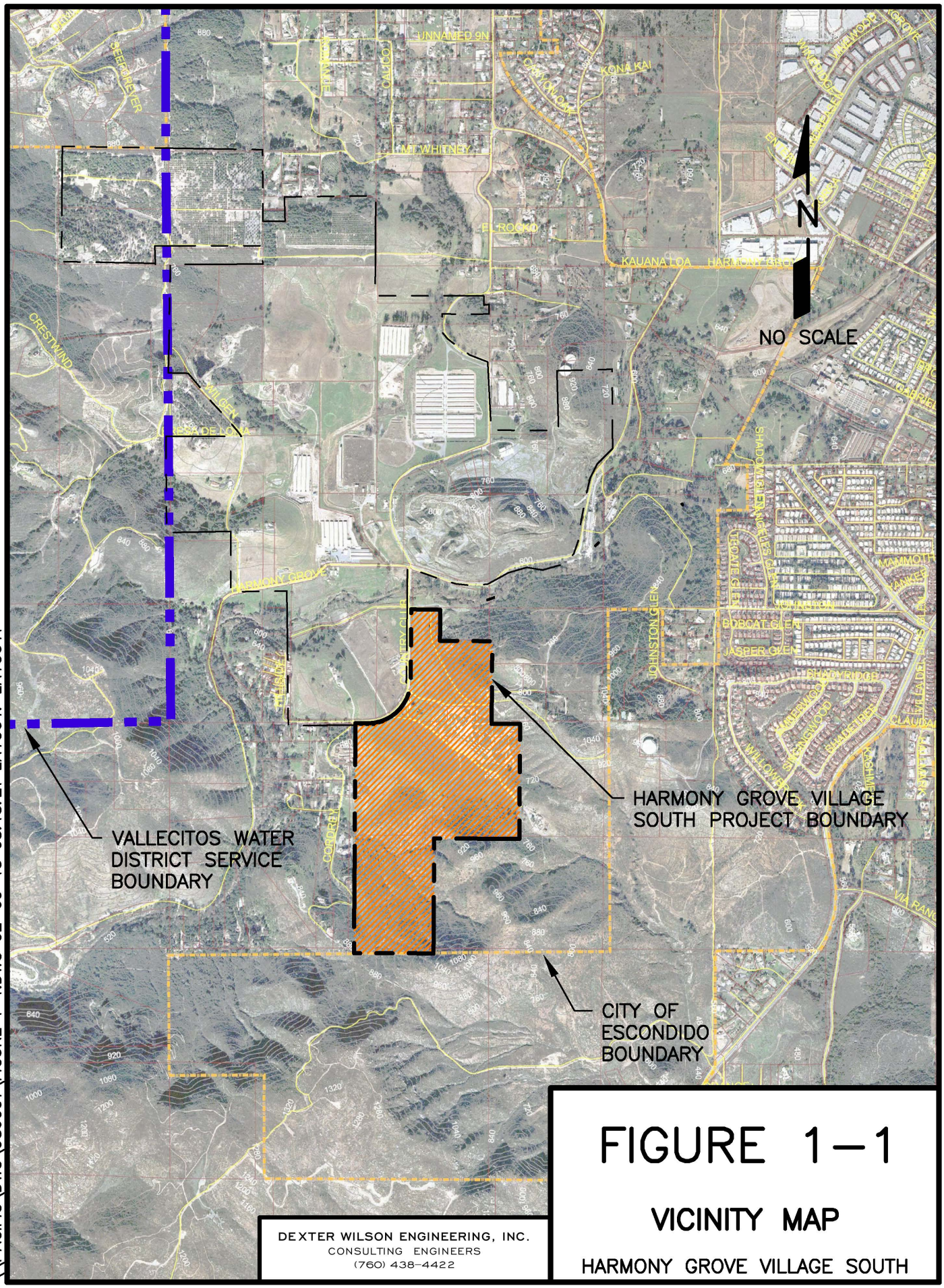
CHAPTER 1

SEWER DRAINAGE BASIN AND SERVICE AREA

This report provides a sewer master plan for the proposed Harmony Grove Village South Project. The project is bounded to the north by Escondido Creek and Harmony Grove Village, to the west by Country Club Drive, and undeveloped land to the east and south. Figure 1-1 provides a vicinity map for the project.

Project Description

The Harmony Grove Village South project proposes an extension of the Harmony Grove Village which is an approved master planned community located to the north of the project site. The project is proposing to extend the existing General Plan Village Regional Category under the compact development model to include the project site. As a result, Harmony Grove Village would include the existing Harmony Grove Village and Harmony Grove Village South projects. The project is topographically connected to Harmony Grove Village and is located within the same flat valley in which Harmony Grove Village is located. In addition, Harmony Grove is part of the same drainage basin and is located within the same valley view-shed. The project proposes to develop the site in a manner that is compatible with the existing character of the surrounding community and integrates with the uses and infrastructure of Harmony Grove Village in order to complete this existing Village. The project will develop 453 single family residential units, limited commercial/civic uses and various facilities required to serve the project. The project site includes a reclamation plant area that allows the project to have independent wastewater service and wet weather storage. All recycled water generated by the project will be provided to the Rincon Municipal Water District for distribution and removal.



\\PACIFIC\DWG\986001\FIGURE 1-1.DWG 02-09-15 08:18:21 LAYOUT: LAYOUT1

FIGURE 1-1

VICINITY MAP

HARMONY GROVE VILLAGE SOUTH

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Purpose of Study

The purpose of this study is to describe the alternative methods that may be used to provide wastewater services to the Project. There are three wastewater treatment system scenarios that could be used to serve the project. These three options include the following: 1) utilization of the existing Harmony Grove Village Water Reclamation Facility with no additional construction, 2) construction of a stand-alone wastewater treatment plant for the project; or 3) construction of a facility that could be integrated with the existing Harmony Grove Village facility to maximize utilization of the existing plant.

Scenario 1: Utilization of the existing Water Reclamation Facility.

The existing Harmony Grove Village Water Reclamation Facility could be used to service the project if based upon a re-evaluation of this treatment facility, it is determined that it could accommodate the flows from both the project and Harmony Grove Village. Harmony Grove Village's onsite wastewater treatment facility is located only approximately 550 feet north of the project's northern boundary at the northeast corner of Harmony Grove Road and Country Club Drive. The existing treatment facility located within Harmony Grove Village was originally sized to serve only the Harmony Grove Village in which the project will become a part thereof. The sizing of the existing Harmony Grove Village facility or the site, upon which this facility is located, will not be increased since this option would only be utilized if it could accommodate both projects. By utilizing the same wastewater treatment facility, the project could annex into Harmony Grove Village's existing community financing district or establish another financing mechanism that would provide additional funding to support the services required for Harmony Grove Village and this project. This would result in a more cost effective manner to finance the facilities and services needed by both projects and result in savings for the rate payers of both projects. In addition, it will result in the least impact to the surrounding properties and environment.

There are two possibilities in which the Harmony Grove Village South wastewater flows could be accommodated by the existing Harmony Grove Village Reclamation Facility.

Scenario 1(a): The original design of the plant is based on an estimate of future flows, if these flows are analyzed to be lower than the original estimate, there may be additional permitted capacity for flows to be accommodated from the Harmony Grove Village South project.

Scenario 1(b): The capacity of the plant could be reevaluated to update the permit for an increased capacity in the permit.

Scenario 2(a): Construction of a new custom designed wastewater treatment plant: sizing for this option is based on the Aeromod process but any extended aeration activated sludge process could be used. Under this option a new stand-alone onsite wastewater treatment facility would be constructed. This option would not result in an increase in the size of the existing facility within Harmony Grove Village or its site. The construction of a standalone facility within the project would result in two wastewater facilities being located within 550 feet of each other. Both facilities would perform similar functions and operate in a similar manner by producing Title 22 effluent suitable for unrestricted use.

Scenario 2(b): Construction of a new package treatment plant: Similar to Scenario 2(a), however this option relies on the utilization of manufactured stand-alone packaged treatment plant. This option would be implemented if a new plant is built onsite and not integrated with the Harmony Grove Village Water Reclamation Plant. The plant will produce Title 22 effluent suitable for unrestricted reuse. A description of the plant is included in Appendix A.

Scenario 3: proposes to construct a facility within the project that could be integrated with the existing Harmony Grove Village facility in order to take advantage of its close proximity to Harmony Grove Village's existing facility. This approach would avoid redundancies that would result in constructing identical facilities that would not be needed to serve the additional sewage generated by the project, such as an operations or administration building. Thus the project would construct only those facilities that would complement the existing system in place at Harmony Grove Village and that may be needed to serve the additional sewage generated by the project. By utilizing this approach the project may be able to annex into Harmony Grove Village's existing community financing district or establish another financing mechanism that would provide additional funding to support the services required for Harmony Grove Village and this project. This would also result in a more cost effective manner to finance the facilities and services received by both projects and result in savings for the rate payers of both projects. This approach would be able to utilize existing solids processing facilities on the Harmony Grove Village site, reducing the volume of solids to be delivered by truck elsewhere.

All new facilities will be designed to minimize odors utilizing water misting, chemical addition, or activated carbon. Unit processes will be covered or housed to avoid uncontrolled release of odors. Foul odors will be collected and passed through a biofilter for destruction. Misting systems will also be employed with odor neutralizing liquids.

One option not considered in this report for sewer disposal is the City of Escondido Hale Avenue Resource Recovery Facility (HARRF). The HARRF is approximately one mile away from the site in the City of Escondido. The City does not allow connection to its system without annexation to the city. Thus there is no available capacity for connections that are not located in the city.

The City of San Diego also has treatment and disposal rights to 5.0 mgd of sewer capacity at the HAARF to provide sewer service to the north Ranch Bernardo Community through an existing sewer agreement. The City of San Diego also has the first rights to an additional 0.3 mgd of treatment capacity at HAARF, if they choose to purchase those rights. The Rancho Bernardo Community is essentially built out and existing sewer flows to Escondido are reported to be approximately half of the actual agreement flows on an annual basis. In summary the City of San Diego has excess sewer capacity at HAARF. Due to limitations in the disposal capacity for HAARF effluent the City of Escondido would likely purchase any excess capacity from the City of San Diego if it were available. Thus acquisition of City of San Diego capacity at HAARF was not considered further for this project.

Additional planning and operational studies as well as design plans and specifications will be required for all of the facilities described in this plan.

Jurisdictional Consideration

The sewerage system will need to be owned by a public agency. The project is adjacent to the Harmony Grove Village project which has sewer service provided by the San Diego County Sanitation District. Annexation to this agency would be needed if they were to provide service to the project. The project is within the boundary of the Rincon del Diablo Water District and they could also own any sewer facility located onsite. The agency that owns the plant could also operate the plant or they could contract out for plant operations.

Regulatory Considerations

All of the sewage generated by the project will be treated and recycled. The San Diego County Sanitation District has a Waste Discharge Permit for the Harmony Grove Village treatment plant and the Rincon del Diablo Water District has a Water Reclamation Permit for the distribution of the treated effluent. Depending on the final plan for sewer service to Harmony Grove Village South these permits may or may not need to be amended. In Scenario 1(a), the permits will not need to be amended as the flow will not exceed permitted capacity. For Scenario 1(b) and Scenario 3 the plant will receive flow greater than the permitted capacity and the existing permit would need to be amended.

If a new standalone plant is constructed or installed then a new Master Water Reclamation Permit would be required. The new permits would be issued to the plant owner which could be the San Diego County Sanitation District, Rincon del Diablo Water District or another public agency.

The project will also have to comply with State and County Health Department Requirements for the use of recycled water, including Title 22 requirements for unrestricted reuse. The diesel emergency generators for a new Wastewater Treatment Plant would need to be permitted by the Air Pollution Control District.

CHAPTER 2

PLANNING, DESIGN CRITERIA AND WASTEWATER GENERATION

In this chapter we will provide planning and design criteria and estimate the flow and strength of the wastewater generated by the proposed Harmony Grove Village South Project. It is assumed that the project will have 453 residential units, limited commercial/civic uses and various facilities required to serve the project. Some of the residential units are attached and some are detached.

PIPELINE DESIGN CRITERIA

Gravity sewer lines 12-inches in diameter and smaller will be designed to convey peak dry weather flows while not flowing at more that 50 percent full by depth. Gravity sewer lines will be designed to flow at a minimum velocity of 2.0 feet per second during peak flow conditions or have to have a minimum slope of 1.0 percent to prevent the deposition of solids. Manning's equation with an "n" value of 0.013 was used in the analysis to determine the pipeline flow conditions.

WASTEWATER FLOW GENERATION FACTORS

The wastewater flow generation factors used in this report are consistent with the factors used in the approved Harmony Grove Village Master Reclamation Plan.

PROJECTED FLOWS

Table 2-1 summarizes the projected flows from the Harmony Grove Village South project based on 215 gpd per edu, the value used for the approved Harmony Grove Water Reclamation Plant. This equates to a flow of 97,395 gpd.

Table 2-2 shows the total estimated flow for the combined Harmony Grove Village and Harmony Grove Village South.

TABLE 2-1
HARMONY GROVE VILLAGE SOUTH
PROJECTED FLOWS
Average Daily Flow

Land Use	Amount	Generation Factor	Flow, gpd
Residential	453 units	215 gpd/unit	97,395
TOTAL			**97,395**

TABLE 2-2
HARMONY GROVE VILLAGE AREA
PROJECTED FLOWS
Average Daily Flow

Land Use	Amount	Generation Factor	Flow, gpd
Residential	1,190[2] units	215 gpd/unit	255,850
Commercial	41,500 SF	---[1]	7,200
Park	14 acres	500 gpd/ac	7,000
Fire Station	2 acres	1,500 gpd/ac	3,000
Institutional	2 acres	1,500 gpd/ac	3,000
TOTAL			**276,050**

[1] 240 gpd for the first 1,000 SF and 168 gpd for each additional 1,000 SF, or fraction thereof.
[2] 737 units for Harmony Grove Village and 453 units for Harmony Grove Village South.

Peak Flow Factors

Table 2-3 summarizes the peak flow design factors used in this report.

TABLE 2-3
STET AND FLOW HARMONY GROVE SOUTH

Factor	gpd
24 Hour Total	
Average Dry Weather Flow	97,395
Peak Monthly Dry Weather Flow (1.2 x average)	116,874
Peak Wet Weather Flow (2.11 x average)	205,503
1 Hour Peak	
Dry Weather (2.42 x average)	235,696
Wet Weather (4 x average)	389,580

Strength

Table 2-4 shows the strength and flow factors as well as the total load for the Harmony Grove Village South.

TABLE 2-4
WASTEWATER STRENGTH

	lbs/per EDU per day	EDU's	lbs/day
BOD	.63[1]	453	284.7
SS	.63[1]	453	284.7
Total nitrogen as N	0.09[2]	453	284.7

[1] Based on 350 mg/l and 215 gpd/edu.
[2] Based on 50 mg/l and 215 gpd/edu.

CHAPTER 3

SEWAGE CONVEYANCE SYSTEM

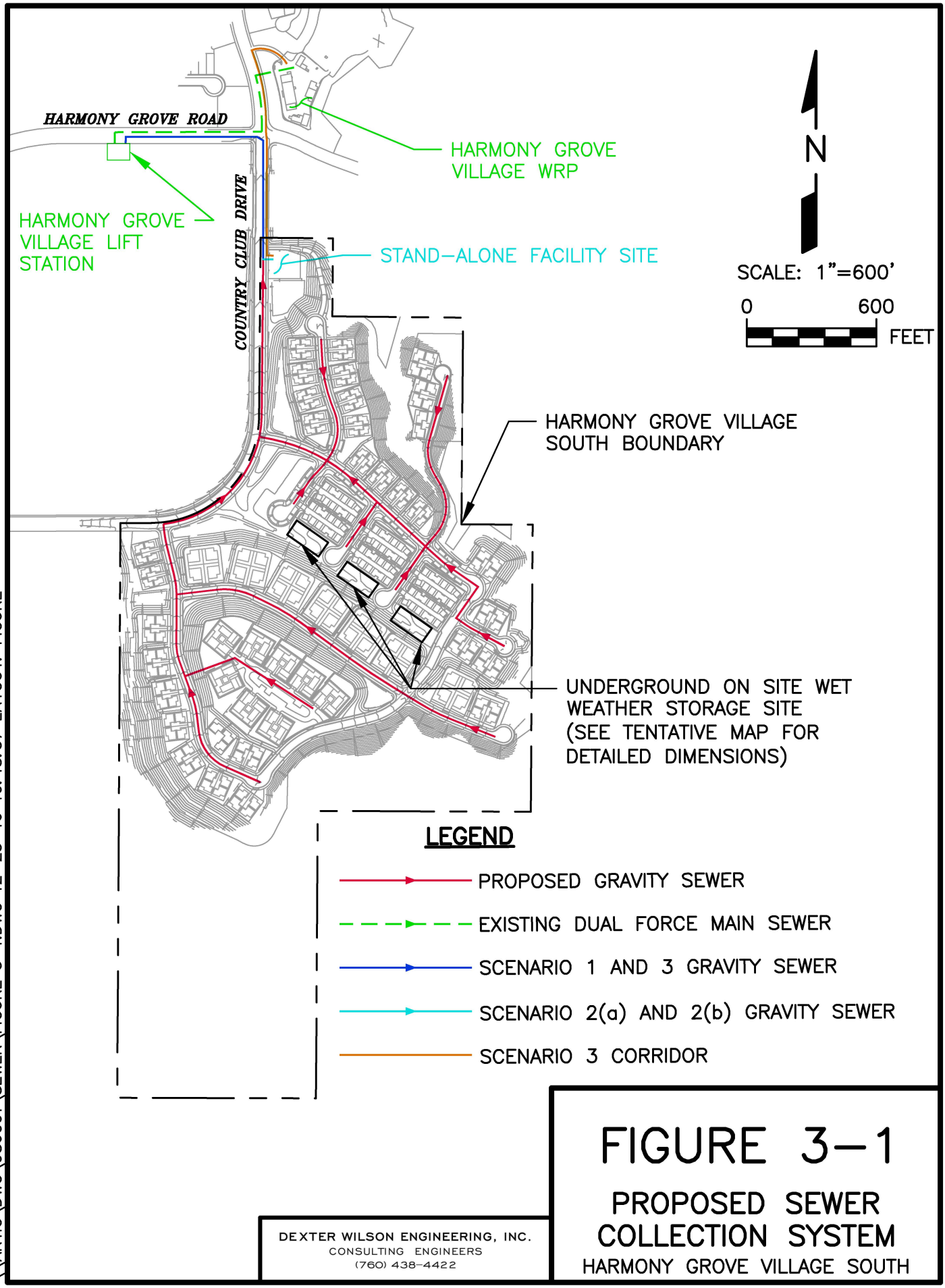
Figure 3-1 shows the proposed sewage conveyance system. Piping for all scenarios discussed in Chapter 1 are shown. For Scenario 2, a stand-alone onsite wastewater treatment facility would be constructed. For Scenarios 1 and 3 the piping connects to the existing lift station and utilizes the Harmony Grove Village Water Reclamation plant for treatment either as constructed or in conjunction with the Harmony Grove Village South site.

HARMONY GROVE LIFT STATION

If connection to the Harmony Grove Village system is chosen it is anticipated that the project will flow by gravity to the existing Harmony Grove Lift Station. This station will pump all flow from the project with Harmony Grove Village sewage to the existing Harmony Grove WRP.

Evaluation of Existing Harmony Grove Lift Station

The Harmony Grove lift station contains three pumps, two duty, and one standby. Two parallel force mains connect the station with the Harmony Grove WRP. With one pump pumping into one of the force mains, the existing station will convey 450 gpm to the WRP. With two pumps pumping into both force mains the existing station will convey 900 gpm. Flow of 900 gpm is greater than the projected flow from both projects. Thus, pump station improvements would not be needed.



\\ARTIC\DWG\986001\SEWER\FIGURE 3-1.DWG 12-23-16 10:48:37 LAYOUT: FIGURE

FIGURE 3–1

PROPOSED SEWER COLLECTION SYSTEM

HARMONY GROVE VILLAGE SOUTH

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CHAPTER 4

WASTEWATER TREATMENT OPTIONS

Three scenarios were presented for wastewater treatment for the Harmony Grove Village South project. These scenarios range from a re-evaluation of the existing Harmony Grove Water Reclamation Facility to find that it can accommodate all flows from Harmony Grove Village South in addition to the flows from Harmony Grove Village to construction of a new package treatment plant serving only the needs of Harmony Grove Village South. The scenarios presented include utilization of the existing plant with no additional construction, two different forms of new stand-alone treatment facilities, and the construction of new facilities designed to complement the existing facilities at Harmony Grove Village. The two different stand-alone facilities may be either an extended aeration activated sludge facility similar to the existing Harmony Grove Village facility, or a pre-packaged membrane bioreactor. All of these items are discussed in this chapter.

DISCUSSION OF FACILITY NEEDS COMMON TO ALL SCENARIOS FOR HARMONY GROVE VILLAGE SOUTH

The purpose of this section is to provide a discussion of facility needs related to wastewater treatment for the Harmony Grove Village South project necessary in all scenarios. Administration, operations building, recycled water use areas and solids disposal will be discussed in the section. All alternatives would be designed to provide disinfected tertiary recycled water meeting the requirements of Section 60304(a) of Title 22 of the California Code of Regulations.

Administration

The San Diego County Sanitation District has administration staff which could be used to manage the administration and finances of this facility. Thus, this proposed service area could contribute to the financing of the existing personnel and overhead, and use existing staff and facilities for administration.

Operations Building

The existing Harmony Grove Water Reclamation Facility has an operations building with showers, office space, and laboratory that could be used as a satellite headquarters for the North County personnel of the same county sanitation district. Thus a Harmony Grove Village South plant, if built, would only need a bathroom in the screening building. .

Recycled Water Use Areas

The Rincon del Diablo Water District has latent powers for recycled water sales in Harmony Grove Village South and the surrounding area. Since all effluent generated from Harmony Grove Village South wastewater will be reused and sold by Rincon the recycled water piping system will be similar for all alternatives. Thus, all wastewater generated by the project will be treated and put to beneficial reuse. In order to utilize all of the recycled water generated from wastewater from the Harmony Grove Village South project, approximately 36 irrigated acres would be needed.

Acceptance of Storm Water Into Recycled Water System

The current County of San Diego BMP Design Manual requires, where feasible, the capture and reuse of first flush stormwater (Water Quality Storm Events). The Harmony Grove Village South ("HGVS") project is in a unique position to pursue this reuse opportunity since it is found within the Rincon Water District. The Rincon Water District possesses an existing recycled water system and has a very large winter user at a power generation plant. This condition is unlike the typical County condition where the majority of the rain occurs in the winter when there is minimal-to-no recycled water use. Since guidelines for this reuse program presently do not exist, the project is unable to achieve the documentation and agreements necessary to ensure this use at the tentative tract map stage. However, it is important that the project preserves the right to confirm this use at the final map stage.

In the unlikely event the project is unable to gain approval for stormwater use in the recycled system, the project will construct a stormwater BMP system in accordance with the BMP Design Manual. This BMP system would likely consist of biofiltration basins in two locations totaling approximately 1.5 acres of land. These basins will be located entirely within the proposed project graded footprint as depicted on the Preliminary Grading Plans. As this

BMP system is employed, only minimal impacts to overall grading quantities would be anticipated, resulting in no additional environmental impacts. In this scenario, minimal shifts in land use may be required as the project will provide the same number of acres of park land and total number of residential units.

If stormwater is accepted into the recycled water system it will enter the system as shown in Figure 4-2. Thus, it will not impact treatment and storage of recycled wastewater. If additional storage or treatment is needed it will be part of the storm water system before it enters the recycled system.

Wet Weather Storage

Additional wet weather storage will be needed to accommodate Harmony Grove Village South. A maximum of 8,181,180 gallons (97,395 gpd x 84-days) may be needed. This storage could be provided on-site as shown in Figure 3-1 or at other sites.

This existing storage utilized by the Harmony Grove Village site is a reconditioned quarry modified for use as a reservoir. The reservoir is designed to hold 84 days of recycled water from the Harmony Grove Village site. It is likely that reassessment of the reservoir would allow for additional storage as only a portion of the available volume available in the reconditioned quarry will be utilized by Harmony Grove Village.

Storage could also be provided through other facilities as deemed necessary by Rincon del Diablo Water District.

Solids

Biosolids are a byproduct of wastewater treatment. For a small plant biosolids may be trucked in liquid form to another wastewater treatment plant. Due to the small size of the Harmony Grove Village South project, a treatment plant serving only Harmony Grove Village South would truck liquid solids. These solids could be trucked to City of San Diego System or the Hale Avenue Resource Recovery Facility for disposal. Also, due to the proximity of the Harmony Grove Village Water Reclamation Plant, the solids handling facilities at the existing plant could be used to treat biosolids generated from an onsite treatment plant at Harmony Grove Village South.

If biosolids are dewatered at the existing Harmony Grove Facility they would be trucked to a landfill for final disposal. This would increase the number of truckloads of solids from two per month to three per month at the existing plant.

If wet solids are trucked from a new plant at the Harmony Grove Village South site it would be expected that one truck per week would be generated by the plant.

EXISTING HARMONY GROVE VILLAGE PLANT
SCENARIOS 1 AND 3

If the water conservation measures are effective enough to reduce the flow per edu to a level that the existing plant could accommodate the Harmony Grove Village South project no onsite facilities would be needed.

It may also be possible to rerate the existing plant to a higher capacity with or without additional construction. This may require the Harmony Grove Village South project to build additional onsite or offsite wet weather storage.

This scenario may be evaluated at a late date if desired by the sewering agency for the project. Since implementation of this alternative is subject to issue beyond the control of Harmony Grove Village South additional alternatives are presented in this report.

HARMONY GROVE VILLAGE SOUTH
ONSITE FACILITIES – SCENARIOS 2 AND 3

In this section we will discuss two alternatives for onsite treatment of wastewater for Harmony Grove Village South. One of these is a package Ovivo plant the other utilizes the same technology as the existing Harmony Grove Village plant, only the stand alone plants are described. If, at a later date, a decision is made that the plants can be integrated with the existing plant the onsite facilities will be reduced as appropriate.

Harmony Grove South Package Plant

In this section the requirements for a new onsite package plant will be described. The total plant footprint will be 85' x 80'. A plant as manufactured by Ovivo is used for sizing purposes, Appendix A provides information on the Ovivo system.

Influent Pump Station. If a new plant is built onsite and not integrated with the Harmony Grove Village Water Reclamation Plant an influent pump station will be needed onsite. This pump station would be approximately 10' x 10' and 20 feet deep in the ground and pump up to the beginning of the Ovivo Package Plant. The station will have a firm capacity of peak wet weather flow (271 gpm) per Table 2-3 earlier in this report.

Ovivo Package Plant. The Ovivo Package Plant will be 40 feet long, 8 1/2 feet wide and 12 feet high. The plant will be a membrane bioreactor. The plant will produce Title 22 effluent suitable for unrestricted reuse. A description of the plant is included in Appendix A.

Off-Quality Effluent Storage. A total of 97,395 gallons of off-quality effluent storage will be required for this plant. This will take approximately 25' x 30' on the site.

Sludge Storage. In order to allow wasting from the Ovivo Package Plant every day an onsite liquid sludge storage tank will be provided. This tank will provide approximately 20,000 gallons of storage for sludge.

Onsite Building. A small building approximately 20' x 25' will be provided on site. This building will be no more than 18 feet high. This building is intended to house the emergency generator and electrical control system. It may also be utilized to house blowers and other equipment needed by the Ovivo Package Plant.

Harmony Grove Village South Non-Package Treatment Alternative

If the treatment system for the Harmony Grove Village South utilizes extended aeration activated sludge technology, it could also have all facilities onsite. In this section we will analyze the maximum footprint onsite for an Aeromod system. The actual onsite facilities may be less depending on integration with the existing plant. Figure 4-1 shows the footprint for a maximum Aeromod type facility on the Harmony Grove Village South site.

Description of Proposed Facilities at Harmony Grove Village South

The process flow schematic for a Harmony Grove Village South Plant is shown in Figure 4-2. The plant would be designed to meet the reliability requirements in accordance with Title 22 of the California Code of Regulations.

Influent Screening. Influent screening will be utilized prior to the secondary treatment process. The drum screen will need to have a firm capacity of 270 gpm.

Secondary Treatment Process and Equalization. The plant utilizes a biological secondary process with clarifiers to separate the sludge from the treated liquid stream. Facilities would be needed to treat 97,000 gpd average flow shown in Table 2-3.

Filtration Facilities. The filtration facilities will include flash mixing, coagulation filtration and support facilities. Disk filters will be used at the plant.

Disinfection. Disinfection at the plant will be accomplished through the use of sodium hypochlorite and a chlorine contact tank.

Non-Compliant Effluent Storage Tank. Twenty-four hours of storage must be provided for non-compliant effluent to meet Title 22 requirements. 97,375 gallons of storage would be needed for sludge disposal.

Sludge Trucking. Sludge will be trucked twice a month from the aerobic digester.

Onsite Building. An onsite building for the emergency generator, electrical, and a bathroom will be provided on-site.

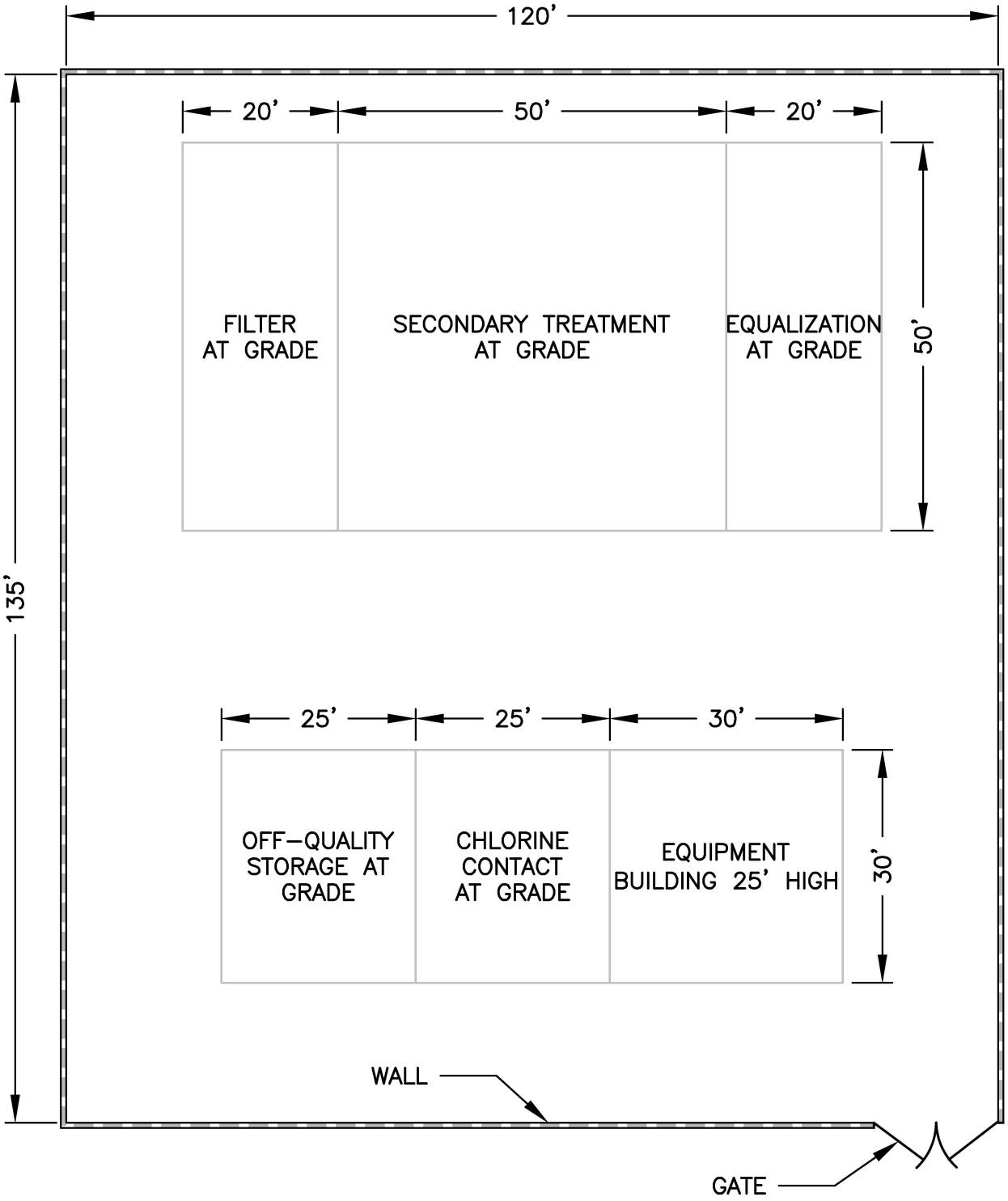

FIGURE 4-1
FOOTPRINT FOR MAXIMUM AEROMOD FACILITY
HARMONY GROVE VILLAGE SOUTH

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PLANT OPERATION – NO RETURN FLOW FROM WET WEATHER STORAGE, CENTRIFUGE IN OPERATION

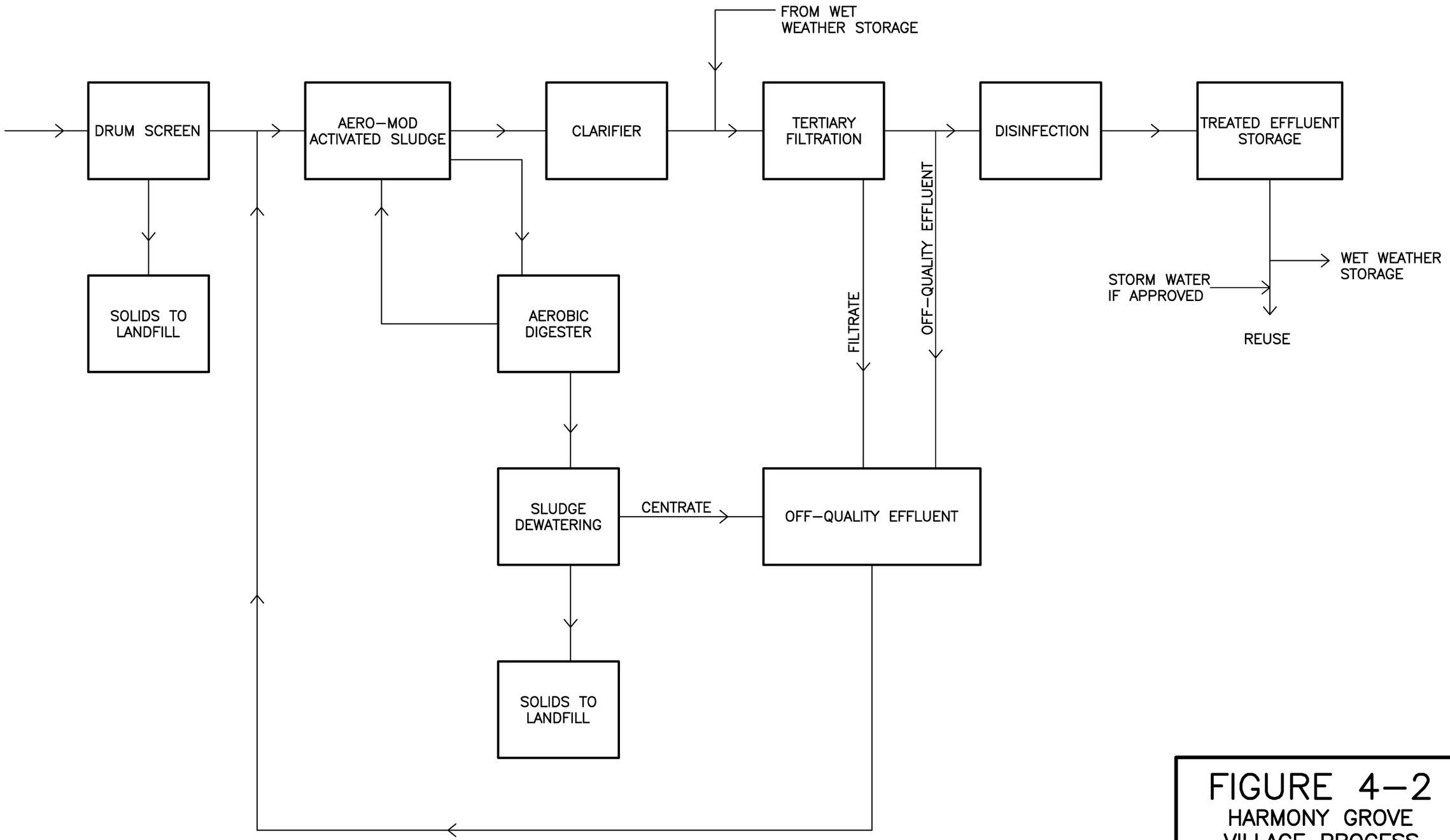

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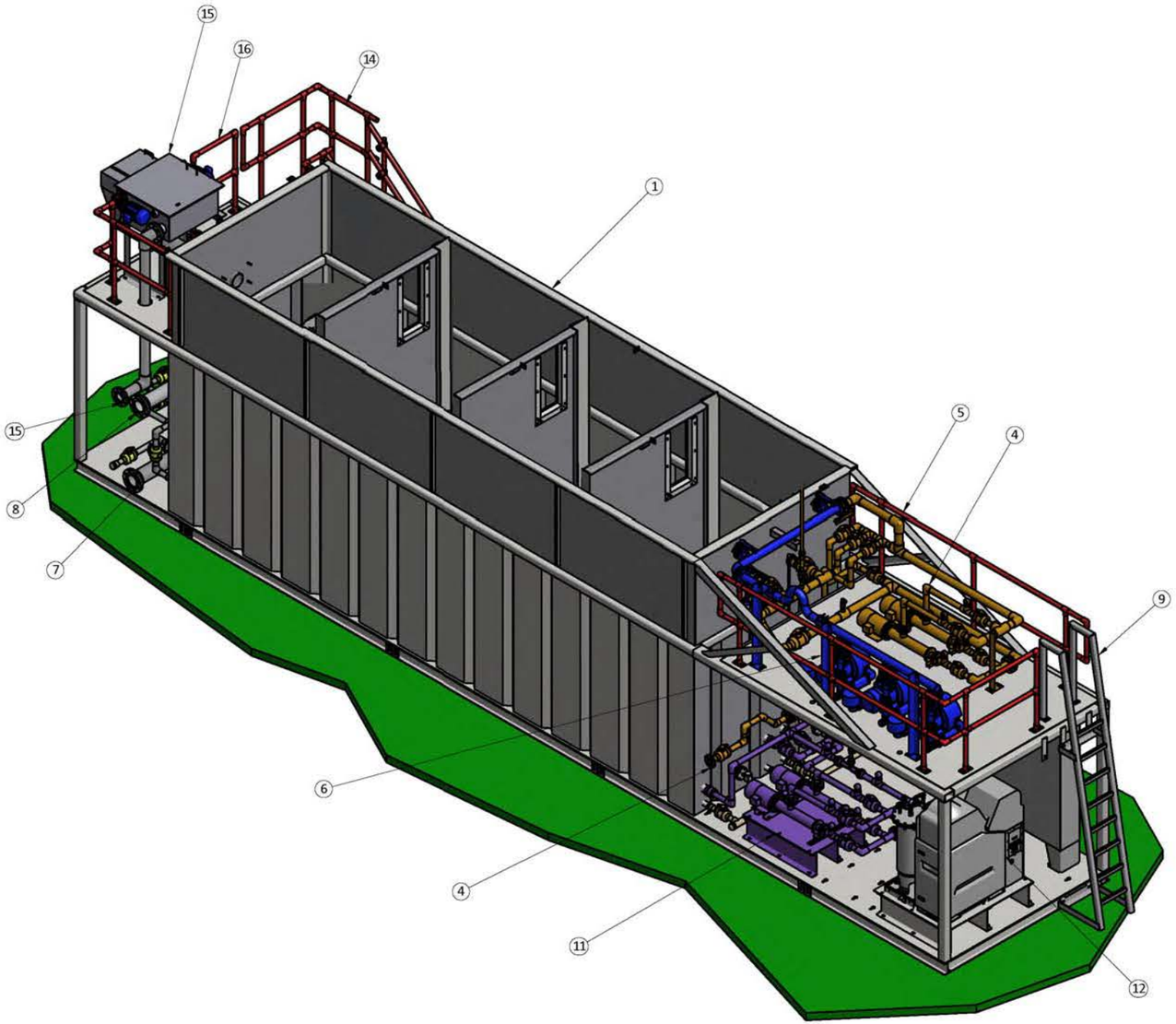
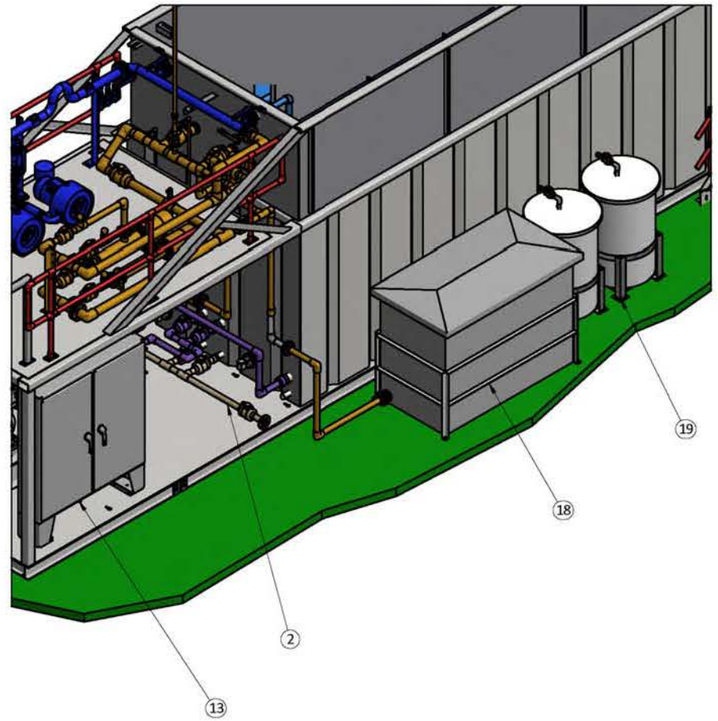
FIGURE 4–2
HARMONY GROVE VILLAGE PROCESS FLOW SCHEMATIC
HARMONEY GROVE VILLAGE SOUTH

APPENDIX A

DESCRIPTION OF OVIVO PACKAGE PLANT

ITEM	QTY	DESCRIPTION
1	1	45' TANK
2	1	WAS PIPING/DRAIN
3	2	OV 100 OMU
4	2	PERMEATE PUMPS
5	1	HAND RAILINIG
6	3	BLOWERS
7	1	EQ DRAIN-SUPP EQ TIE IN
8	1	OVERFLOW DRAIN
9	2	LADDER
10	2	EQ PUMPS
11	2	INTERNAL RECYCLE PUMPS
12	1	OXYGEN GENERATOR
13	1	CONTROL PANEL
14	1	STAIR LANDING ASSEMBLY
15	2	FINE SCREENS
16	1	HANDRAIL, SMALL PORCH
17	1	ADJUSTABLE WALL
18	1	CDS PIPING
19	1	CDS PALLET
20	2	LEVEL TRANSMITTER





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OVIVO
Bringing water to life

TYPICAL
45' microBLOX
LAYOUT PROPOSAL

DWG. NO. **S-TYPICAL 45'-R1**

SHEET 1 OF 7

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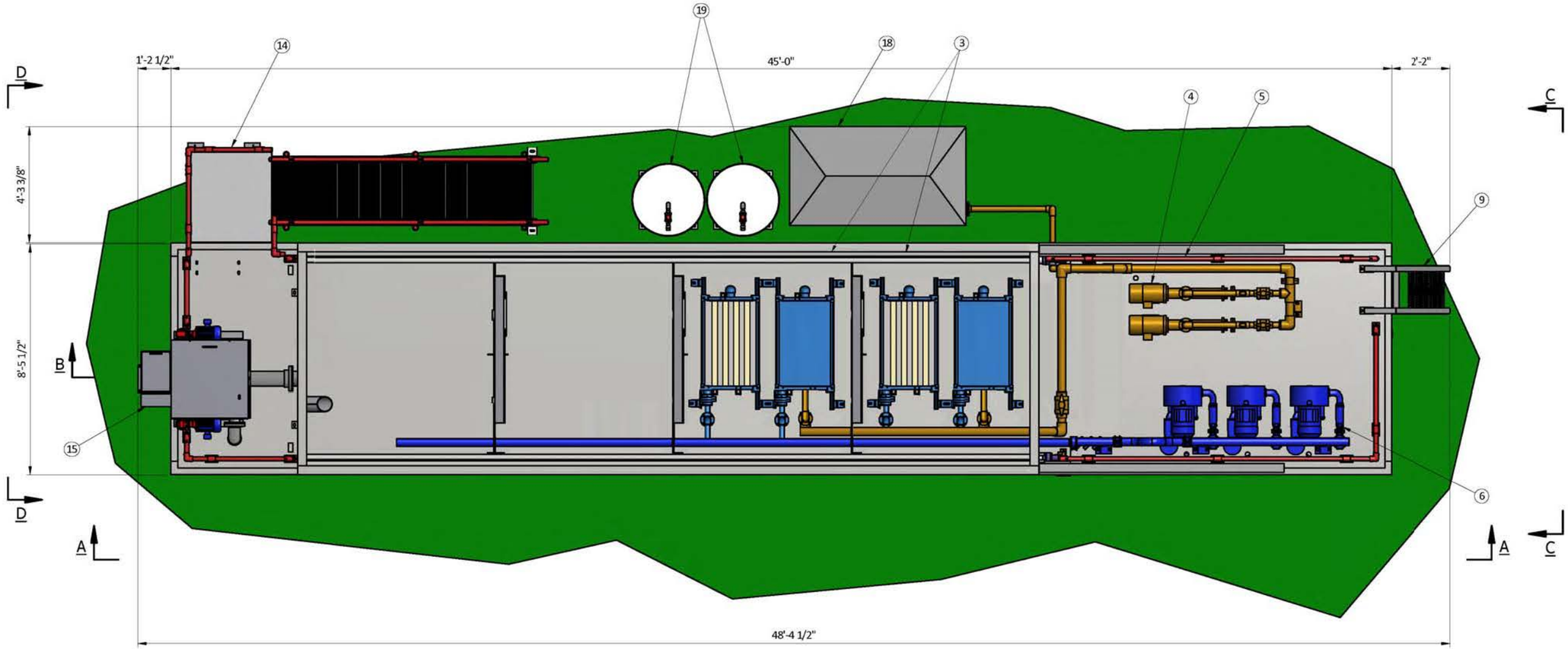

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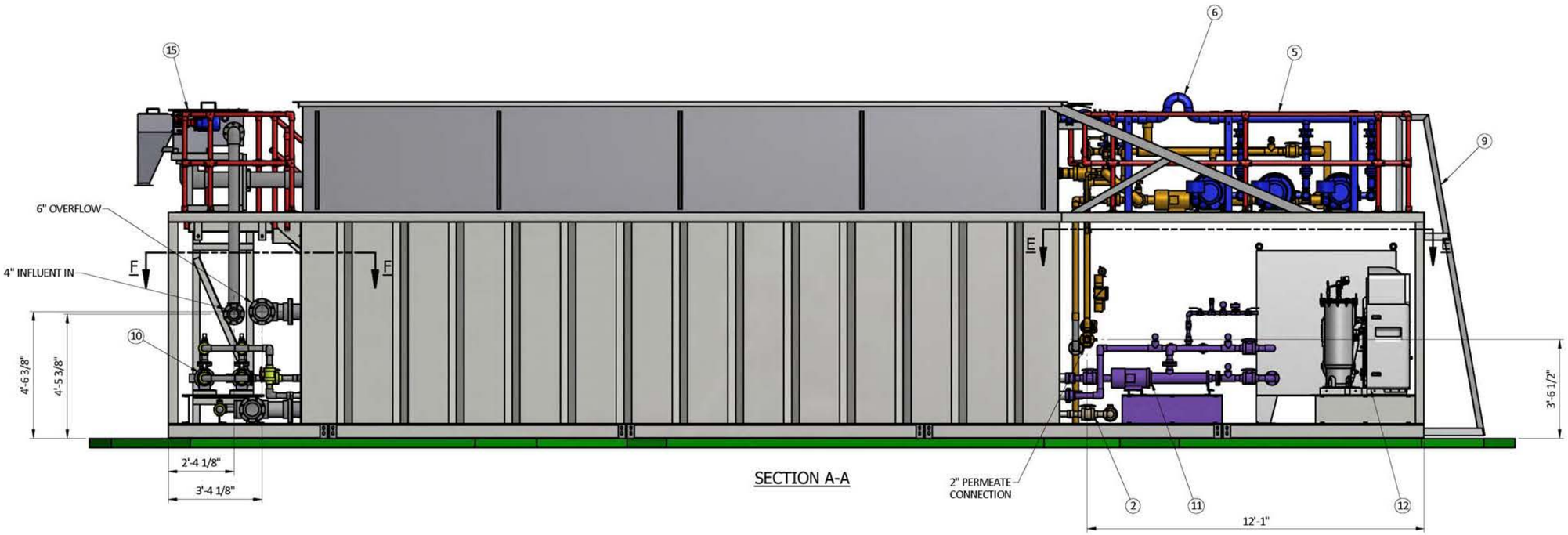

SECTION A-A

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THIRD ANGLE PROJECTION

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Bringing water to life

TYPICAL
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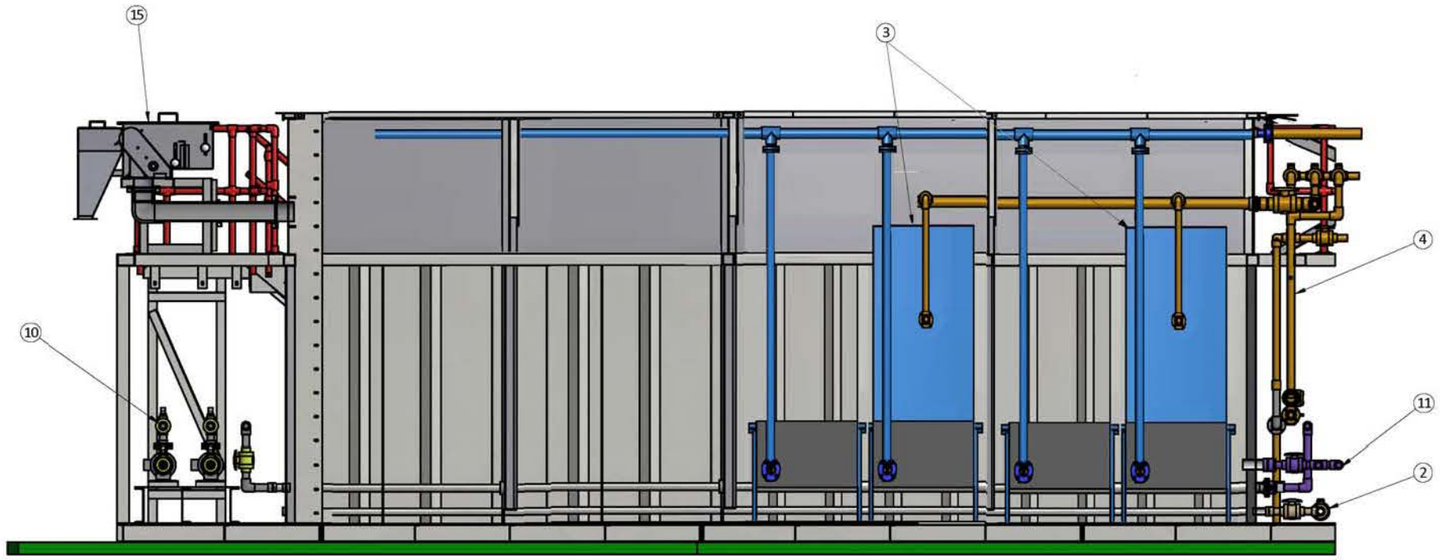
DWG. NO. **S-TYPICAL 45'-R1**

SHEET 3 OF 7

REV



SECTION B-B
MBR BASIN SECTION

D		THIRD ANGLE PROJECTION	OVIVO Bringing water to life
REF. FROM		DO NOT SCALE PRINTS	TYPICAL 45' microBLOX LAYOUT PROPOSAL
DATE (m/dd/yy)	11/20/2013	WORKMANSHIP STANDARD WE-2501-01 APPLIES	
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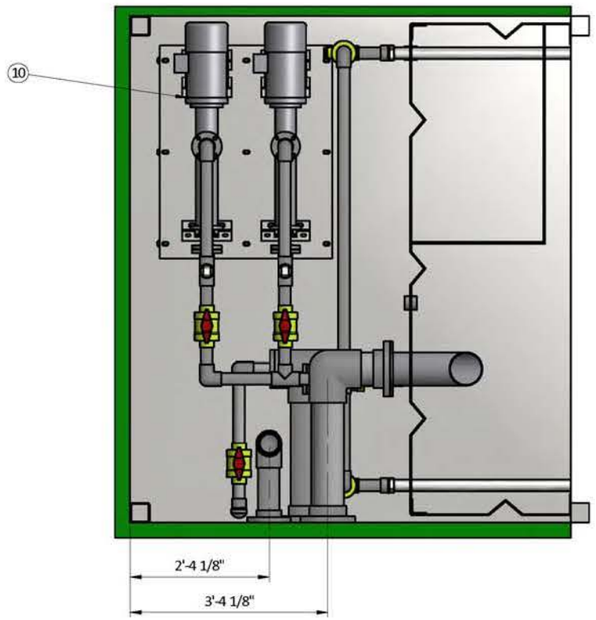
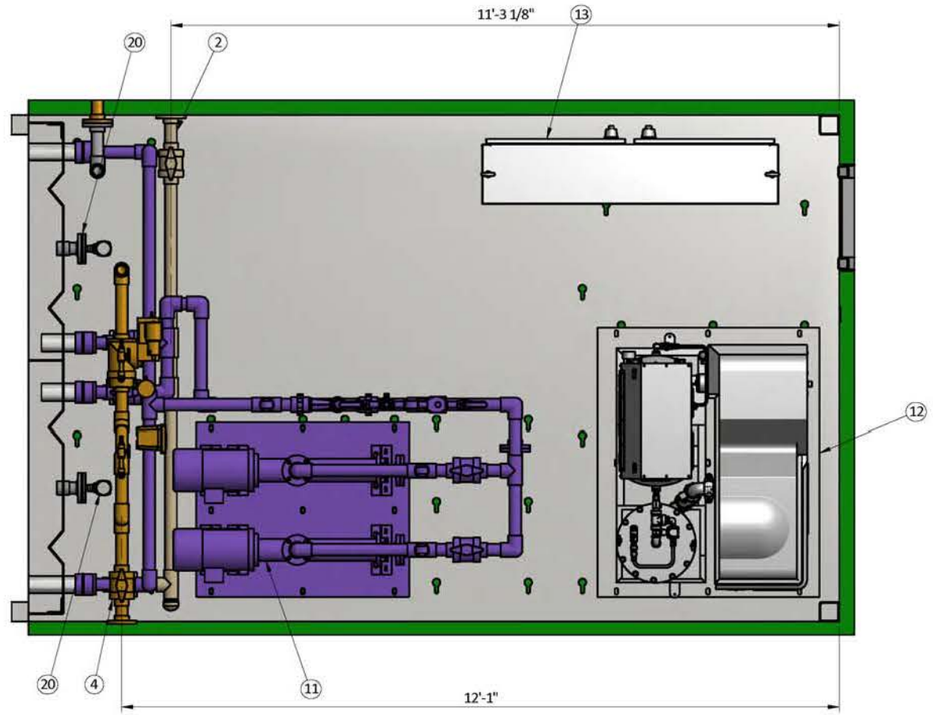
CHECK'D			

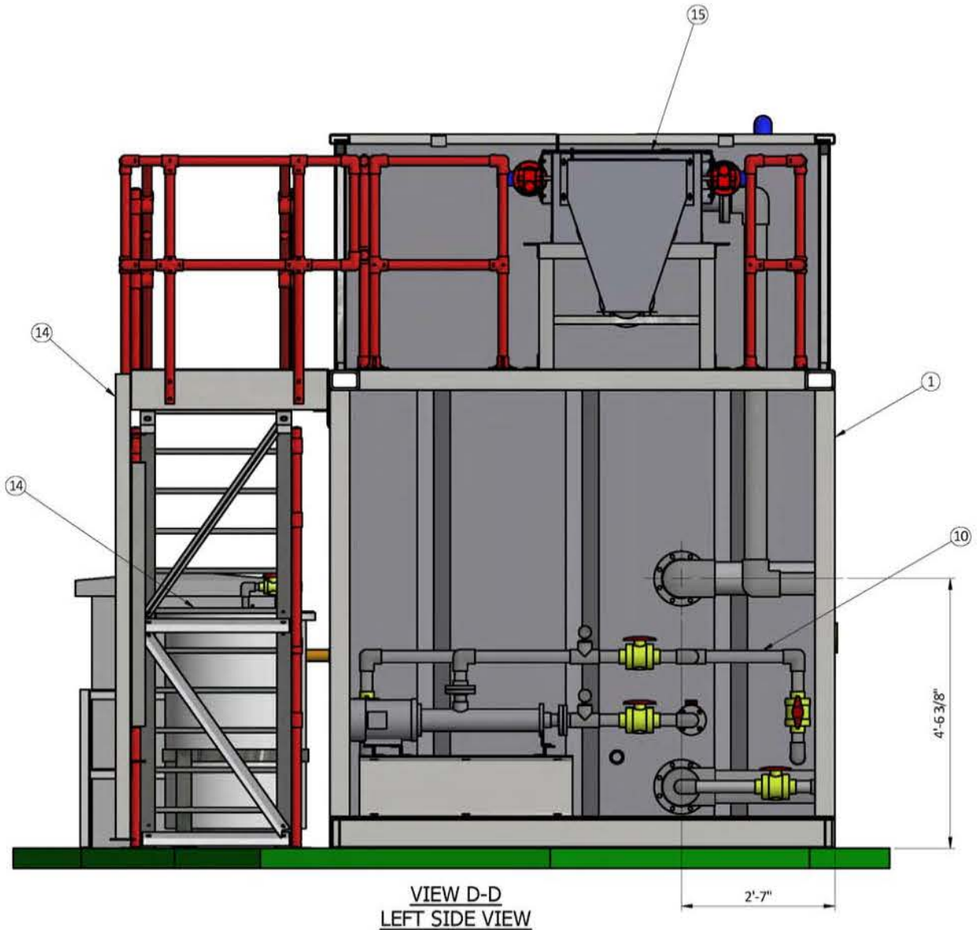


SECTION F-F
LOWER SMALL PORCH PLAN

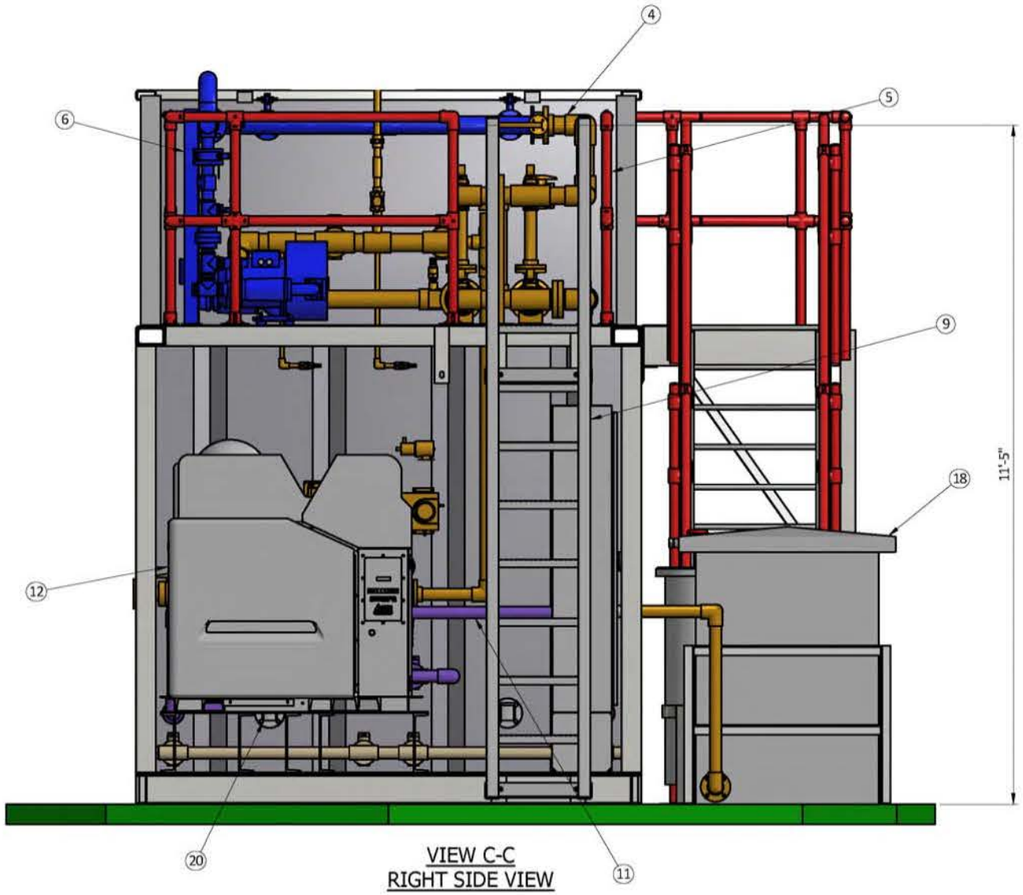


SECTION E-E
LOWER LARGE PORCH PLAN

D		THIRD ANGLE PROJECTION	OVIVO Bringing water to life	
			TYPICAL 45' microBLOX LAYOUT PROPOSAL	
REF. FROM		DO NOT SCALE PRINTS		
DATE m/dd/yy	11/20/2013	WORKMANSHIP STANDARD WI-7503-01 APPLIES		
DRAWN	DLA	ORIGINAL S.O.	DWG. NO. S-TYPICAL 45'-R1	SHEET 5 OF 7 REV
CHECK'D				

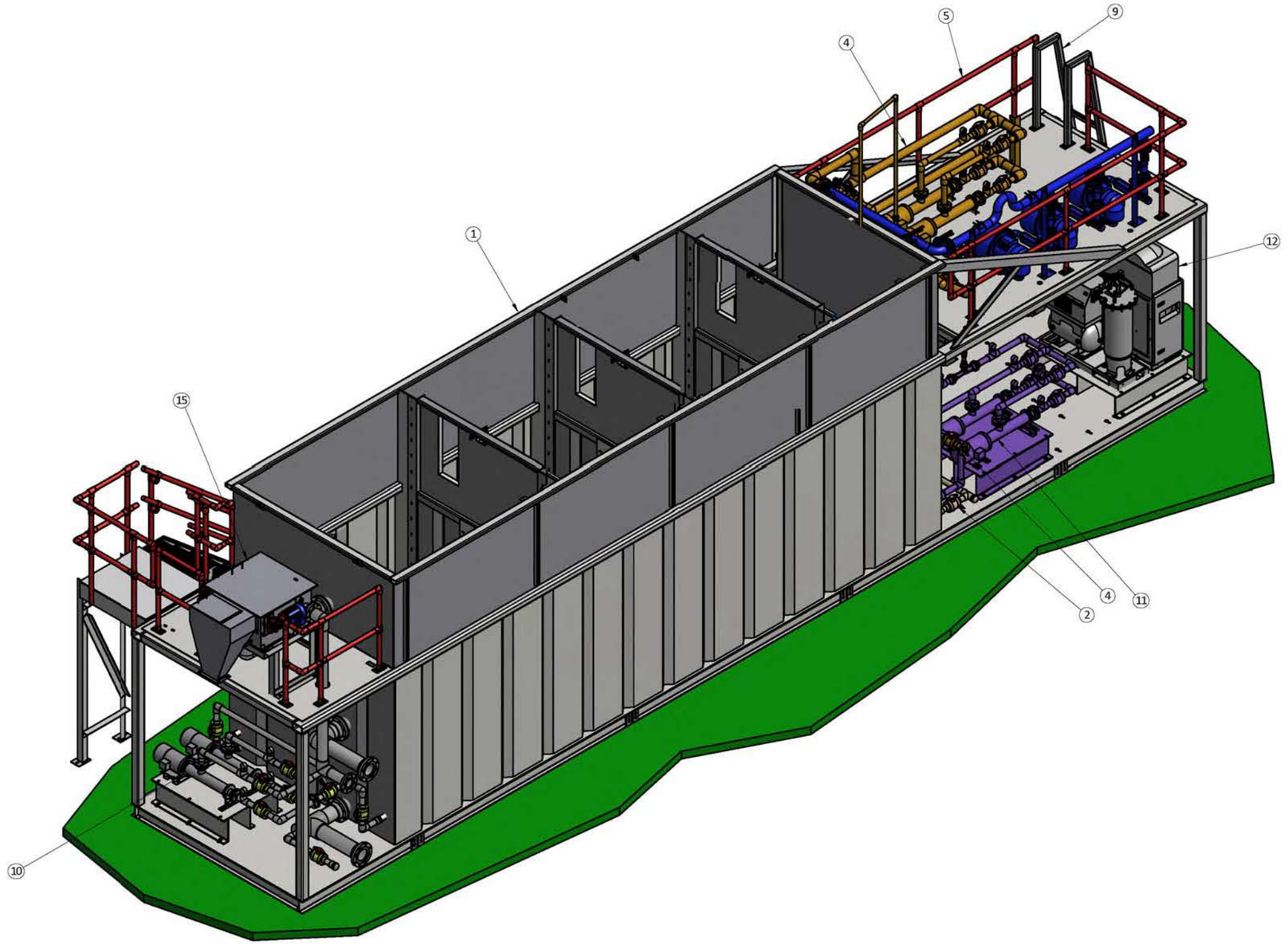


VIEW D-D
LEFT SIDE VIEW



VIEW C-C
RIGHT SIDE VIEW

D		THIRD ANGLE PROJECTION	OVIVO Bringing water to life	
			TYPICAL 45' microBLOX LAYOUT PROPOSAL	
REF. FROM		DO NOT SCALE PRINTS		
DATE (mm/dd/yy)	11/20/2013	WORKMANSHIP STANDARD WI-7501-01 APPLIES		
DRAWN	DLA	ORIGINAL S.O.	DWG. NO. S-TYPICAL 45'-R1	SHEET 6 OF 7 REV
CHECK'D				



D

THIRD ANGLE PROJECTION

REF. FROM		DO NOT SCALE PRINTS
DATE (m/dd/yy)	11/20/2013	WORKMANSHIP STANDARD WI-7501-01 APPLIES
DRAWN	DLA	ORIGINAL S.O.
CHECK'D		

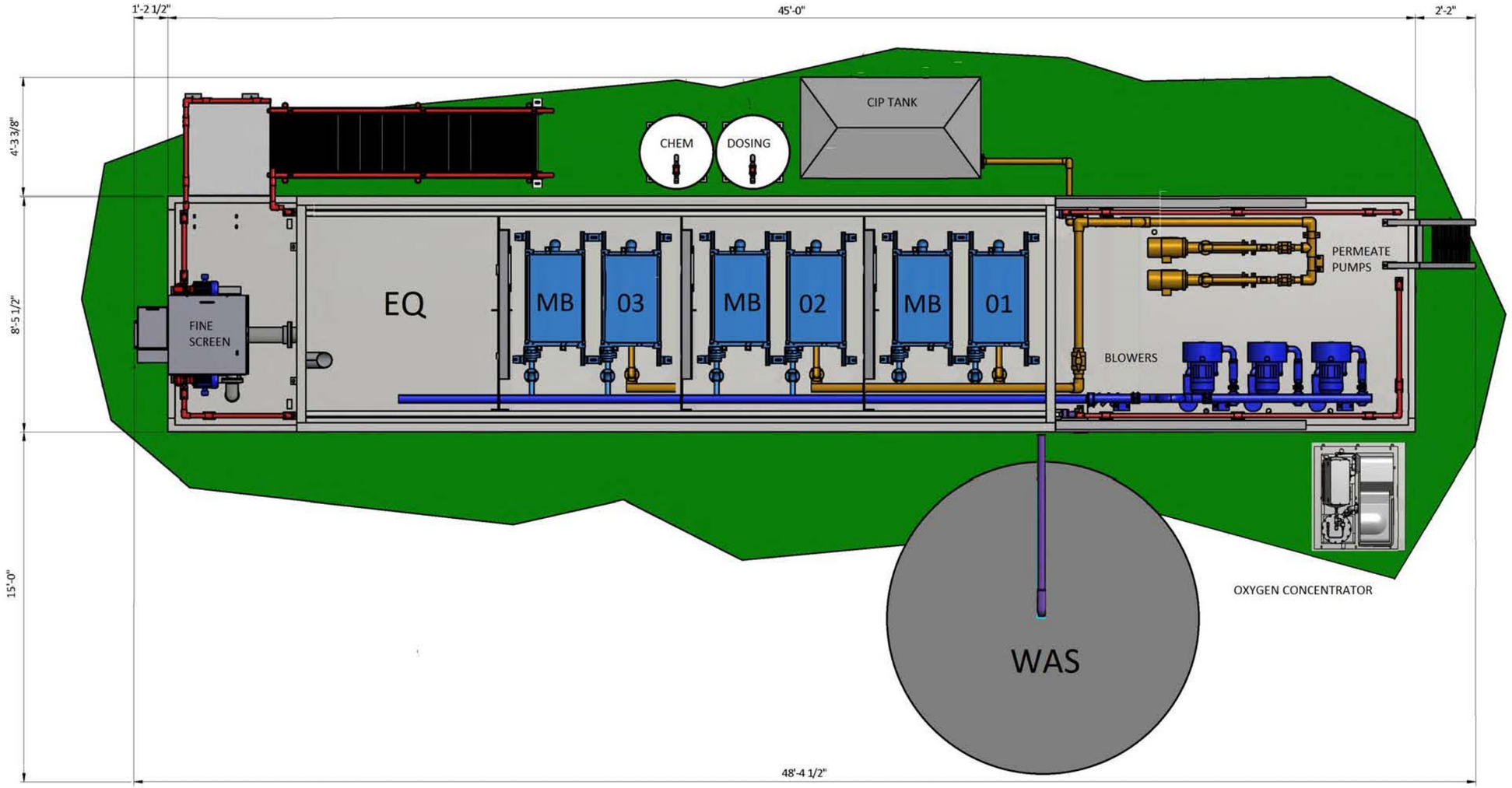
OVIVO
Bringing water to life

TYPICAL
45' microBLOX
LAYOUT PROPOSAL

DWG. NO. **S-TYPICAL 45'-R1**

SHEET 7 OF 7

REV



D

THIRD ANGLE PROJECTION

REF. FROM		DO NOT SCALE PRINTS
DATE (m/dd/yy)	11/20/2013	WORKMANSHIP STANDARD WE-2501-01 APPLIES
DRAWN	DLA	ORIGINAL S.O.
CHECK'D		

OVIVO
Bringing water to life

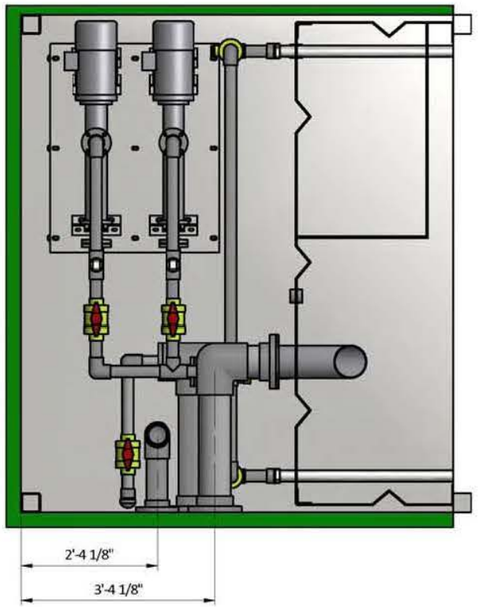
TYPICAL
45' microBLOX
LAYOUT PROPOSAL

DWG. NO. **S-TYPICAL 45'**

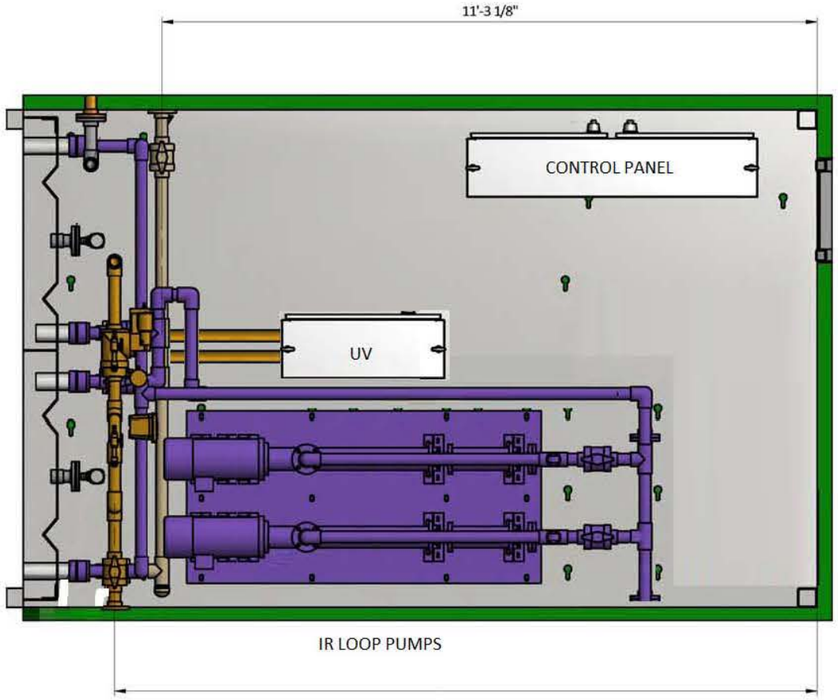
SHEET OF

REV

TRANSFER PUMPS

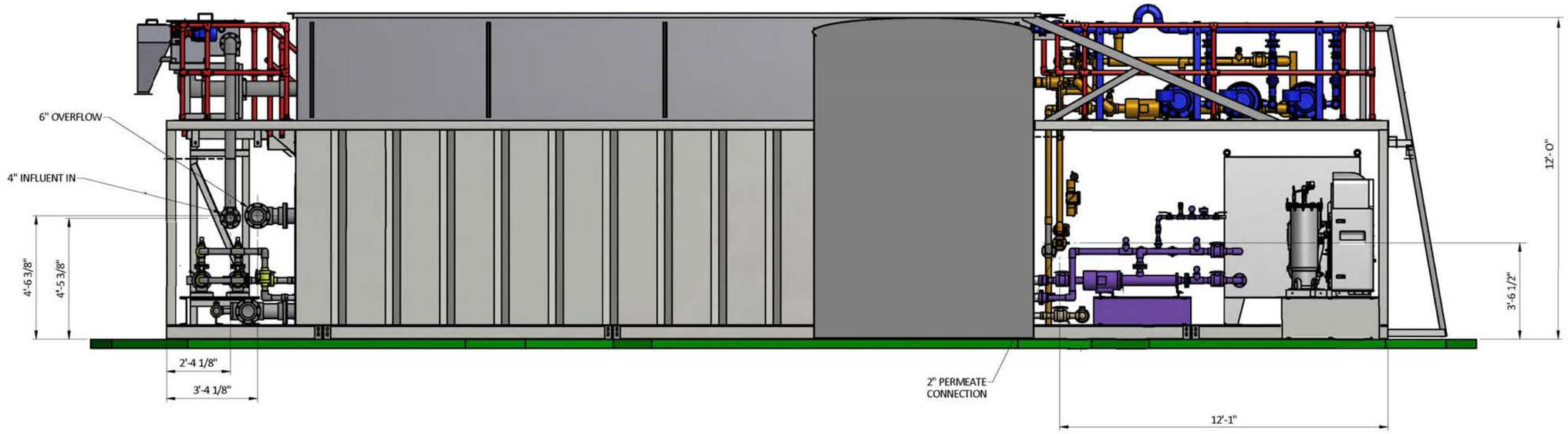


LOWER SMALL PORCH PLAN



LOWER LARGE PORCH PLAN

D		THIRD ANGLE PROJECTION	OVIVO Bringing water to life
			TYPICAL 45' microBLOX LAYOUT PROPOSAL
REF. FROM		DO NOT SCALE PRINTS	
DATE (mm/dd/yy)	11/20/2013	WORKMANSHIP STANDARD W1-7501-01 APPLIES	
DRAWN	DLA	ORIGINAL S.O.	DWG. NO. S-TYPICAL 45' SHEET OF REV
CHECK'D			



D

THIRD ANGLE PROJECTION

REF. FROM		DO NOT SCALE PRINTS
DATE (mm/dd/yy)	11/20/2013	WORKMANSHIP STANDARD WI-7501-01 APPLIES
DRAWN	DLA	ORIGINAL S.O.
CHECK'D		

OVIVO
Bringing water to life

TYPICAL
45' microBLOX
LAYOUT PROPOSAL

DWG. NO.		SHEET OF	REV
S-TYPICAL 45'			

APPENDIX B

ESTIMATE OF FLOW PER EDU
AT THE 4S RANCH WRP

4S RANCH

ESTIMATE OF FLOW PER EDU
AT THE 4S RANCH WRP

From the January 6, 2012 memorandum from Black & Veatch to the County of San Diego, the reported average annual flow to the 4S Ranch WRP for 2010 is 0.86 mgd. The peak day flow for December 21-22, 2010 is reported to be 1.57 mgd.

The number of wastewater connections for 4S Ranch was obtained from the Olivenhain Municipal Water District report of the number of wastewater connections being billed for sewer service. The total number is 6,778 connections.

Average Flow per EDU

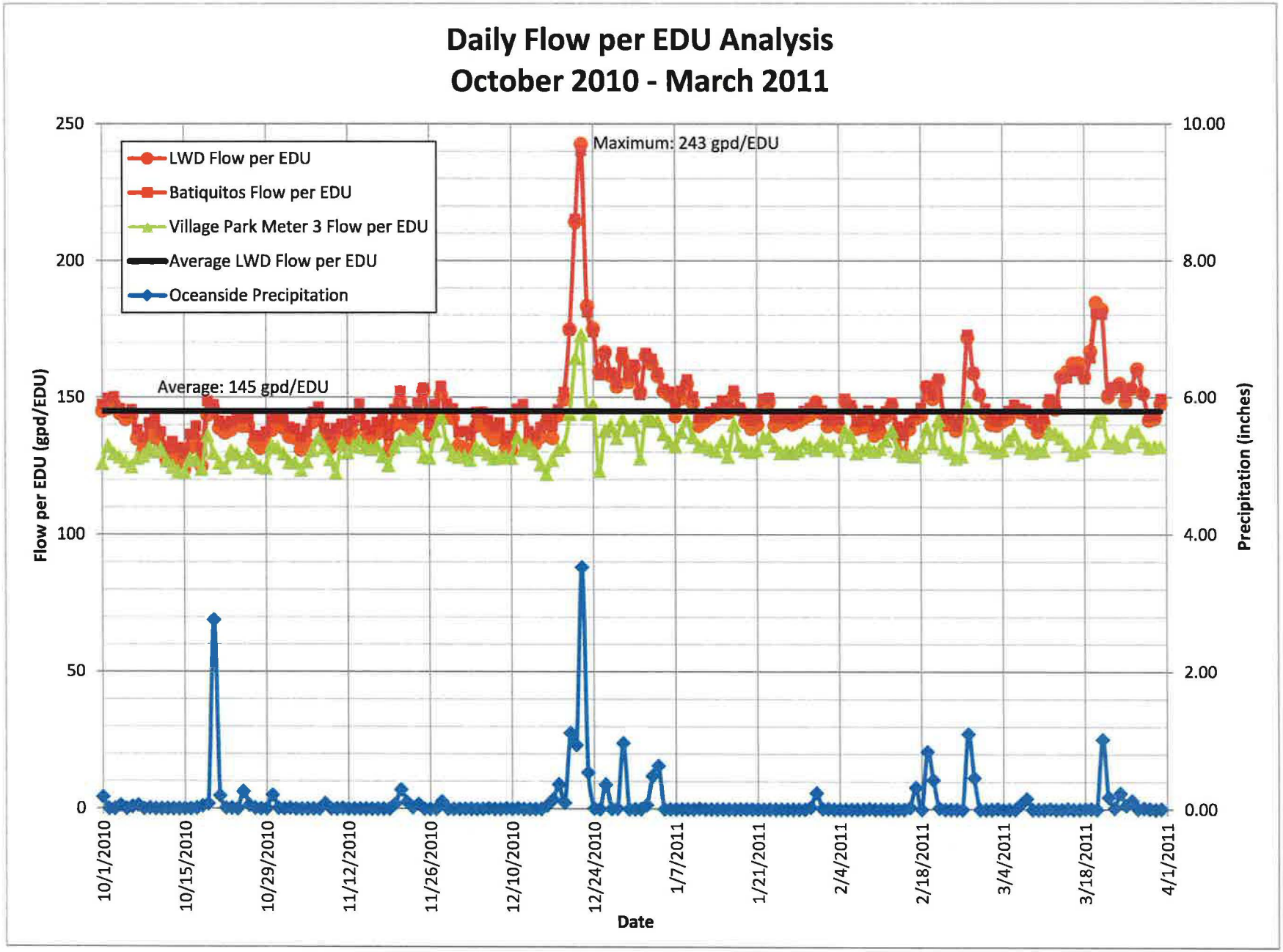
860,000 gpd ÷ 6,778 EDUs = 127 gpd/EDU

Peak 24 Hour Flow per EDU

1,570,000 gpd ÷ 6,778 EDUs = 232 gpd/EDU

APPENDIX C

ESTIMATE OF FLOW PER EDU IN LEUCADIA WASTEWATER DISTRICT


Daily Flow per EDU Analysis
October 2010 - March 2011
LWD Flow per EDU
Batiquitos Flow per EDU
Village Park Meter 3 Flow per EDU
Average LWD Flow per EDU
Oceanside Precipitation
Maximum: 243 gpd/EDU
Average: 145 gpd/EDU
Flow per EDU (gpd/EDU)
Precipitation (inches)
Date
250
200
150
100
50
0
10.00
8.00
6.00
4.00
2.00
0.00
10/1/2010
10/15/2010
10/29/2010
11/12/2010
11/26/2010
12/10/2010
12/24/2010
1/7/2011
1/21/2011
2/4/2011
2/18/2011
3/4/2011
3/18/2011
4/1/2011

APPENDIX D

HARMONY GROVE WRP
PROCESS DESIGN CRITERIA
WITH FLOWS FROM TABLE 2-3

APPENDIX D

HARMONY GROVE WRP
PROCESS DESIGN CRITERIA
WITH FLOWS FROM TABLE 2-3

Influent Flow

Pumping rate from Harmony Grove Sewer Lift Station

One force main = 500 gpm

Two force mains = 900 gpm

INFLUENT FLOW REGIMES		
Flow	**gpd**	**gpm**
24 Hour Total		
Average Dry Weather Flow (215 gpd/edu)	276,050	192
Peak Monthly Dry Weather Flow (1.2 x average)	331,260	230
Wet Weather Flow (2.11 average)	582,466	404
1 Hour Peak		
Dry Weather (2.42 x average)	668,041	464
Wet Weather (4.0 x average)	1,104,200	767
WASTEWATER STRENGTH		
Strength	**mg/l**	**lbs/day**
Average		
BOD	350	
SS	350	
TKN	50	
NH_3-N	50	
Peak Month (1.2 times Average) (Including recirculation flow loads)		
BOD	350	
SS	350	
TKN	50	
NH_3-N	50	
TEMPERATURE		
	High	**Low**
Air	105°F	30°F
Sewage	90°F	70°F

Discharge Specifications

Recycled water effluent from the Harmony Grove Water Reclamation Plant shall meet the definition of "disinfected tertiary recycled water" in CCR Title 22 Section 60301.230 and "filtered wastewater" in Section 60301.320. These definitions are incorporated by reference, prospective, including future changes to the incorporated provisions as the changes take effect.

a. The median concentration of total coliform bacteria measured in the disinfected recycled water effluent from the Harmony Grove WRP shall not exceed a Most Probable Number (MPN) of 2.2 per 100 milliliters, utilizing the bacteriological results of the last seven days for which analyses have been completed; and the number of total coliform bacteria shall not exceed a MPN of 23 per 100 milliliters in more than one sample in any 30-day period. No sample shall exceed a MPN of 240 total coliform bacteria per 100 milliliters.

b. Turbidity measurement of the recycled water effluent from the Harmony Grove WRP shall not exceed a daily average value of 2 NTU, shall not exceed 5 NTU more than 5% of the time during a 24-hour period, and shall not exceed 10 NTU at any time.

Expected Discharge Parameters (non-regulated)

BOD	<30 mg/l
SS	<30 mg/l
Total Nitrogen – N	<15 mg/l

Drum Screen – Enclosed in an Odor Controlled Room

Flow capacity = 900 gpm
Screen size = 6mm
Estimated screenings removed = 10 cubic feet per million gallons (per Metcalf & Eddy, Fourth Edition, Table 5-8)
Bypass channel design basis: 500 gpm at 2 fps flow velocity
Bypass channel able to handle 900 gpm flowrate
Manual bar screen bar spacing = 1"

Bar incline, from vertical = 45 degrees
Building Ventilation – 12 air exchanges per hour

Drum Screen Ok

Equalization

Provide total equalization volume = 145,700 gallons
Equalization volume to be divided into 3 tanks 2 @ 47,500 gallons each, one at new site at 50,700 gallons.
Each tank will be covered, aerated and provided with odor control

Equalization tank will receive internal plant flows including:

- Filter backwash
- Sludge dewatering centrate
- Plant floor drains
- Site storm drain low flows
- Off-Quality effluent return flows (may also be directed upstream of the filters)

Secondary Treatment – All Tankage Uncovered (AeroMod Calculations attached)

Secondary treatment will consist of the Aeromod SEQUOX proprietary design system. Process calculations prepared by Aeromod for their treatment system are included in Attachment A at the back of this document.

Five (5) treatment train approach (4 at main plant one at satellite plant)
Volume of each treatment train = 60,653 gallons

- Stage 1 Tank Volume = 29,865 gallons
- Stage 2 Tank Volume = 30,788 gallons

Total Treatment Plant Aeration Tank volume = 303,265 gallons
Detention time at ADWF 5 trains in service 26.4 hours

Treatment Plant Aeration Tank volume with one train out of service (4 trains in service) = 242,612 gallons
Detention time at ADWF with one tank out of service = 21.1 hours

Clarifiers

5 tanks, each at 20,106 gallons
Total volume 100,530 gallons

5 tanks, each at 192 SF
Total surface area 960 SF

Surface area, one tank out of service 768 SF

Clarifier Surface Loading Rates		
Flow, gpd	5 Tanks in Service gpd/sf	4 Tanks in Service gpd/sf
276,050	288	360
331,260	345	431
582,466	607	758

Aerobic Digesters

5 tanks – one per train, each at 23,305 gallons
Total Volume 116,525 gallons

Tertiary Filters

Coagulation/Flocculation Basins

One basin will be provided upstream of each of the five (5) filter bays.

Check Size for detention time under Peak Monthly Dry Weather flow with one train not in service.

331,260 gpd = 230 gpm
Then each basin is 1,500 gallons or 200 cu.ft.
6,000 gallons ÷ 230 gpm = 26.1 minutes

Check detention time for Wet Weather flow of 582,466 gpd through the filters:

582,466 gpd = 404 gpm
For 5-train operation, 1,500 gallons ÷ (404 gpm ÷ 5 tanks) = 18.6 minutes detention
For 4-train operation, 1,500 gallons ÷ (404 gpm ÷ 4 tanks) = 14.9 minutes detention

Check detention time for Average Dry Weather flow of 276,050 gpd through the filters:

276,050 gpd = 192 gpm

For 4-train operation, 1,500 gallons ÷ (192 gpm ÷ 4 tanks) = 31.3 minutes detention

For 3-train operation, 1,500 gallons ÷ (192 gpm ÷ 3 tanks) = 23.4 minutes detention

Normal Operation – No Return Flow from Wet Weather Storage

Number of filter beds = 5

Maximum hydraulic loading rate = 5 gpm/sq ft

Maximum design flowrate: Use maximum loading rate with one filter bed not in service

Maximum design flowrate = Wet Weather Scenario, flow is 582,466 gpd

Design criteria per Severn Trent:

Maximum specific solids loading = 0.67 lbs/sf

Backwash rate = 5 gpm/sf

Backwash duration = 24.2 minutes

Influent TSS = 20 mg/l

Effluent TSS = 3 mg/l

Backwash volume, estimated at 7% of filter flowrate = 40,800 gpd

Then maximum wet weather flow through filters is = 582,466 gpd = 404 gpm

Filter area needed: 404 gpm ÷ 5 gpm/sf = 80.9 sf

Existing filter bed area one filter out of service 84.4 (load rate 4.79 gpm/sf, maximum rate 582,466 gpd).

Filter Loading Rates		
Flow, gpd	5 Filters in Service, gpm/sf	4 Filters in Service, gpm/sf
276,050	1.82	2.27
331,260	2.18	2.73
582,466	3.83	4.79

Sludge Dewatering – Enclosed in Odor Controlled Room

Centrifuge	one (1) unit
Hydraulic Capacity	50 gpm, 24,000 gallons in 8 hours at < 10,000 mg/l solids
Solids Capacity	6,000 dry pounds per day
Ventilation	12 air exchanges per hour

Two sludge haul-off bins will be provided. Space will be provided for one in the Sludge Dewatering Room. The second bin will be stored outside.

Chlorine Contact Tanks

Chlorine Contact Tanks Detention Times, minutes		
Flow, gpd	1 Tank	2 Tanks
276,050	90	179
331,260	75	151

Off-Quality Effluent Storage

Provide total Off-Quality Effluent volume for one Average Dry Weather Flow day = 276,050 gallon, volume above 180,000 will divert to WWS.

Off-Quality Effluent return flows will connect upstream of the Tertiary Filters or go to the Equalization Basin.

Off-Quality Effluent overflow will go to Wet Weather Storage.

Wet Weather Storage

Provide total Wet Weather Storage volume equal to 84 days at Average Dry Weather plus needed additional off quality effluent storage of 97,395 gallons

276,050 gpd x 84 days + 97,395 gallons = 23,285,595 gallons or 71.46 AF