LAS VIRGENES - TRIUNFO
JOINT POWERS AUTHORITY
AGENDA

4232 Las Virgenes Road, Calabsas, CA 91302

CLOSING TIME FOR AGENDA IS 8:30 A.M. ON THE TUESDAY PRECEDING THE MEETING. GOVERNMENT CODE SECTION 54954.2 PROHIBITS TAKING ACTION ON ITEMS NOT ON POSTED AGENDA UNLESS AN EMERGENCY, AS DEFINED IN GOVERNMENT CODE SECTION 54956.5 EXISTS OR UNLESS OTHER REQUIREMENTS OF GOVERNMENT CODE SECTION 54954.2(B) ARE MET.

5:00 PM May 1, 2017

PLEDGE OF ALLEGIANCE

1 CALL TO ORDER AND ROLL CALL

2 APPROVAL OF AGENDA

3 PUBLIC COMMENTS

Members of the public may now address the Board of Directors **ON MATTERS NOT APPEARING ON THE AGENDA**, but within the jurisdiction of the Board. No action shall be taken on any matter not appearing on the agenda unless authorized by Subdivision (b) of Government Code Section 54954.2

4 CONSENT CALENDAR

A Minutes: Regular Meeting of April 3, 2017 (Pg. 3)

5 ILLUSTRATIVE AND/OR VERBAL PRESENTATION AGENDA ITEMS

A Pure Water Project Las Virgenes-Triunfo: Update

6 ACTION ITEMS

A Tapia Process Air Improvements Project: Preliminary Engineering Report, CEQA Determination and Request for Proposals for Selection of Diffusers and Blowers (Pg. 10)

Receive and file the Preliminary Engineering Report, find that the work is exempt from the California Environmental Quality Act, and approve the issuance of Requests for Proposals for the selection of diffusers and blowers for the Tapia Water Reclamation Facility Process Air Improvements Project.

B Rancho Amendment Bin and Conveyance Modifications Project: Preliminary Design Report, CEQA Determination and Award of Design Contract (Pg. 69)

Receive and file the Preliminary Design Report; find that the work is exempt from the California Environmental Quality Act; accept the proposal from MWH Global, Inc.; and authorize the General Manager to execute a professional services agreement, in the amount of $124,915, for the Amendment Bin and Conveyance Modifications Project.

C Heal the Bay's "Bring Back the Beach" Event: Attendance (Pg.118)

Authorize one Board Member from each agency and the Administering Agent/General Manager to attend the Heal the Bay "Bringing Back the Beach" Event at a cost of $600 per person.

7 BOARD COMMENTS

8 ADMINISTERING AGENT/GENERAL MANAGER REPORT

9 FUTURE AGENDA ITEMS

10 INFORMATION ITEMS

A Rancho Las Virgenes Composting Facility Switchgear Failure: End of Emergency (Pg. 121)

B 2016 Bioassessment Monitoring Report: Approval of Purchase Order (Pg.127)

C Las Virgenes-Triunfo Joint Powers Authority v. United States Environmental Protection Agency: Settlement and Dismissal (Pg. 130)

11 PUBLIC COMMENTS

Members of the public may now address the Board of Directors **ON MATTERS NOT APPEARING ON THE AGENDA**, but within the jurisdiction of the Board. No action shall be taken on any matter not appearing on the agenda unless authorized by Subdivision (b) of Government Code Section 54954.2

12 CLOSED SESSION

A Conference with Real Property Negotiators (Government Code Section 54956.8):

- JPA Negotiators: David W. Pedersen, Administering Agent/General Manager and Keith Lemieux, Legal Counsel
- Property Owner Negotiators: Agoura Hills Center Properties, LLC, represented by CBRE
- Property: APN 2061-001-025
- JPA will be negotiating price and terms

13 ADJOURNMENT

Pursuant to Section 202 of the Americans with Disabilities Act of 1990 (42 U.S.C. Sec. 12132), and applicable federal rules and regulations, requests for a disability-related modification or accommodation, including auxiliary aids or services, in order to attend or participate in a meeting, should be made to the Executive Assistant/Clerk of the Board in advance of the meeting to ensure availability of the requested service or accommodation. Notices, agendas, and public documents related to the Board meetings can be made available in appropriate alternative format upon request.

LAS VIRGENES – TRIUNFO
JOINT POWERS AUTHORITY
MINUTES
REGULAR MEETING

5:00 PM April 3, 2017

PLEDGE OF ALLEGIANCE

The Pledge of Allegiance to the Flag was led by Chair Wall.

1. CALL TO ORDER AND ROLL CALL

The meeting was called to order at **5:00 p.m.** by Chair Wall in the Board Room at Las Virgenes Municipal Water District headquarters at 4232 Las Virgenes Road in Calabasas, California. Josie Guzman, Clerk of the Board, conducted the roll call.

Present: Director(s): Caspary, Iceland, Pan, Paule, Peterson, Polan, Renger, and Wall.
Absent: Directors: Lewitt and Orkney.

2. APPROVAL OF AGENDA

Director Iceland moved to approve the agenda. Motion seconded by Director Paule. Motion carried by the following vote:

AYES: Caspary, Iceland, Pan, Paule, Peterson, Polan, Renger, Wall
NOES: None
ABSENT: Lewitt, Orkney
ABSTAIN: None

3. PUBLIC COMMENTS

None.

4. CONSENT CALENDAR

A Minutes: Regular Meeting of February 6, 2017 and Special Meeting of February 23, 2017

Director Caspary moved to approve the Consent Calendar. Motion seconded by Director Iceland. Motion carried by the following vote:

AYES: Caspary, Iceland, Pan, Paule, Peterson, Polan, Renger, Wall
NOES: None
ABSENT: Lewitt, Orkney
ABSTAIN: None

5. ILLUSTRATIVE AND/OR VERBAL PRESENTATION AGENDA ITEMS

A Pure Water Project Las Virgenes-Triunfo: Update

David Lippman, Director of Facilities and Operations, provided an update of the seven categories of next steps:

Funding and Financing: A letter of interest was submitted for the Water Infrastructure Finance and Innovation Act (WIFIA) financing. The JPA applied for two Bureau of Reclamation grants, including a $300,000 grant for the demonstration project and a $150,000 grant to complete a Title XVI Feasibility Study. Staff expects to hear back from the Bureau of Reclamation in June or July. Staff will also submit an application for a $75,000 State Water Resources Control Board (SWRCB) Recycled Water Planning grant to assist in developing the Feasibility Study. Next steps include meeting with staff from the State Revolving Fund Program to begin the application process.

Advocacy: Staff from Best Best & Krieger continue to meet with elected officials and their staff members in Sacramento and Washington DC on behalf of the JPA. Administering Agent/General Manager David Pedersen previously provided a summary of the lobbying efforts for the Washington D.C. trip. All of the legislators expressed an interest in the project and asked to be kept informed on its progress.

Technical Studies: The mixing and dilution study has begun for Las Virgenes Reservoir to support the JPA's approach that this project will fit into the proposed regulations for surface water augmentation. Preliminary results are expected in late summer or early fall. The SWRCB has not released the draft regulation for surface water augmentation because the State Department of Finance is conducting an economic analysis.

Outreach: Staff is working on implementing the Pure Water Project Outreach Plan. Eight presentations have been made to various groups and five presentations are scheduled between now and late May. The presentations have been well received and staff is keeping a log of all presentations. Staff is working on setting up a tour of the Leo J. Vander Lans Advanced Water Treatment Facility in Long Beach.

Demonstration Project: Staff met with CDM Smith to discuss the preliminary design and community outreach. The preliminary design will be presented to the JPA Board in June for review and feedback.

Siting Study: The Preliminary Siting Study is currently underway. A list of approximately 200 possible sites will be narrowed down to a list of six to ten possible sites. Early results will be presented to the JPA in late summer.

Institutional Issues: A JPA workshop was held on February 23, 2017, and the institutional issues were narrowed down to five issues including: 1) how to establish a cost for the use of Las Virgenes-only facilities; 2) Calleguas MWD's role in the project; 3) the future of expanding the recycled water system for traditional uses; 4) how to engage another partner such as the City of Thousand Oaks; and 5) whether to finance the project jointly or separately. Staff is working on gathering information on these remaining issues and is proposing to schedule another workshop this summer.

Mr. Lippman noted that the JPA Board had authorized approximately $1.4 million for the various work related to the project dating back to the Plan of Action in 2015.

Director Polan requested that staff provide a project schedule and the log of the presentations to the various community groups.

6. ACTION ITEMS

A Infrastructure Investment Plan: Fiscal Years 2017-18 through 2020-21

Receive and file the Infrastructure Investment Plan for Fiscal Years 2017-18 through 2020-21.

David Lippman, Director of Facilities and Operations, presented the report. He highlighted the projects planned for Tapia Water Reclamation Facility, Rancho Las Virgenes Composting Facility, and recycled water system along with the programs identified for addition or removal.

A discussion ensued regarding the summer season 2013 TMDL compliance; consideration of the budget for each agency for the $11 million budgeted for capital improvements for the coming fiscal year; planning for the process air compressor improvements during drought and wet weather conditions; and maintenance of the high-voltage cabinets at Tapia.

Director Pan requested that staff provide an update on the discussions with the City of Thousand Oaks for the potential to connect to their system to convey impaired groundwater to the advanced water treatment plant. She also spoke regarding the possibility of collecting stormwater from Oak Park and conveying it

to the treatment plant, and the possibility of capturing stormwater flows at Tapia. Mr. Lippman noted that a monthly update on the Pure Water Project would be included on each future JPA agenda.

B Rancho Las Virgenes Raw Sludge Wet Well Recirculation Modifications: Reject All Bids

Reject all bids for the Rancho Las Virgenes Raw Sludge Wet Well Recirculation Modifications project and authorize a new Call for Bids based on a revised bid package.

Administering Agent/General Manager David Pedersen presented the report.

John Zhao, Principal Engineer, responded to questions related to the optional bid items and requirements for use of specialized equipment or equivalent.

Director Peterson moved to approve Item 6B. Motion seconded by Director Paule. Motion carried by the following vote:

AYES: Caspary, Iceland, Pan, Paule, Peterson, Polan, Renger, Wall
NOES: None
ABSENT: Lewitt, Orkney
ABSTAIN: None

C Agreements Associated with Triunfo Sanitation District's Acquisition of Recycled Water System Facilities in Ventura County from Calleguas Municipal Water District

Authorize the Administering Agent/General Manager to execute the *Agreement Terminating Agreement Regarding Purchase of Wholesale Reclaimed Water, Assignment & Assumption of Obligations under Memorandum of Understanding,* and *Consent* to facilitate Triunfo Sanitation District's acquisition of the Oak Park/North Ranch and Lake Sherwood recycled water system facilities in Ventura County from Calleguas Municipal Water District.

Administering Agent/General Manager David Pedersen presented the report.

Director Iceland moved to approve Item 6C. Motion seconded by Director Pan. Motion carried by the following vote:

AYES: Caspary, Iceland, Pan, Paule, Peterson, Polan, Renger, Wall
NOES: None
ABSENT: Lewitt, Orkney
ABSTAIN: None

7. BOARD COMMENTS

Director Paule commended staff and John Freshman from Best Best & Krieger for facilitating the meetings with legislators during the Washington D.C. lobbying trip.

Director Iceland announced that he would be moving from the Triunfo Sanitation District (TSD) service area boundaries, and his last day as TSD and JPA Director would be June 6, 2017. He noted that he would not be present at the May 1, 2017 JPA Board meeting because he would be out of town

8. ADMINISTERING AGENT/GENERAL MANAGER REPORT

Administering Agent/General Manager David Pedersen reported that the Heal the Bay Gala would be held on May 18, 2017, at the Santa Monica Pier, and an item would be presented at the next JPA meeting to authorize one Board member from each agency to attend the event. He also reported that the first administrative draft of the NPDES permit for Tapia was received for review and comment. He noted that one area of concern was a proposed lower limit for chloride concentrations for discharges to the Los Angeles River. He noted that staff would meet with the Los Angeles Regional Water Quality Control Board staff on April 5, 2017, to discuss this issue. He also reported that staff would be present at the Westlake Street Festival to provide materials and outreach.

Director Peterson departed from the meeting at 6:01 p.m.

9. FUTURE AGENDA ITEMS

None.

10. INFORMATION ITEMS

A Rancho Las Virgenes Composting Facility: Biofilter Maintenance

B Rancho Las Virgenes Composting Facility: Contract Award for Amendment Supply

11. PUBLIC COMMENTS

None.

12. CLOSED SESSION

A Conference with District Counsel – Existing Litigation (Government Code Section 54956.9(a)):

1. Las Virgenes - Triunfo Joint Powers Authority v. United States Environmental Protection Agency

The Board recessed to Closed Session at **6:02 p.m.** and reconvened to Open Session at **6:20 p.m.**

Authority Counsel Keith Lemieux reported that during the Closed Session the Board authorized Authority Counsel to execute and submit a settlement offer. He noted that the motion carried unanimously by a vote of 7-0, with Directors Lewitt, Orkney, and Peterson absent.

13. ADJOURNMENT

Seeing no further business to come before the Board, the meeting was duly adjourned at **6:21 p.m**.

James Wall, Chair

ATTEST:

Glen Peterson, Vice Chair

May 1, 2017 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Tapia Process Air Improvements Project: Preliminary Engineering Report, CEQA Determination and Request for Proposals for Selection of Diffusers and Blowers

SUMMARY:

On October 5, 2016, the JPA Board accepted a proposal from Pacific Advanced Civil Engineering, Inc. (PACE), and authorized the Administrating Agent/General Manager to execute a professional services agreement, in the amount of $215,216, for the environmental review and design of the Tapia Water Reclamation Facility (WRF) Process Air Improvements Project. The scope of work consists of replacing the existing blowers and aeration basin air diffusers, which have reached the end of their useful life. Process air is used at the Tapia WRF to support the treatment processes, which require air for mixing, oxygen transfer for biological treatment and filter backwashing.

PACE's scope of work included a task to provide a performance-based specification for both the diffusers and blowers to allow for selection of the best valued equipment. The Preliminary Engineering Report, environmental review and performance-based specifications for the project have been completed, and staff recommends issuance of a request for proposals for the selection of the diffusers and blowers. Once the proposals have been received, staff will evaluate the equipment based on criteria included in the request for proposals and will return to the Board with a recommendation for procurement of the equipment.

RECOMMENDATION(S):

Receive and file the Preliminary Engineering Report, find that the work is exempt from the California Environmental Quality Act, and approve the issuance of Requests for Proposals for the selection of diffusers and blowers for the Tapia Water Reclamation Facility Process Air Improvements Project.

FISCAL IMPACT:

No

ITEM BUDGETED:

No

FINANCIAL IMPACT:

There is no financial impact associated with a request for proposals. The adopted Fiscal Year 2016-17 JPA Budget provided funding for the project in the amount of $1,797,400.

DISCUSSION:

Background:

In 2011, an evaluation of the Tapia WRF Process Air System was performed and concluded that the aeration diffusers and blowers needed to be upgraded as a result of age and inefficiencies. The Tapia WRF Process Air Improvements Project consists of upgrades including the replacement of existing swing arm diffusers with a full floor aeration system and replacement of three process air blowers with high-efficiency blowers. These upgrades would improve the Oxygen Transfer Efficiency and the overall energy efficiency by about 15% as well as save the JPA up to 40% annually on power cost.

There are six blowers at the Tapia WRF: three 250-horsepower Hoffman blowers (4,500 cubic feet per minute each) and three 900-horsepower Roots blowers (22,500 cubic feet per minute each). The Hoffman blowers were installed in the early 1970s, and the Roots blowers were installed in the late 1970s and early 1980s. The blowers were designed for the complete nitrification of the wastewater at an average daily flow of 16.1 MGD.

The current operation at Tapia WRF requires less air than the original design because the treatment process now includes partial denitrification, which requires anoxic conditions, at a design flow of 12 MGD. The existing blowers do not have the "turndown" capability to operate efficiently with the lower air demand. Also, the swing arm air diffusers in the aeration tanks introduce air on one side of the tank, causing a spiral roll of mixing and aeration. This type of aeration is inefficient for oxygen transfer (50% lower than comparable water reclamation facilities). By replacing the blowers and diffusers, the 2011 Carollo Engineers Process Air Evaluation Study estimated the JPA can achieve an annual energy savings of $185,000.

As a result, the JPA contracted with PACE to provide design upgrades to the Tapia WRF Process Air System. PACE's preliminary analysis showed that the design of the Process Air System will greatly depend on the design flow, load conditions, effluent requirements and treatment process configuration. In addition, the JPA's plans for the future construction of an advanced water treatment facility (AWT) for the implementation of a potable reuse program will require consistently high effluent quality from the WRF to minimize operational impacts. Therefore, the objectives of this Preliminary Engineering Report were as follows:

- Identify the Basis of Design for the Process Air System based on treatment flow and load conditions, effluent requirements and treatment process configurations that will maximize efficiencies and minimize power cost while improving effluent quality; and

- Identify the upgrade design requirements for the Process Air System in order to minimize capital and construction cost.

Request for Proposals/Performance-Based Specification:

Staff proposes an innovative approach to procure the diffusers and blowers to select the products that bring the best value to the JPA. A performance-based specification was developed to define the performance criteria necessary to meet the specific needs of the Tapia Water Reclamation Facility, as well as meet the goals and objectives of the overall project. The specification will be circulated through a competitive request for proposals process.

This alternative approach in comparison to more traditional procurement methods provides more flexibility to allow for the selection of equipment that brings the best overall value to the JPA. Through more traditional procurement methods, the owner is limited to the proposed manufacturers included in the lowest responsible bid, as long as it meets the technical specifications for the project. The problem with this approach is that the JPA has no control over the selection of the equipment, which may have significant on-going operational costs beyond the initial capital outlay.

There are currently numerous types of diffusers and blowers utilizing a broad spectrum of technologies with varying efficiencies, bearing types, flow rate capabilities, maintenance requirements and specific installation requirements. The blower with the lowest capital cost may bring the best initial value in the form of construction bidding; however, it may prove to result in a higher lifecycle cost if criteria such as energy efficiency, energy cost, maintenance cost, and performance are not considered. The issuance of a request for proposals with a performance-based specification will address this challenge by allowing for the selection of the equipment with the lowest overall lifecycle cost.

The process will first consist of advertising a request for proposals for a retreivable fine bubble aeration system. Proposals will be reviewed and evaluated based on criteria listed in the performance-based specification, including but not limited to: capital cost, lifecycle cost, fabrication/construction materials, performance, installation requirements, references, retrievability, service, etc. The proposal review team consisting of staff and the consultant will make a recommendation on selection of the diffusers.

The selected diffuser's specification will then be utilized and included in a blower request for proposals that will be advertised in a similar fashion to that for the diffusers. The performance-based specification and rating criteria for the blowers will also be similar to the diffusers; however, additional criteria and emphasis on energy efficiency and cost-savings will be included. Also, the proposers will have the advantage of best matching the blower with the selected diffusers.

The JPA will not be obligated to purchase the equipment selected through either request for proposals process. The processes solely allow for the selection of best equipment. The vendors will be responsible to provide a committed price, which will later be incorporated in the bid package for construction of the project.

Once the blowers are selected, the design and construction bid documents will be finalized, incorporating the selected diffusers and blowers. The equipment will be listed in the bid documents without the option to submit "or equal" products. When recommending approval of a call for bids for the project, staff will also recommend that the Board find that the selected diffusers and blowers have no equal and that the products fit into one of four exceptions specified in Public Contract Code Section 3400.

The prohibition against requiring a particular brand or manufacturer in a call for bids is not applicable if the awarding body makes a finding that a particular product is designated by brand name in the call for bids in order to obtain a necessary item that is only available from one source. The finding will be described in the call for bids for construction. The proposal process and approach has been discussed in detail and approved by JPA Legal Counsel.

Engineer's Estimate:

The total Engineer's Estimate for procurement and installation of the diffusers and blower is $3,325,678, consisting of $2,115,000 for the diffusers and $1,210,678 for the blowers.

Environmental Review:

The work is categorically exempt from the California Environmental Quality Act (CEQA), pursuant to Section 15301(a) and (b) of the CEQA Guidelines for repair or minor alteration of existing mechanical equipment involving negligible expansion of use. Attached is a Notice of Exemption that staff proposes to file, pending Board approval of the CEQA determination.

Project Schedule:

Release Fine Bubble Diffuser RFP	5/01/2017
Diffuser Selection	6/16/2017
Release Blower RFP	6/19/2017
Blower Selection	7/31/2017
Design Completion and Call for Bids	December 2017

Prepared by: Eric Schlageter, P.E., Senior Engineer

ATTACHMENTS:

Preliminary Engineering Report
Notice of Exemption
Diffuser Request for Proposals

Preliminary Engineering Report

Tapia Water Reclamation Facility
Air Process Upgrades

February 2017

Prepared For:

Joint Power Authority (JPA) of
The Las Virgenes Municipal Water District (LVMWD) &
Triunfo Sanitation District
4232 Las Virgenes Rd
Calabasas, CA 91302-1994

Prepared By:

Pacific Advanced Civil Engineering, Inc.
17520 Newhope St., Suite 200
Fountain Valley, CA 92708

Contact Person:

Duong Do, PE
Robert Murphy, PE
Charles Falzone, PE

PACE JN B058

Table of Contents

List of Figures:

List of Tables:

List of Appendices:

1 Project Description

1.1 Introduction and Objectives

The Las Virgenes Municipal Water District (LVMWD) is a special district established in 1958. The service area encompasses 122-square miles in western Los Angeles County and includes the incorporated cities of Hidden Hills, Calabasas, Agoura Hills and Westlake Village, as well as unincorporated areas. The District provides potable water, recycled water and wastewater services to a population of approximately 65,000. The Triunfo Sanitation District (TSD) within Ventura County is a joint venture partner with LVMWD in wastewater and recycled water services, which serves an additional 30,000 people.

The LVMWD/ TSD Joint Power Authority (JPA) operates the Tapia Water Reclamation Facility (WRF). The Tapia WRF was originally constructed in 1965 and provides tertiary treatment for municipal wastewater from domestic, commercial, and industrial sources within the JPA's service area. The JPA is responsible for proper treatment of the wastewater through compliance with its permit requirements and to ensure that the facility is operating as efficiently as possible in order to minimize cost to its rate payers and other stakeholders. As a result, the JPA proactively seeks ways to improve the facility from both a process standpoint and from a cost standpoint.

In 2011, the JPA performed an evaluation of the Tapia Water Reclamation Facility (WRF) Process Air System, which includes blowers and air diffusers used for mixing and aeration of process areas and basins[1]. The evaluation concluded that both the blowers and aeration diffusers will need to be upgraded due to age and inefficiencies. The upgrades have the potential to save the JPA as much as 35 - 40% annually on power cost.

As a result, the JPA has contracted PACE to provide design upgrades to the Tapia WRF Process Air System. PACE's preliminary analysis shows the design of the Process Air System will greatly depend on the design flow and load conditions, the effluent requirements and the treatment process configuration. In addition, the JPA is in planning and design phase for the construction of a new advanced water treatment system for the implementation of an indirect potable reuse program, which will require consistently high effluent quality from the WRF to minimize operational impacts. Therefore, the objectives of this Preliminary Design Report are as follows:

- Identify the Basis of Design for the Process Air System based on treatment flow and load conditions, effluent requirements and treatment process configurations that will maximize efficiencies and minimize power cost while improving effluent quality
- Identify the upgrade design requirements for the Process Air System in order to minimize capital and construction cost

1.2 Existing WRF Process Description

The Tapia WRF was expanded to its current footprint in 1990 under Regional Facility Expansion IV. The plant was designed for an average dry weather flow (DWF) of 16.1 mgd and peak wet weather flow of 28 mgd. Beginning in 2008, the plant was retrofitted for biological nutrient removal (BNR) operation for an average DWF of 12 MGD in anticipation of meeting effluent ammonia and Nitrate-Nitrite as Nitrogen (NOx) limits required by the Waste Discharge Requirements Order R4-2010-0165.

Treatment at the plant includes screening, grit removal, primary treatment, BNR secondary treatment, secondary clarification, tertiary filtration, chlorination and dechlorination as depicted in Figure 1. Return activated sludge (RAS) from the secondary clarifiers is treated through two RAS re-aeration basins, each with three equal zones that operates as oxic – anoxic – anoxic. Activated sludge is wasted from the end of the RAS re-aeration basin as Waste Activated Sludge (WAS). WAS and primary sludge are combined and pumped to the Rancho Las Virgenes Composting Facility for solids treatment.

[1] LVMWD – Process Air Evaluation Tech Memo No.1 (Carollo, Nov. 2011)

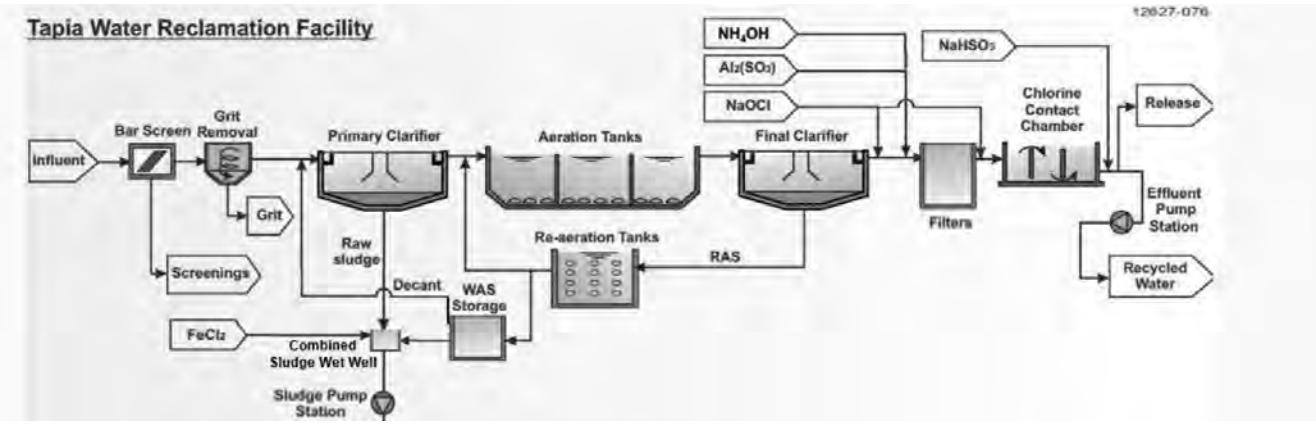


Figure 1: Tapia WRF Process Flow Diagram

Primary effluent (PE) and RAS are combined at the head of the selector channel prior to entering secondary treatment. The 6 aeration basins are configured as two plug flow treatment trains with three passes, each arranged in a serpentine configuration as shown in Figure 2. Each basin is approximately 160 ft long by 30 ft wide. The average operating water level is 14.1 ft, resulting in an approximate volume of 508,000 gallons per aeration basin and a total volume of approximately 3.1 MG. In the current serpentine configuration, the West Train consists of basins 1, 2, and 3, while the East Train consists of basins 4, 5, and 6. The 6 aeration basins can also operate in a parallel configuration; however, it is only used when bypass of one of the basins is necessary for repair or maintenance.

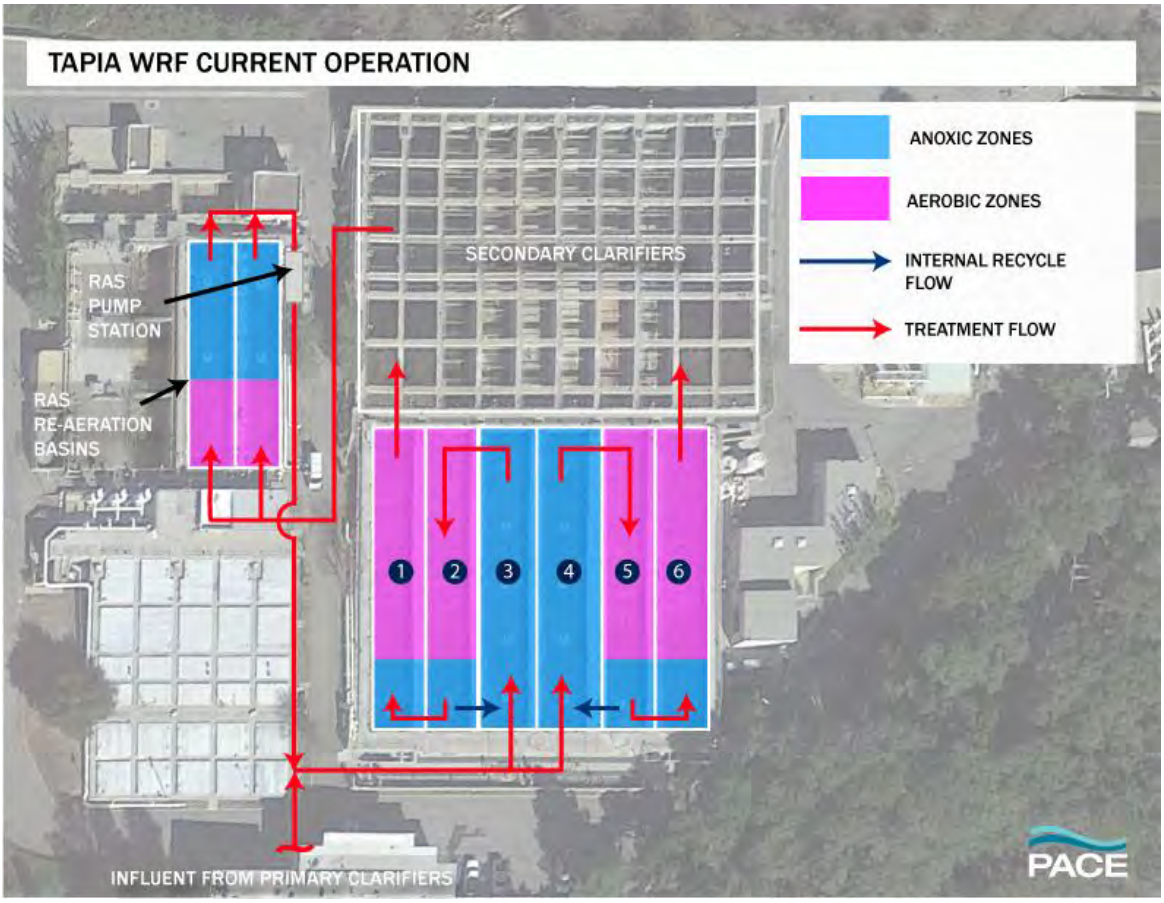


Figure 2:Tapia WRF Current 4-Stage Bardenpho Secondary Process Configuration

The Secondary Treatment process is a 4-stage Bardenpho Activated Sludge Process in its serpentine configuration. Primary effluent and Mixed Liquor (ML) in the selector channel is fed to the first pass of each of the two treatment trains. The first pass is the first-stage anoxic zone with 5 floating mixers. The second pass is primarily the second-stage aerobic zone with the start of the third-stage anoxic zone at the end of the second pass. An internal mixed liquor recycle (IMLR) returns ML at the end of the second pass to the head of the first pass at a rate of three times the plant influent (3Q). The third pass of each treatment train contains the continuation of the third-stage anoxic zone, followed by the final fourth-stage aerobic zone.

1.3 Process Air System

The Tapia WRF Process Air System mainly consists of the aeration components within the different process areas used for aeration and mixing and the process blowers used to supply the air flows and pressures to those aeration components. For the purpose of this report, the Process Air System will consists of the following three Main Process Air Components.

- Secondary Process Aeration System
- Process Air Blowers
- Other Process Air Components

The Secondary Process Aeration System consists of the fine bubble aeration diffusers installed within the Secondary Aeration Basins and the RAS Re-Aeration Basins. The Process Air Blowers are the main blowers used to supply air to the Process Air System. The Other Air Components comprise of the rest of the other processes that requires air from the Process Air Blowers. There are other minor blowers and/or compressors dedicated to an isolated equipment or processes. These minor process air units are not included as part of the Process Air System in this report. The existing Process Air System, separated into the three main components, with their existing air usage are listed in Table 1. The air flow demands are for the current air flow usage based on the average day treatment capacity of 6.8 MGD.

Table 1: Tapia WRF Current Process Air System Usage

Main Process Air Components	Process Areas	Air Demands (Ave/Peak) (SCFM)	Percent of Ave (%)
Secondary Process Aeration System	Secondary Aeration Basins[1]	6,300/ 7,740	61
	Re-Aeration Basins[1]	900	8.7
Other Process Air Components	Aerated Grit Chamber	150/300	1.5
	Grit Chamber Effluent Channel	400	3.8
	Primary Clarifier Feed Channel	1,000	9.7
	Aeration Basin Feed Channel	500	4.8
	Mixed Liquor Feed Channel	400	3.8
	Return Activate Sludge Channel	400	3.8
	Filter Backwash Scour	300	2.9
	Total Air Flow	**10,350/ 11,940**	

[1] Based on current Ave flow of 6.8 MGD provided by JPA Staff.

Table 1 shows that almost 70% of the total process air requirements is used for biological oxidation treatment within the Secondary Aeration Basins and the Re-Aeration basins, of which over 85% is used for the Secondary Process alone.

1.3.1 Existing Secondary Basin Aeration System

Aeration and mixing within the Secondary Aeration Basins and the RAS Re-aeration Basins are performed using fine bubble tube diffuser grids installed to promote a spiral-roll. The diffusers grids are equipped with swing arms used to retrieve the entire diffuser grid without having to take the basin out of service. Each basin has eight diffuser grids spaced approximately 20 ft apart. Each grid is equipped with approximately 65 diffusers (the number of diffusers varies depending on whether the grid is located near the end wall, near recycle pumps, etc.). The diffuser grids are set at a submerge depth of approximately 12.4 ft. For areas within the basins that are dedicated anoxic zones, surface mixers are also installed. Figure 3 illustrates the existing layout of the spiral-roll diffusers and surface mixers in the West Train of the Secondary Aeration Basins. To promote the formation of the spiral-roll, the basin wall structure has an angle or "Y" configuration as shown in the section view.

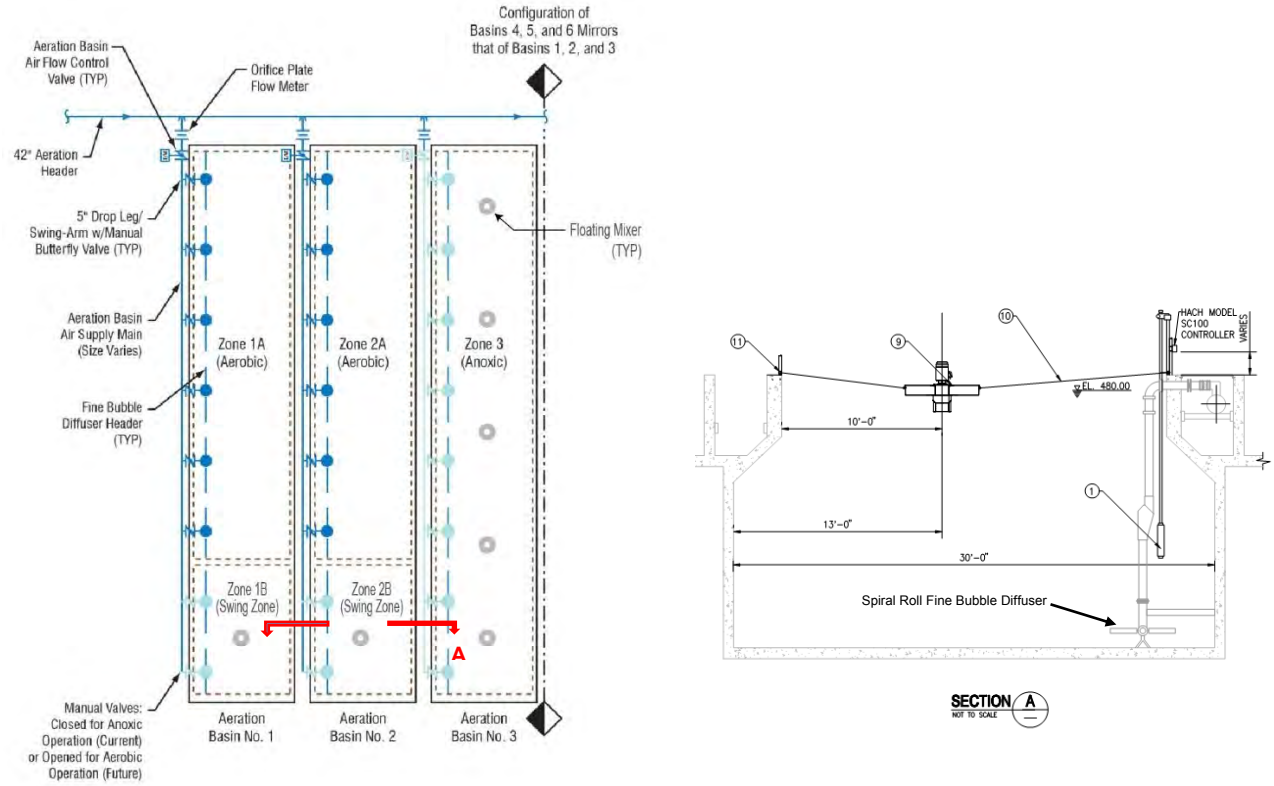


Figure 3: Current Spiral-Roll Aeration System Layout and Section View

The RAS Re-Aeration basins are also equipped with the swing arm diffuser grids similar to the Secondary Aeration Basins; however, only six swing arm grids are installed due to the shorter basin length. During normal operation, two-thirds of the basin is operated as anoxic zones, while the remaining one-third is operated as an aerobic zone.

1.3.2 Existing Process Air Blowers

Currently there are six blowers at Tapia installed to provide the required process air and to maintain a system pressure of approximately 7.5 psi. Three Roots 900 HP single-stage centrifugal blowers (with an air flow capacity of 22,500 scfm per blower) provide process air during periods of high demand. At the current flow, only one Roots blower is typically in operation. There are also three Hoffman 250 HP multi-stage centrifugal blowers (with an air flow capacity of 4,500 cfm per blower) that provide process air during low demand periods and to supplement the Roots blowers. Typically, two Hoffman blowers are operating when the Roots blowers are off and one Hoffman blower is periodically used to supplement the Roots blower. The Hoffman blowers were installed in the 1970's and the Roots blowers were installed in the 1980's.

The Roots blowers are equipped with adjustable inlet guide vanes, while the Hoffman blowers are equipped with inlet throttling valves. Both inlet control mechanisms help with flow control and turndown; however, they drastically reduce the blower system efficiency.

1.3.3 Existing Other Air Process Components

The Other Air Process Components consists of the remaining smaller process areas that need air for mixing, scouring or aeration. The smaller process areas are listed in Table 1 above and are mainly the smaller feed channels, grit aeration components and filter scouring components. Air requirements in the process channels are primarily used to provide solids suspension and mixing to minimize solids deposits within the channels. The process channel's aeration and mixing are achieved with coarse bubble diffusers, which were recently upgraded as part of the Tapia WRF Channel Mixing Improvement Project completed in 2015. The air requirements for the grit and filtration processes are based on equipment design requirements need for scouring and aeration.

2 Basis of Design

Even though the Tapia WRF has the air flow capacity to meet the current treatment process requirements, the high electrical costs are placing significant impacted on the overall operational budget of the facility. Historical data shows that the plant's average process air electrical cost is approximately $338,000 annually or 30% of the total power consumption of the plant. Therefore, improvements made to the Process Air System can have a significant impact to overall operational cost of the facility.

In 2011, the JPA conducted an evaluation of the Process Air, which included an off-gas study of the existing spiral-roll aeration system within the Secondary Aeration Basins[2]. The result of the study concluded that the spiral-roll aeration system provides an average Oxygen Transfer Efficiency (OTE) of approximately 7.5%. This is 50% lower OTE compared to other BNR activated sludge aeration systems, which typically have OTE of approximately 14% for the same depth coverage and treatment capacity. The study recommended replacing the existing spiral-roll aeration system and install a full floor coverage, fine-bubble aeration system to improve the transfer efficiency, which may reduce the air flow requirements to the secondary aeration process by as much as 50%. The evaluation also recommended replacing the existing aeration/mixing systems in the different process channels, which the JPA completed in 2015.

Similarly, the JPA has decided to replace the majority of the aging blowers. The existing blowers will be replaced with high efficiency blowers, which are expected to have approximately 7 - 10% greater blower efficiency and will improve the overall energy efficiency by about 15 % due to greater turndown capability and controls.

The sizing and selection of the proposed air diffuser system and blowers have to be performed methodically. The air diffuser system has to be selected first before the blowers can be sized since the air diffuser's OTE affects the air flow and pressure requirements of the blowers. The sizing of the aeration diffuser component, on the other hand, is affected by the amount of oxygen required by the treatment process, which in turn is affected by the facility's parameters, such as wastewater flow and influent loading, treatment process and the effluent quality requirements. The following sections will discuss establishing the Basis of Design for upgrading the Tapia WRF Process Air System's Secondary Process aeration diffuser system and the process air blowers based on these different parameters.

2.1 Permitting and Effluent Requirements

2.1.1 Waste Discharge Requirements

The Tapia WRF is mainly regulated by its Waste Discharge Requirements (WDR) Order R4-2010-0165 from the Los Angeles Regional Water Quality Control Board (LA RWQCB). The current Order was issued in 2010 and is expected to be renewed sometime in 2017. As part of the Order, the facility needs to meet certain effluent quality requirements. The effluent requirements vary depending on the disposal mechanism for the effluent. The majority of the effluent is currently being beneficially reused through the District-wide reclaimed water distribution system with only excess effluent being discharged to Malibu Creek during the winter and to the Los Angeles River during the summer. As a result of the potential to discharge to surface water, certain nutrients have to be removed, such as nitrogen and phosphorous. Current major constituents and nutrient limits are listed in Table 2 below.

[2] Off-gas Test Report for the Tapia WRF Performed on April 22 and June 6, 2011 (Stenstrom, M.K., 2011)

Table 2: Tapia WRF Effluent Limits for Major Constituents[1]

Constituents	Units	Ave Monthly	Max Daily
BOD5	mg/L	10	20
TSS	mg/L	5	10
Ammonia	mg/L	3.1/ 2.3	8.1/ 10.1
Nitrate+Nitrite	mg/L	8	-
Tot Phosphorous	mg/L	3	4

[1] Constituent Limits from Tables 6a, 6b and 6c of the WDR Order R4-2010-0165

In 2013, the United States Environmental Protection Agency (USEPA) adopted a Total Mass Daily Load (TMDL) for Nutrients to Malibu Creek. The new TMDL limit would be very difficult for the facility to meet with the current treatment volume and process. As a result, the JPA developed a TMDL Implementation Plan, which was approved by the LA RWQCB that will maximize the reuse of the effluent with minimal discharge to Malibu Creek. The JPA also proposes to design and construct a new Advanced Water Treatment facility that can treat up to 6 MGD of effluent to drinking water standards for the purpose of indirect potable reuse. In addition, the JPA can discharge up to 5 MGD to the LA River at Discharge Point 005. With the combined discharge option of 11 MGD, Malibu Creek discharge avoidance can be met for most, if not all, of the effluent produced from the Tapia WRF during dry weather conditions. Therefore, the Implementation Plan allows the facility to continue to meet the current WDR nutrient level without the concerns of the Malibu Creek TMDL limits.

2.1.2 California Environmental Quality Act (CEQA)

CEQA is a state statute that requires state and local agencies to identify significant environmental impacts associated with any actions or activities that may have a physical effect on the environment or a reasonable foreseeable indirect change in the environment. Even though upgrades to the Tapia WRF Process Air System will occur within the WRF confines without creating any new environmental disturbances, most construction activities are subjected to the provisions of CEQA and therefore a review of the CEQA requirements will be needed for the project.

Based on no major environmental impact anticipated for the Process Air Upgrades and the construction work is to upgrade existing equipment within an existing facility, the project will most likely qualify for categorical exemption defined in Title 14 of the California Code of Regulations, Chapter 3, Article 19 – Categorical Exemptions, specifically Section 15301 for repair or alteration of mechanical equipment within existing facilities.

2.2 Influent Flow and Load Conditions

Influent flow and load conditions impact the Tapia WRF Process Air System by affecting the biological process oxygen requirements. As flow and load increases, more air is required in order to maintain the biological oxidation process.

Flow and process data for the last 6 years was provided by the JPA. Figure 4 shows the historical flow data from 2010 to present. The annual average day flow to the Tapia WRF has been trending downward from approximately 8.5 MGD in 2010 to approximately 6.8 MGD presently. Influent BOD and Primary Effluent BOD (i.e., effluent from Primary Clarifiers) have been trending upward within the same 2010 – 2016 time frame (see Figure 5). Similarly, influent ammonia is also treading upward as shown in Figure 6. These trends are indications of the current voluntary water conservation as a result of the ongoing drought in Southern California. As wastewater flow generation decreases, load concentration increases.

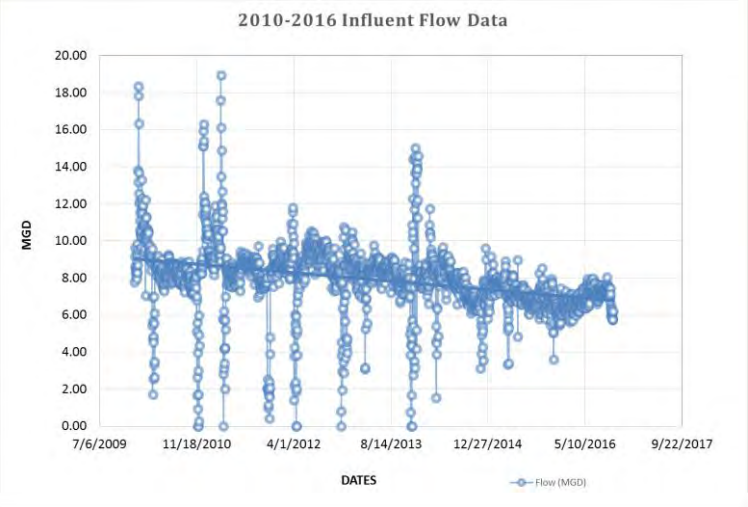


Figure 4: Tapia WRF Influent Flow Data from 2010 – 2016

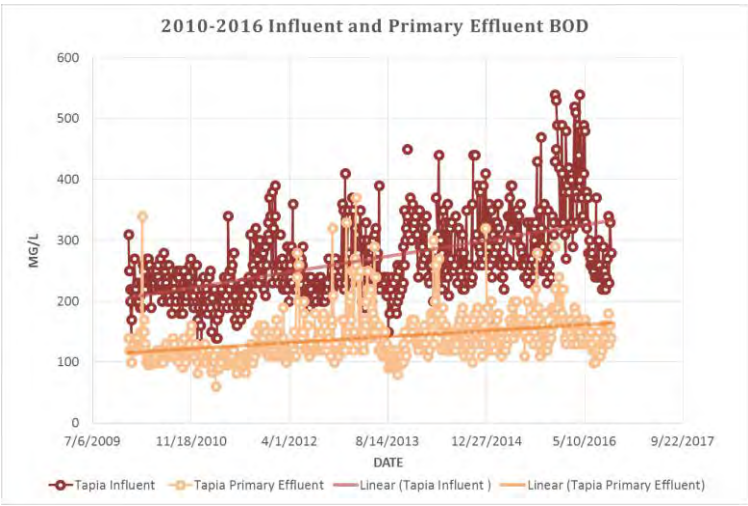


Figure 5: Tapia WRF Influent & Primary Effluent BOD Data from 2010 – 2016

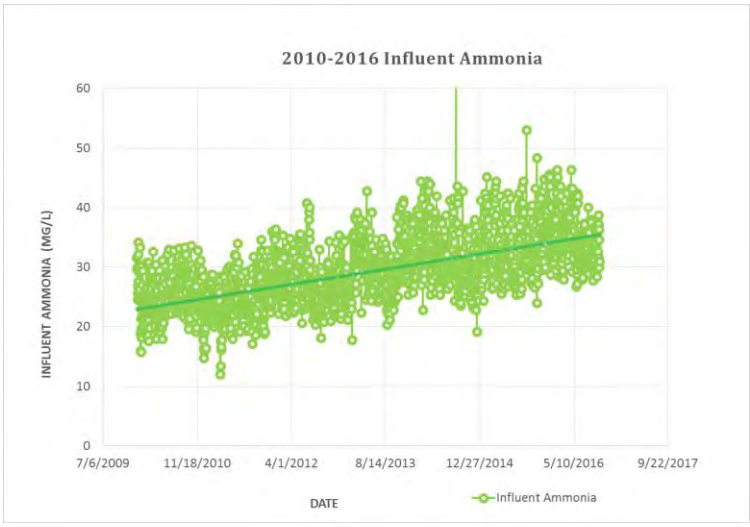


Figure 6: Tapia WRF Influent Ammonia Data from 2010 – 2016

In determining the Basis of Design, the flow and load data from 2015 – 2016 will be used since it reflects current conservation trend; captures the flow and load conditions over a minimum of one year, and minimizes the dilution of the load concentration due to time averaging. The average and maximum flow and load conditions for 2015 – 2016 was extracted from the data provided by the JPA and are summarized in Table 3 below. It should be noted that the use of the primary clarifiers reduced the influent BOD_5 load by approximately 50%, which reduces the need for the secondary process to treat this load and the air requirements for the treatment. Therefore, the primary clarifiers will need to be maintained for proper operation of the facility as part of this Process Air Upgrades.

Table 3: Tapia WRF Average and Maximum Flow and Load Conditions for 2015 – 2016

Influent Parameters	Units	Average	Maximum
Flow[1]	mg/L	6.8	8.0
Influent BOD_5	mg/L	320	540
Primary Effluent BOD_5	mg/L	153	290
Influent Ammonia	mg/L	34	46

[1] Average and maximum Flow data was for 2016 only.

2.3 Treatment Process Configuration

One of the JPA's goals is to producing high quality effluent to satisfy its reuse customers and to minimize operational cost associated with effluent quality within its reclaimed water distribution system. In addition, having high effluent quality will also reduce maintenance cost to the proposed Advanced Water System for indirect potable reuse by reducing the amount of contaminants that need to be removed from the proposed system. Therefore it is important that the treatment process selected should be based on producing the highest effluent quality. The treatment process also plays a significant role in determining the design of the Process Air System by affecting the amount of air required based on the available volume, depth, process configuration, the available floor coverage, and treatment capacities.

In 2016, the JPA evaluated the secondary process to identify the optimum treatment process based on current tank geometry, volume and hydraulic process[3]. The evaluation considered the following five treatment options:

- Existing Bardenpho configuration with carbon addition
- Existing Bardenpho configuration but with baffle installation and carbon addition
- Step Feed Configuration (with baffle installation)
- Modified Ludzack Ettinger (MLE) Process
- Revised Bardenpho Configuration with baffle installation and carbon addition

The evaluation utilized Biowin™ process modeling based on facility process data and sampling results. The modeling results indicated that the Revised Bardenpho Configuration with baffle installation and carbon addition would result in the highest water quality. This process configuration may lower the effluent's Total Nitrogen to less than 3.5 mg/L and Total Phosphorous to as low as 0.1 mg/L up to an average day treatment capacity of approximately 10 MGD. As a result, this process configuration will be used as the primary configuration in determining the Basis of Design.

Figure 7 shows the proposed configuration of the Revised Bardenpho Process, which is also a 4-Stage Bardenpho Process similar to the existing process with the exception of the size and location of each aerobic/ anoxic zones. In addition to the changes to the zones, other modifications include requirements for carbon addition, relocation of the internal mixed-liquor recycle stream, and installation of wall baffles.

[3] Tapia Water Reclamation Facility Treatment Process Feasibility to Meet Proposed Phase I and Phase II Effluent Limits (Hazen and Sawyer, 2016)

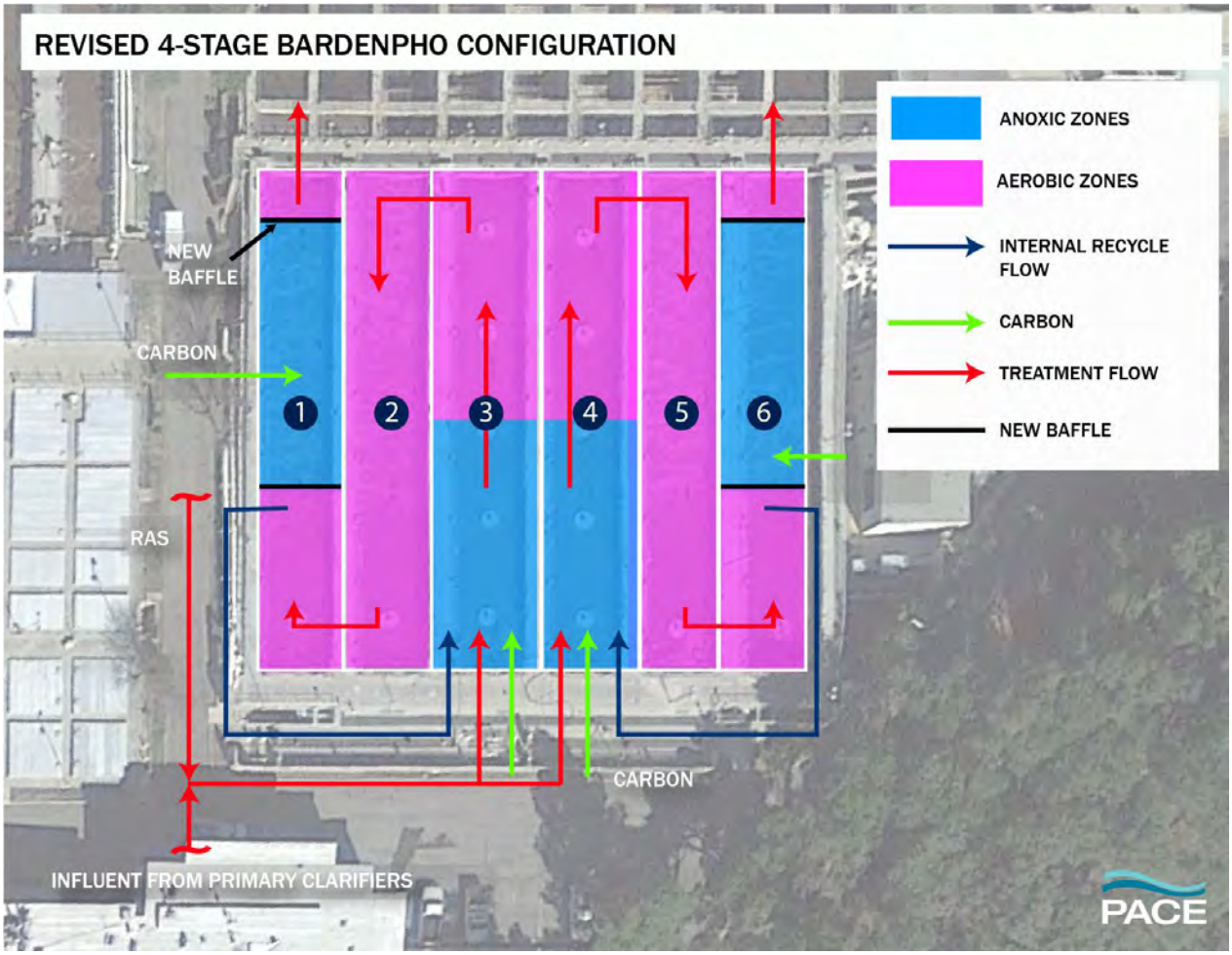


Figure 7: Proposed Revised 4-Stage Bardenpho Process with New Aerobic/ Anoxic Zones

2.4 Process Air Requirements

Even though the 2016 evaluation identified the Revised 4-Stage Bardenpho Configuration as the recommended alternative for providing the highest water quality, the evaluation did not identify the air requirements for the process. PACE performed in-house calculations and static modeling of the 4-stage Bardenpho Process to provide a verification of the Biowin™ model and to identify the air requirements. PACE's evaluation was based on the design parameters listed in Table 4, which was derived from the influent load conditions listed in Table 3 in the previous section. PACE's load values were rounded up mainly to provide a more generic value, which also adds a small level of conservatism.

Table 4: Influent Conditions and Design Parameters

Flow (MGD)	BOD (mg/L) (Min/Max)	TKN (mg/L) (Min/ Max)	MLSS (mg/L)
5.5	160/290	35/ 46	2000
6.8	160/290	35/ 46	2000
7.5	160/290	35/ 46	3000
9.3	160/290	46	4000
10	184/ 290	50	4500
11	184/ 290	50	4500
12	184/ 290	50	4500

PACE performed calculations at 6 different flow conditions using average and peak loadings. The first three flow conditions were used to represent the projected flows the facility may experience in the next 10 years assuming the water conservation trend continues. The 9.3 MGD flows condition was evaluated as a comparison to the 2011 evaluation and off-gassing study performed by the JPA (Carollo, 2011). The 10, 11 and 12 MGD flow conditions were performed to find the upper limit of the treatment process air requirements.

Key steady-state conditions in PACE's evaluation are listed below:

- Aerobic volume is adjusted to maintain a solids retention time of approximately 5 days or greater
- Mixed-liquor concentration upper limit is 4,500 mg/L
- Internal recycle rate of 3 times the influent flow
- Operating depth was increased to 14.5 ft
- Total effluent Nitrogen is less than 8 mg/L

The results of the PACE's evaluation are shown in Tables 5 and 6, for average and peak load conditions, respectively. PACE's evaluation is based on in-house calculations[4] using both published and empirical data collected from operating facilities of similar processes. To ensure reliability of the calculations and as an added "gut check", PACE determined the Oxygen Transfer Rate (OTR) using the calculations at the average flow condition at 9.3 MGD, which is similar to flow conditions the JPA evaluated in 2011 using another Biowin™ Model. The results of the OTR for both evaluations were within 0.5% of each other. Completed PACE calculation printouts are attached in Appendix A.

Table 5: PACE In-House Calculations for Average Loading Conditions at Various Flow Rates

Flow (MGD)	BOD (mg/L)	TKN (mg/L)	MLSS (mg/L)	SRT (Days)	OTR (lbs/day)
5.5	160	35	2500	6.3	8,654
6.8	160	35	2500	5.2	10,114
7.5	160	35	3000	5.4	11,304
9.3	160	46	4000	5.4	14,212
10	184	50	4500	5.8	18,052
11	184	50	4500	5.2	19,244
12[1]	184	50	4500	5.5	21,319

[1] Flow condition did not meet Effluent Total Nitrogen of <8 mg/L.

[4] Developed through work done with Dr. David Stensel, Professor Emeritus in Environmental Engineering from the University of Washington and Co-author of the Wastewater Treatment Engineering: Treatment and Reuse (McGraw-Hill, 2003), widely considered as the premier reference for wastewater engineering and design.

Table 6: PACE In-House Calculations for Peak Loading Conditions at Various Flow Rates

Flow (MGD)	BOD (mg/L)	TKN (mg/L)	MLSS (mg/L)	SRT (Days)	OTR (lbs/day)
5.5	290	46	3000	6.9	14,136
6.8	290	46	4000	5.4	16,108
7.5	290	46	4000	5.2	17,513
9.3[1]	290	46	4000	4.9	21,276
10[1]	290	50	4500	5.2	23,284
11[1]	290	50	4500	4.6	24,681
12[1]	290	50	4500	4.2	26,030

[1] Flow condition did not meet Effluent Total Nitrogen of <8 mg/L.

The results of PACE's in-house evaluations show that the existing treatment volume is sufficient to treat up to 11 MGD at average day load conditions and still meet the effluent TN requirements of less than 8 mg/L. For peak loading conditions, the facility can treat more than 7.5 MGD but less than 9.3 MGD. The results show that the facility cannot treat 12 MGD at average or peak loading conditions.

2.4.1 Fine Bubble Aeration System Basis of Design

The Standard Oxygen Transfer Efficiency (SOTE) is how well oxygen transfers into water at standard operating conditions. The SOTE is based on many factors, such as OTR required by the treatment process (flow and load), diffuser layout, submergence depth, floor coverage density, etc. Higher SOTE translates to lower air flow requirements because the oxygen is transferred more efficiently into the water, thus requiring less air. It is one of main parameters used in sizing of the aeration system because it takes the interconnecting factors into account and allows for a fair comparison. For example, high SOTE is desirable to lower the air requirement for the treatment system; however, high SOTE requires increase floor coverage density, which increases the number of diffusers to be installed. To minimize cost, some manufacturers may decrease the number of diffuser, compromising the SOTE of their system. Therefore, to maintain high efficiencies (and thus the minimum number of diffusers required), a minimum SOTE should be established for different flow conditions.

Table 7 lists the minimum SOTE required for the Tapia WRF's fine bubble aeration system based on typical fine bubble aeration SOTE of 2.1% per foot submergence at the lower flow conditions and 1.7% per foot submergence at the higher flow conditions. All conditions were based on a total diffuser submergence depth of 13.5 ft. The table also identifies the air requirements for both average and peak OTR loading for various flow conditions based on the minimum SOTE.

Table 7: Aeration Design Parameters based on Minimum SOTE

Flow (MGD)	Ave OTR (lbs/day)	Max OTR (lbs/day)	Min Design SOTE %	SCFM (ave)	SCFM (max)
5.5	8,654	14,136	28	2,950	4,819
6.8	10,114	16,108	28	3,448	5,492
7.5	11,304	17,513	27	3,996	6,191
9.3	14,212	21,276	25	5,426	8,123
10	18,052	23,284	24	7,180	9,261
11	19,244	24,681	24	7,653	9,816
12	21,319	26,030	24	11,656	14,233

2.4.2 *Process Blower Upgrades Basis of Design*

The Basis of Design for the new process air blowers will be based on the total air flow range and the highest pressure requirements from all of the facility's process air. Table 8 lists the minimum and maximum air flow requirements of the Secondary Process Aeration Basins, taking into account the different flow scenarios from 5.5 MGD to 12 MGD. These flow ranges are based on the assumed SOTE for the fine bubble aeration system listed in Table 8.

Table 8: Minimum and Maximum Air Flow Requirements for the Secondary Aeration Process Basins at the Tapia WRF

Flow (MGD)	SOTE %	SCFM (ave)	SCFM (max)	Pressure (PSI)[1]
5.5	28	2,950	4,819	7.5
6.8	28	3,448	5,492	7.5
7.5	27	3,996	6,191	7.6
9.3	25	5,426	8,123	7.6
10	24	7,180	9,261	7.8
11	24	7,653	9,816	8.0
12	24	11,656	14,233	8.0

[1] Pressure based on 13.5 ft submergence, Mfg.'s diffuser pressure loss and 1 psi of pipe head loss.

The Secondary Process Aeration Basin will require an air flow range from approximately 2,950 scfm to 14,300 scfm at a pressure of approximately 8.0 psi in order to cover the treatment capacity from 5.5 MGD to 12 MGD. Significant changes to the SOTE will affect the air flow ranges. Therefore, identifying the design of the fine bubble aeration system will be required before a final air flow range for the Process Air blowers can be finalized.

Table 9 shows the air flow ranges and pressure requirements from the Other Process Air Components and the RAS Re-aeration Basins, which has a total range of 3,050 – 4,500 scfm with a maximum pressure requirement of 7.5 psi.

Table 9: Tapia WRF Air Flow Range and Pressure for the Other Process Air Components

Process Area	Air Flow Min (SCFM)	Air Flow Ave (SCFM)	Air Flow Max (SCFM)	Pressure (PSI)
RAS Re-aeration Basins[1]	450	900	1200	6.5[2]
Grit Aeration	150	150	300	NA[4]
Grit Chamber Effluent Channel	150	400	400	4.7[2]
Channel No. 1 (Primary Clarifier Effluent)	1,000	1,000	1,000	5.3[2]
Channel No. 2 (Aeration Basin Channel)	500	500	500	4.5[2]
Channel No. 3 (MLSS)	400	400	400	4.5[2]
Channel No. 4 (RAS)	400	400	400	5.3[2]
Effluent Filter Backwash Scour	0	0	300	7.5[3]
Total Air Flow	**3,050**	**3,750**	**4,500**	

[1] Min and Max Air flow for RAS Re-aeration based on Tapia WRF - Process Air Evaluation Tech Memo No.1 (Carollo, 2011).
Ave air flow based on current daily usage provided by JPA.
[2] Pressure estimated based on process operating depth plus 1 psi.
[3] Pressure requirement not available. Currently operating off of existing system pressure of 7.5 psi.
[4] Pressure not available but anticipate to be less than 7.5 psi.

The total air flow range requirements for the Process Air Blowers will be the summation of all of the Process Air components as shown in Table 10. It should be noted that even though the peak air flow for the Other Process Air is 4,500 scfm, it seems excessive to include the peak flow conditions with the Secondary Process Aeration Basins' peak air requirement at 12 MGD. This peak condition is very unlikely to occur and therefore, requiring equipment to meet this rare condition would only increase capital cost to the JPA. For example, the largest high speed, turbo blower currently in production has an upper limit of slightly higher than 9,000 scfm for the 8-psi pressure requirement. Requiring the peak conditions for both the Secondary Process and the Other Air Process would require three of these blowers, instead of two, increasing capital cost to the JPA. As a result, it is recommended that the proposed Process Air Blowers will be sized to meet the flow range of 6,000 scfm to 18,000 at a maximum pressure of 8 psi.

Table 10: Tapia WRF Total Air Flow Range and Pressure Requirement for the New Process Air System

Process Area	Min Design Air Flow (SCFM)	Max Design Air Flow (SCFM)	Design Pressure (PSI)
Secondary Process Basins	2,950	14,233	8
Other Process Air	3,050	3,750	7.5
Total	**6,000**	**17,983**	**8**

3 Preliminary Design

The Tapia WRF Air Process Upgrades will consists of upgrading the following main components:

- Secondary Process Aeration Basins' aeration diffusers
- Process Air Blowers

The RAS Re-aeration basins' existing spiral-roll diffusers will remain in place and any upgrades will be deferred due to the minimal cost benefits identified by the JPA[5]. Improvements to the channel aeration system were performed in 2015 as part of the Tapia WRF Channel Air Improvements.

3.1 Secondary Process Basin Aeration Upgrades

Improvements to the Secondary Basins' Aeration System will require improvements to the existing aeration equipment and physical improvements to the tank structure and process equipment. Improvements to the aeration equipment will primarily be the replacement of the existing spiral-roll diffusers in most of the basins with new fine bubble aeration system to increase the floor coverage density. New air piping, valves and instrumentations will also be installed for required air connections and controls. Improvements to the tank structure and process equipment will include modifications for the installation of the proposed fine bubble aeration system, increase the operating water depth, and may include provisions for the Revised 4-Stage Bardenpho process, such as piping for the Internal Mixed-Liquor Recycle (IMLR) and guide rails for future walls baffles and mixers. The basin floor will also need to be modified to allow for proper leveling of the new aeration system, which may include grouting of the floor or installation of landing pedestals.

3.1.1 Proposed Fine Bubble Aeration Equipment

The placement and floor coverage of the new diffuser system will be determined based on the locations of the different aerobic zones in the Revised 4-Stage Bardenpho Process; however, to allow the JPA's staff flexibility to adjust and modify the aerobic zones as needed, fine bubble diffusers will also be placed in some anoxic zones to create swing zones. Swing zones allow more air to be added to the process, especially during low flow conditions, reducing the air flux rate and improves OTE. In addition, the swing zones allows the basins to be operated similar to the current process in the event that the JPA wants to delay the implementation of the Revised 4-stage Bardenpho process to a future date. Figure 8 shows the proposed retrievable fine bubble diffusers layout for the Revised 4-Stage Bardenpho process. New submersible mixers will be required in swing zones to provide mixing during anoxic periods.

[5] LVMWD – Process Air Evaluation Tech Memo No.1 (Carollo, Nov. 2011), pg.1-37.

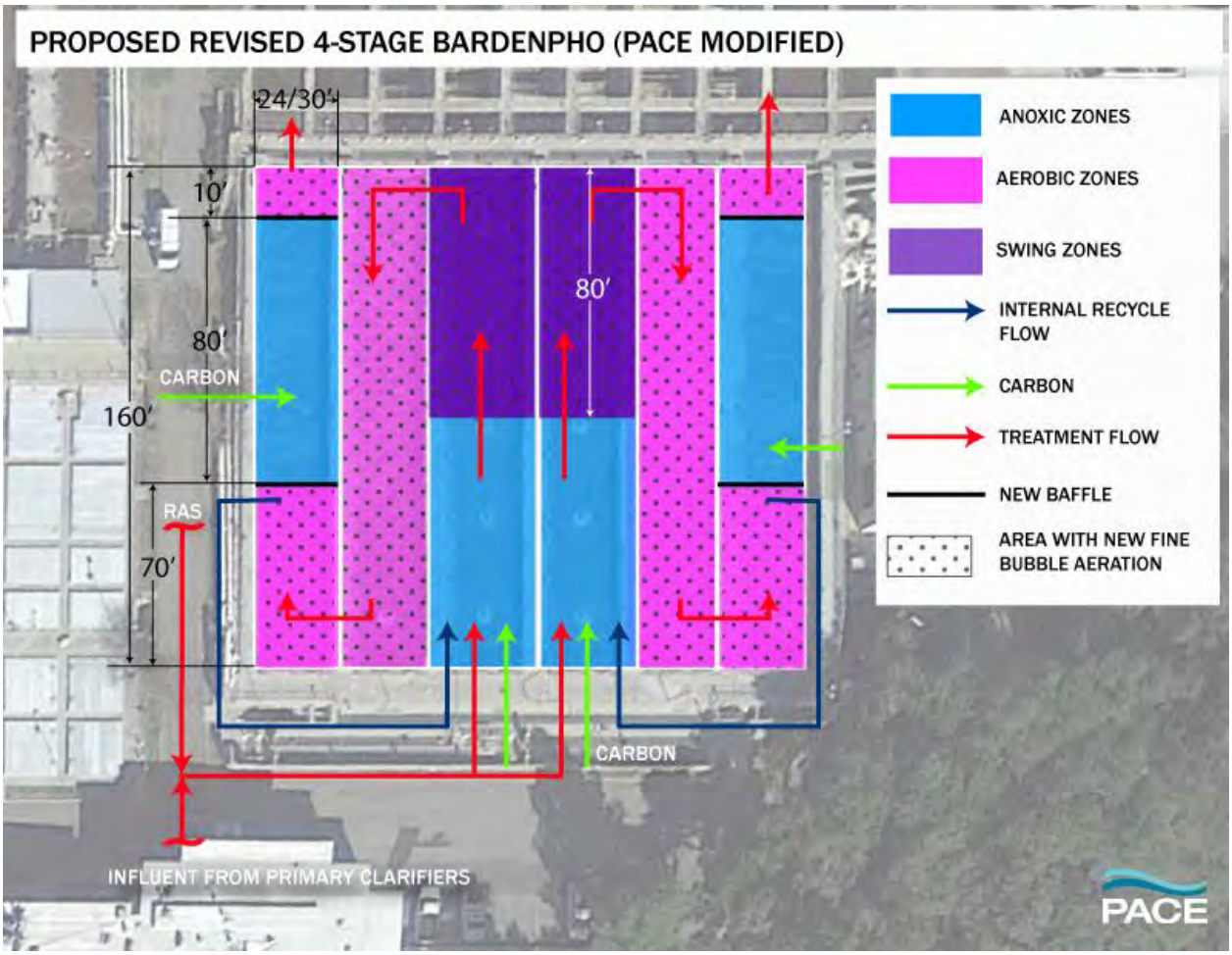


Figure 8: Proposed Locations of New Fine Bubble Aeration

3.1.1.1 Fine Bubble Aeration System Evaluation

Fine bubble diffusers can be installed as permanent fixtures on the basin floor (fixed diffusers) or as retrievable grids. There are advantages and disadvantages to both types. The advantages to the fixed diffusers installation is the higher SOTE and lower capital cost. The advantage to the retrievable grid diffusers is lower installation cost and the ability to service and repair the system without taking the affected process basin out of service.

Deeper diffuser submergence increases the SOTE by increasing the retention time of the air bubbles as they rise to the top. Since fixed diffusers are permanently anchored to the basin floor, the diffusers can be placed almost directly on the floor, such as with flat panel diffusers, or about 4 to 6 inches above the floor to allow for leveling and alignment with the supply-air piping, which is typical of disc or tube diffusers. Retrievable grid diffusers, on the other hand, are installed on retrievable frames. The frames are typically 6 – 8 inches thick, decreasing the submerged depth of the diffusers by 1 foot or more, translating to about 1.5 – 2% reduction in SOTE.

Another disadvantage of the retrievable frame that affects the SOTE and is specific to the Tapia WRF is the reduced floor coverage due to the “Y” configuration of the existing side walls. Retrieving the diffuser grids requires a clear opening from the floor to the top of the basin. The existing basins’ inside width is approximately 30 ft; however, the “Y” configuration converges on top, reducing the clear opening to approximately 25 ft. This reduces the floor coverage density of the retrievable grid type by about 15-20% (note that the actual floor reduction as compared to the fixed diffusers would only be 8-10% because

there is existing IMLR piping along the east side of each basin that will also limit the installation of fixed diffusers).

The maintenance frequency of the fine bubble diffusers (whether fixed or retrievable) is recommended annually by the manufacturers. Biological and inorganic scaling should be removed manually using a bristle brush and low pressure hosing, which can be labor intensive (see Preventative Maintenance requirements for EDI Fine Bubble Diffusers attached in Appendix B). Therefore, the main advantage of the retrievable grid diffuser type is the ability to maintain and repair diffusers without taking the entire basin out of service and impacting the treatment process. Each retrievable fine bubble grid can be isolated and removed with minimal effects on the remaining aeration grids (i.e., the air flux rate in the remaining grids will only increase by approximately 5%) or treatment capacity. Whereas maintenance or services on fixed diffusers require isolating the affected basin and draining the basin before operators can enter to make inspections or repairs. This will require draining the basin and entering the basin for physical inspections, which is expected to take 1 to 2 weeks per basin. Removing any process basins from service will impact the effluent water quality and treatment capacity of the facility due to the reduction of treatment volume. As a result, maintenance of a basin should only occur during the summer months when all of the effluent produced can be reused to eliminate the need to discharge to outfalls and the potential to violate the discharge permit.

The ease of removal for the retrievable grid diffusers also allows for a proactive maintenance program since the maintenance of the diffuser is less labor intensive and can be done at any time without impacting the process. For example, if one or two diffuser grids required maintenance, it is more likely that those diffusers will be repaired promptly with a retrievable system. For permanently fixed diffuser system, the repair will most likely not occur until a sufficient number of diffusers are in need of repair to justify taking the entire basin down, or during the summer maintenance period. This delayed maintenance impacts the performance of the aeration system and operational cost.

3.1.1.1.1 Fine Bubble Aeration System Cost Analysis

From a cost perspective, fixed diffusers have lower capital and operating costs than retrievable grid diffusers; however, the installation cost and maintenance cost are higher. The budget cost for fixed diffuser at the Tapia WRF is estimated at $196,000, which includes the drop pipes, lateral piping, and supports. The budgetary cost of a retrievable diffuser system for the Tapia WRF is approximately $300,000. The budgetary costs were provided by Aquarius and OTT, both are manufacturers of fine bubble aeration systems (see Appendix B for vendors' budgetary quotations and correspondences).

The higher capital cost for the retrievable grid type is associated with providing a retrievable frame structure and the guide mechanism for the aeration grid itself. In addition, the cost for a retrieval mechanism, such as a gantry crane system, will also have to be included. The retrieval crane system will need to travel along the length of each basin, allowing any diffuser grid to be pulled and transported to the staging area located south of each basin. The crane system does provide added maintenance benefits since it can be used to retrieve and service other existing equipment in the basins, such as mixers and valves. A budgetary cost of a gantry crane system is approximately $45,800.

Installation costs for the two types of diffuser systems vary significantly. Installation of fixed diffusers are labor intensive and requires anchoring of the lateral piping and drop legs, as well as the physical installation of the estimated 5,600 diffusers. The estimated cost for equipment and installation was approximately $258,000, including labor and materials. Installation cost for the retrievable grid diffuser is estimated at $276,000, which includes the installation of the guide rails, assembly of the frames for an estimated 56 grids, labor and materials. It should be noted that final installation cost will vary depending on the actual system selected.

From a maintenance cost standpoint, the retrievable grid diffusers will not require any addition equipment during maintenance (assuming a gantry crane is used); however, dewatering equipment will be needed for maintenance of the fixed diffusers. Based on the JPA's operator's estimate, each basin will require between 1 to 2 weeks for service, which equates to approximately 9 weeks for all six basins (using an average of 1.5 weeks per basin). This time estimate is based on emptying the basin using both the existing basin drains and pumping the water into the other basins, entering the basin and performing light

maintenance on each fixed diffusers, and putting the basin back into service. Estimated pump rental cost is $320 per day or approximately $20,000 for the entire maintenance period (see Appendix B for Rental Quote). Labor cost will also be higher due to greater supervision required for confine space entry into the basins; however, labor is not included in the cost estimation due varying unknown factors, such as salary, available personnel, hours of operations, etc. It is estimated that three operators will be required, especially when the operators are performing maintenance inside the basin.

Even though the fine bubble diffuser system does not require any power, operating cost of the facility is affected by the SOTE of the diffusers. Higher SOTE decreases the air flow requirements for the Process Air Blowers. As mentioned earlier, the fixed diffusers have deeper submergence depth and greater floor coverage, which translated to an increase of approximately 4 – 7% higher SOTE. Assuming an average of a 5% SOTE improvement, the estimated average power saving is approximately $18,500 annually.

Table 11 summarizes the 20-year Life Cycle Cost (LCC) analysis of both the fixed diffuser type and the retrievable grid diffuser type. The operating cost is based on the new estimated air flow for the new high efficiency blowers and a 5% higher SOTE for the fixed diffusers. The Net Present Value is calculated based on a 5% interest rate. The analysis is based mainly on budgetary costs and assumed values for certain parameters and therefore provides only a general idea of the long-term cost of ownership. Appendix C provides a detailed breakdown of the 20-year LCC analysis.

Table 11: 20-yr LCC Analysis for Fixed Diffusers and Retrievable Grid Diffusers

	Fixed Diffusers	Retrievable Grid Diffusers	Difference
Aeration Equipment Cost	$196,000	$345,800[1]	
Aeration Equip Installation Cost	$258,240	$220,640	
Mechanical/ Electrical/ Controls	$450,100	$451,600	
Total Capital Cost	**$904,340**	**$1,018,040**	**$113,700**
Annual Operating Cost	$173,800	$192,280	
Maintenance Cost	$37,008	$3,000	
Total O&M Cost	**$210,762**	**$195,280**	**-$15,482**
20-yr Life Cycle Net Present Value	**$3,530,897**	**$3,451,664**	**$-79,232**

[1] Equipment Cost includes cost of gantry crane.

In general, the 20-yr LCC analysis shows that the retrievable grid fine bubble diffuser system is approximately $79,000 less than the fixed fine bubble system, based on net present value. This difference is approximately 8% of the project cost and would make the retrievable grid system more favorable from a LCC standpoint. Even though the total capital cost of the fixed system, which includes equipment cost, installation, mechanical and electrical & controls, is approximately $114,000 lower than the retrievable system, the higher annual maintenance cost associated with draining the basin, diffuser replacement and renting equipment offset the capital cost over the 20-yr period.

3.1.1.1.2 Fine Bubble Aeration System Recommendation

Table 12 provides a summary of the advantages and disadvantages of the Fixed Fine Bubble Diffusers and the Retrievable Grid Fine Bubble Diffusers.

Table 12: Advantages and Disadvantages of Fixed and Retrievable Grid Fine Bubble Diffusers

		Fixed Diffusers		Retrievable Grid Diffusers
Total Capital Cost	√	• Approx. $170k Less		• Approx. $170k more
Total O&M Cost		• Approx. $15k more annually	√	• Approx. $15k less annually
20-Yr LCC		• Approx. $79K NPV more	√	• Approx. $79K NPV less
System Efficiency	√	• Higher SOTE by 4-7%		• Lower SOTE
Maintenance Requirement		• Requiring removing affected basin out of service • Renting dewatering equipment. • Adversely affect treatment capacity • More diffusers to maintain	√	• Allows diffusers to be serviced without taking basins down • Do not affect treatment capacity

Most of the advantages of the fixed diffusers are associated with the lower capital cost, however, this savings is offset by the higher maintenance requirements, especially the cost to dewater the basins and diffuser replacement. The main advantage of the retrievable grid diffusers is the ability to service the diffusers without adversely affecting the treatment process.

The main goal of the JPA is to produce high quality effluent at the minimum cost; therefore, the advantage of the retrievable grid aeration system to maintain treatment capacity at lower 20-yr LCC outweighs the initial lower capital cost savings of the fixed fined bubble system. As a result, it is recommended that the JPA install the retrievable fine bubble diffuser grid system for the aeration of the Secondary Process Basins.

3.1.1.1.3 Fine Bubble Aeration System Performance-based Specifications

Most of the main fine bubble aeration system manufacturers, such as Sanitaire, EDI, Aquarius, SSI and OTT, provide retrievable grids systems. Cost of the retrievable system varies depending on the design of the frame, retrieval mechanism and the quantity and type of fine bubble diffusers. As such, it is difficult to know which equipment to select and how to proceed with the design. Typically, a preliminary evaluation is performed prior to design; however, during a typical evaluation, select equipment vendors provide budget prices that are significantly higher than competitively-bid prices. Once an evaluation is complete and equipment recommended, the upgrades are designed around the selected equipment, resulting in a high probability that the final cost of the equipment will be higher than if competitive bidding were performed.

To mitigate this, the JPA can implement a Performance-based Specifications process to solicit bids from aeration manufacturers prior to initiating design. This means that a Request for Proposals (RFP) is issued by the JPA for the fine bubble aeration system based on an established set of performance-based specifications that the JPA developed specifically for the project. The RFP with Performance-based Specifications allows the JPA to get competitive bids from selected equipment vendors and evaluate capital cost, operational costs and operational performance of the equipment prior to the design phase. The major advantage is that the competitive bidding environment significantly drives down the capital cost, allowing for the evaluation to be done based on real binding cost. After the evaluation, the JPA commits to the purchase of the selected equipment, allowing the design to proceed based on the exact equipment, reducing design ambiguity and potential change orders during construction. Therefore, it is highly recommended that the JPA uses Performance-based Specifications in selecting the proper retrievable fine bubble aeration system.

3.1.2 Aeration Basin Modifications

The Secondary Process Aeration Basins will continue the current operation; however, the basins will need to be modified for the installation of the proposed fine bubble aeration system, which will be installed in the aeration zones as shown in Figure 9. New air piping and drop legs will be extended to each aeration grid to allow for independent air feed to each grid. The ability to control each aeration grid provides more process flexibility, especially to either increase or decrease aerobic or anoxic zones as dictated by the treatment process. For both Basins 3 and 4, where the front half of the basins are dedicated as anoxic zones, the existing floating anoxic mixers and existing spiral roll diffusers will remain in place. Similarly, the dedicated anoxic zones in Basins 1 and 6 will also use existing surface mixers and

spiral-roll diffusers. The mixers will continue to provide anoxic mixing during normal treatment process, while the spiral roll diffusers will remain in the event that future aeration may be needed and to allow for parallel basin operation. Optionally, during low flow conditions (average day flow treatment capacity of less than 8 MGD), the proposed swing zones in Basins 3 and 4 can operate as an anoxic zone similar to the current operation; however, this will require the installation of new submersible mixers to provide horizontal mixing since the new aeration diffusers will be turned off.

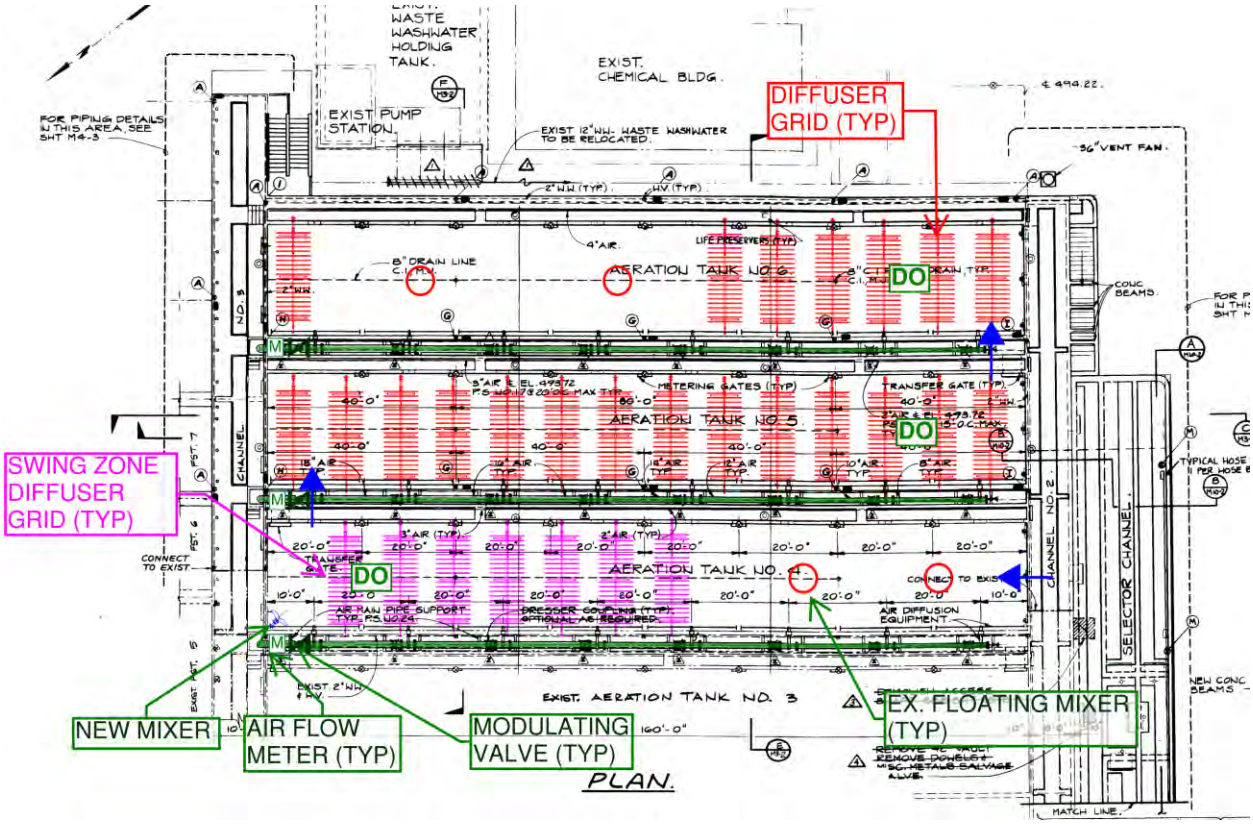


Figure 9: Proposed Fine Bubble Aeration System Grid Layout for East Train (Configuration mirrored for West Train)

The main structural modifications to the basins will be to level the existing basin concrete floor with grout or install landing pedestals for the proper placement of the proposed aeration system. Process modifications will include installing new basin effluent weirs to increase the operating water level to 14.5 ft. Guide rails for retrievable systems will also need to be installed. Other modifications to the basins will include the following:

- Installation and/or modifications to air flow meters and modulating valves
- Air piping modifications for connections to the new fine bubble aeration system
- Installation of new DO probes in each basin

Since most basins will need to be drained and cleaned in preparation for the floor leveling or to install landing pedestals, this presents an opportunity for the JPA to make improvements to existing equipment and to install provisions that would allow the facility to operate in the Revised 4-Stage Bardenpho process in the future with minor disruptions. These options may include the following:

- Replacement of existing slide gates and weir gates that have corroded or non-operational
- Installation of baffle wall guides for future baffle wall installations
- Installation of mixer guides (and submersible mixers to maintain current process)

- Installation of wall penetration, pump cans and piping for the future IMLR to the Basin Feed Channel
- Improvements to the center walkways and guard rails to allow for the operations of the gantry cranes

3.1.2.1 Aeration Basin Modifications Construction Sequence

The installation of the retrievable grid fine bubble system requires that the grids be leveled when they are set at the bottom of the basin's floor during normal operation. This will likely required that the existing sloped floors of the basins be grouted to provide level resting pads for the grids or level pedestals be installed to serve the same purpose. As a result, each basin will need to be drained in order to perform either option. At the current treatment flow of less than 6.8 MGD, one of the six basins can be taken out of service without significantly impacting the effluent quality. This will allow construction in each basin to occur in series starting with one train until all basins in the train is completed before transitioning to the remaining train. When construction begins in one train, all operable basins in that train will operate in parallel configuration while all the basins in the other train continue to operate in the serpentine configuration.

Each basin can be isolated using the existing influent gate weirs. Process water within the basin will be emptied by partially draining the water back to the head of the plant and to pumping it into the selector channel where it will be redistributed into the other five basins. Similarly, all air piping laterals to each basin can be manually isolated to allow air pipe modifications and to remove the existing spiral row diffusers where required.

3.2 Aeration Blower System

Currently there are six blowers at Tapia installed to provide the required process air. The three Roots 900 HP single stage centrifugal blowers have a rated air flow capacity of 22,500 scfm at 7.3 psi per blower (approximately 19,500 scfm at 8 psi). The three Hoffman 250 HP multi-stage centrifugal blowers have an air flow capacity of 4,500 cfm per blower. Each of the Roots blowers are housed within its own blower bay located north of the old digesters and east of the headworks. The Hoffman blowers are located together below ground on the northeast side of the old digester structure.

Although the blowers can provide the required air flow ranges listed on Table 10, they were installed in the 70's and 80's and the increase frequency of service maintenance and repairs is impacting the reliability of the blowers and placing undue burden on the operations staff. In addition, the blowers are becoming less efficient with age. Based on a recent evaluation[6], the Roots blowers are operating at 65.9% efficiency, while the Hoffman blowers are estimated at only 55 to 63% efficiency. Replacing the blower with higher efficiency blower, coupled with upgrading to full coverage fine bubble diffusers, is projected to save the JPA more than $138,000 annually.

In 2011, the JPA conducted a detailed evaluation to compare different blower technologies available for wastewater application[7]. The evaluation looked at the following four commonly used blower technologies:

- Positive-displacement blowers,
- Multi-stage, centrifugal blowers,
- Single-stage, integrally geared, centrifugal blowers; and
- High speed, direct-drive turbo blowers.

The evaluation identified the single-stage, integrally geared, centrifugal blowers (referred to as Turblex blowers since Siemens Turblex has the majority market share in this type of blowers) and the direct-drive turbo blowers as the most viable choice due to their high wire-to-air efficiency, and they were further evaluated based on a 20-yr LCC analysis. The evaluation recommended the use of the Turblex blowers as the best option for the JPA.

[6] As determined by LIncus Incorporated, LVMWD WWTP Blower and Diffuser Project Feasibility Study (December 2016)
[7] Tapia Process Air Evaluation – Technical Memorandum No.2, Blower Evaluation, (Carollo, December 2011)

PACE reviewed the evaluation and agreed with the majority of the findings; however, because the recommendation to use the Turblex blower was weighted heavily on the 20-yr LCC analysis, significant changes to the cost of the blowers or to the operations and maintenance (O&M) cost can affect the 20-yr LCC and thus the recommendation. Since the time of the evaluation, high speed turbo blowers have gained significant market share of the wastewater blower industry. This increase in use and market share have reduced the cost of the turbo blowers. In addition, the turbo blowers are available with magnetic bearings, which provides more reliability and robustness versus the air-foil bearing design used in the evaluation. Another area that may need to be revisited is the maintenance cost comparison of the two types of blowers. A significant portion of the O&M cost was the replacement cost of the turbo blower's VFD versus the replacement of the Turblex blower's bearings. The VFD replacement cost for the turbo blowers seems elevated while the cost for maintenance and bearing replacements for the Turblex blowers seems significantly lower than with typical bearing maintenance cost requirements.

PACE obtained new budgetary cost proposals from Siemens Turblex and ABS Sulzer (manufacturer of magnetic bearing turbo blowers). A new 20-yr LCC analysis of both the turbo and Turblex blowers was performed and summarized in Table 13 below. The annual power cost is based on the new estimated air flow using the recommended retrievable fine bubble aeration system and for treatment capacity from 5.5 MGD to 9.3 MGD over the 20-yr period. O&M cost is based on actual cost from facilities with existing Turblex or Turbo blowers. The net present value was based on a 5% annual interest rate. Appendix B provides a detailed breakdown of the cost analysis.

Table 13: 20-yr LCC Analysis for Turbo and Turblex Blowers

	Turblex Blowers	Turbo Blowers	Difference
Blower Equipment Cost	$600,000	$500,000	
Ancillary Equipment Cost	$50,000	$90,000	
Mechanical Installation Cost	$69,520	$69,520	
Electrical/ Controls	$78,260	$78,260	
Total Capital Cost	**$797,780**	**$737,780**	**$60,000**
Annual Power Cost	$173,433	$176,422	
Annual Maintenance Cost	$8,760	$2,000	
Total O&M Cost	**$182,193**	**$178,422**	**$3,771**
20-yr Life Cycle Net Present Value	**$3,068,313**	**$2,961,314**	**$106,999**

Based on the new 20-yr LCC analysis, the turbo blower is approximately $107,000 less than the Turblex blower, based on net present value; however, as mentioned earlier, the LCC analysis is very sensitive to the accuracy of the input parameters, such as capital and O&M costs. Since most of the input parameters are budgetary or assumed values, the 20-yr LCC analysis should be used mainly as an analysis tool and not as the sole source for selecting an equipment.

Similar to the fine bubble aeration system, Performance-based Specifications can be implemented to evaluate the blower technologies and to obtain real costs for determining a more accurate 20-yr LCC that will help in selecting the blowers that will provide the JPA with the best performance, reliability and value. Even though the Turblex and Turbo blowers are different technologies, Performance-based Specifications can still be used to create a fair environment for both blower technologies to compete since the specifications are based primarily on performance requirements and less on the technologies themselves.

In addition, the Performance-based Specifications allows for a larger competitive field. Currently, Siemens Turblex controls the majority of the market share for Turblex-type blower. There are new startup companies, such as Nexturbo and Lone Star, but not many of their machines are installed, making it difficult for them to compete. For Turbo Blowers, there are more established manufacturers, such as ABS Sulzer, Piller, Atlas Copco, and Neuros, making the field more competitive when the technologies are bid side by side.

3.2.1 Proposed Process Air Blowers Requirements

Table 14 shows the air flow requirements for the different treatment flow capacities from the current capacity of 5.5 MGD up to 12 MGD.

Table 14: Air Flow and Pressure Requirements based on Treatment Flow Capacities

Flow (MGD)	Pressure Req'd (PSI)	Ave Secondary Process (SCFM)	Max Secondary Process (SCFM)	Other Air Process (Min/Max) (SCFM)	Min Total Process Air (SCFM)	Max Total Process Air (SCFM
5.5	7.5	2,950	4,819	3050/ 4500	6,000	9319
6.8	7.5	3,448	5,492	3050/ 4500	6,498	9,992
7.5	7.6	3,996	6,191	3050/ 4500	7,046	10,691
9.3	7.6	5,426	8,123	3050/ 4500	8,476	12,623
10	7.8	7,180	9,261	3050/ 4500	10,230	13,761
11	8	7,653	9,816	3050/ 4500	10,703	14,316
12	8	11,656	14,233	3050/ 3750	14,706	17,983

As a result, the new blowers will need to meet an air flow requirement that ranges from approximately 6,000 scfm to 18,000 scfm at a pressure requirement of 8 psi. To meet this requirement, two blowers will be utilized in order to maintain high efficiency, meet the required turndown, and provide partial redundancy. Each blower will be sized to provide approximately half the total capacity or approximately 9,000 scfm. Full blower redundancy will be maintained by keeping one of the existing Roots Single Stage blowers operational for emergency use only.

The main reason for dividing the flow range in half is to ensure that all flow conditions can be met. There are not many blowers that can operate efficiently in the range of 6,000 scfm to 18,000 scfm. Most blowers can only turndown to 40% – 60% of its peak flow. For example, a single Turblex blower can meet the 18,000 scfm peak air flow requirement, but the same blower maximum turndown can only go as low as 7,200 scfm. Two smaller Turblex blowers can provide a range of 3,600 – 9,000 scfm per blower, which would meet the entire air flow range. Similarly, the largest turbo blowers in production are limited to 500 HP with an air flow range up to approximately 9,500 scfm at the required 8 psi design pressure. They can turn down to approximately 3,600 scfm.

Sizing the blower within this tighter range of 3,000 scfm (versus 13,000 scfm) also improves the efficiency of most available blowers. For example, turbo blowers' isentropic efficiency decreases as it moves away from its best efficiency point as shown in the Figure 10 below. Therefore, sizing the blower at its highest efficiency range and maintaining a smaller air flow range allows for best efficiency performance.

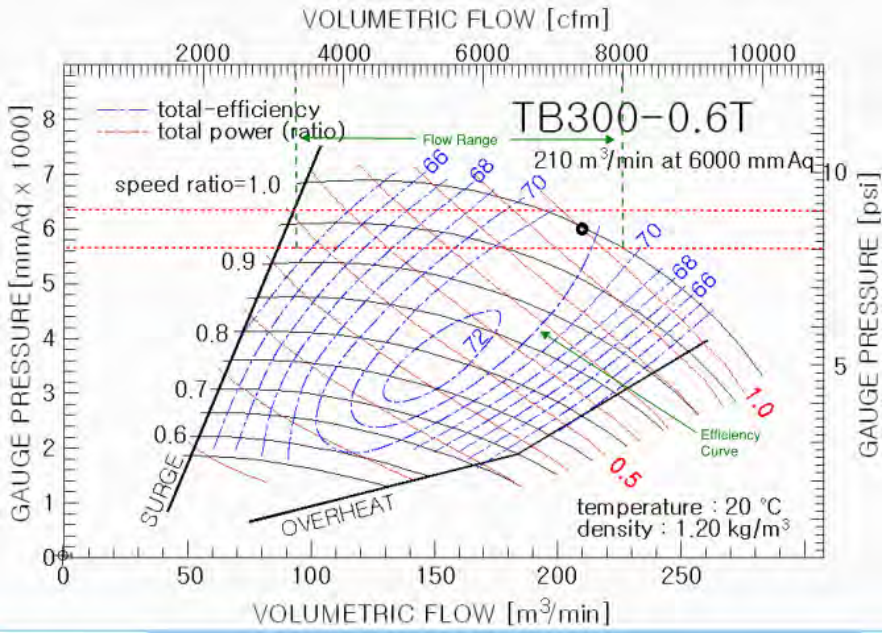


Figure 10: Typical Turbo Blower Chart with Flow, Pressure and Efficiency Curves

Another advantage of the two-blower configuration is that it provides full redundancy at the flow conditions most anticipated. Even though the design treatment capacity is 12 MGD, the JPA anticipates that the treatment flow capacity will only increase slightly for the next 10 years. The influent flow has decreased due to drought conservation measures and is trending downward in the last 5 years. Additional housing developments that can increase wastewater generation within the service area is also very limited, making the possibility of the flow exceeding 7 – 8 MGD in the next 10 years to be very unlikely. Therefore, the facility will most likely be operating in the 5 to 8 MGD treatment flow capacity for the foreseeable near future, which corresponds to an air flow range requirement of approximately 6,000 scfm to 8,500 scfm and is within the capacity range of the two blower types. With one new blower in lead operation, the second new blower will operate as a standby redundant blower. The lead and standby operational status will alternate between the two new blowers to allow for even operation and to minimize wear. As flow increases in the future to beyond 8 MGD, the two new blowers will operate together to meet the higher air flow requirements, while the existing Roots blower will provide the required redundancy.

3.2.2 Process Air Blower Modifications

The two new blowers will be installed in place of two of the three existing Roots Blowers. The Roots blower that is determined to be in the best condition will remain as the redundant blower. Each existing Roots blower's footprint dimensions are approximately 14 ft long by 8 ft wide, which is significantly larger than a new Turblex or Turbo blower. Once removed, there will be sufficient space for the installation of the new blowers.

The existing air piping was sized for larger air flow and therefore will be sufficient for the new blowers. Some air piping modifications will be required for connection to the new blowers. Improvements to the air plenum or cooling air will not be required since these components were also sized for the larger air flow volume used by the existing Roots blowers.

Existing electrical power available is medium voltage at 4,160V. The Turblex blowers can be designed to accept medium voltage, while the turbo blowers will require a step-down transformer to lower the voltage to 480V. In addition, the turbo blowers operate on variable frequency drives (VFDs), which will likely require harmonic filters. Even with the stepdown transformer and harmonic filters, there will be sufficient space available in each blower bay. A general layout of the new blower within the existing blower bay is illustrated below in Figure 11.

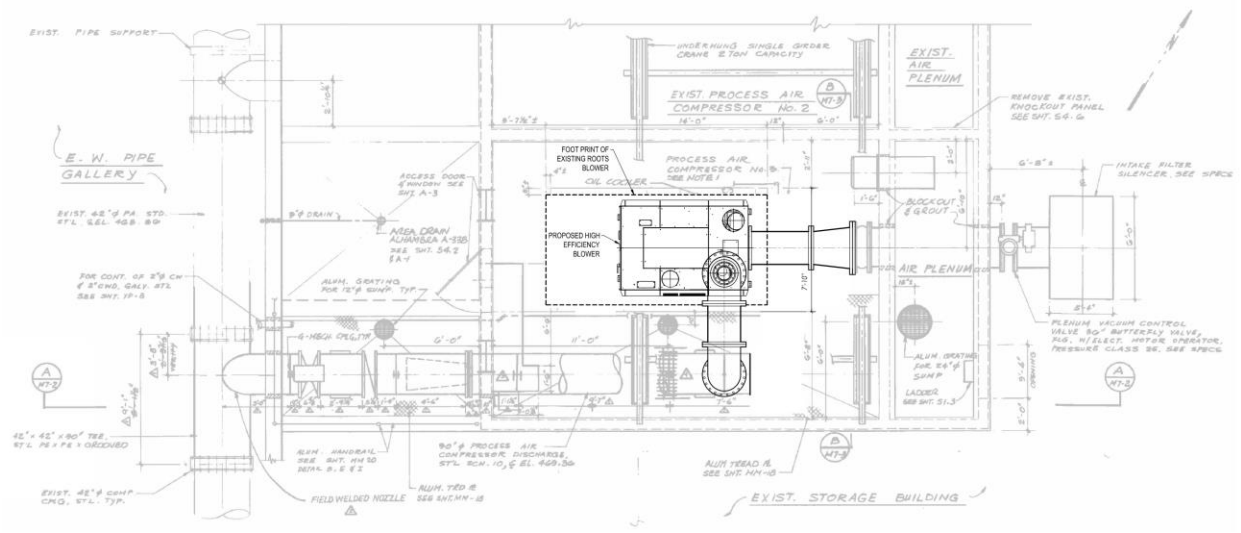


Figure 11: Proposed Blower Layout in Existing Roots Blower Bay

3.2.2.1 Process Air Blower Construction Sequence

Currently the majority of the process air demand is being provided by only one Roots blower. This allows the two proposed blowers to be installed without interrupting the current operation. Installation will require that the two existing Roots blowers be isolated using the existing isolation valve on each blower's discharge piping. Once isolated, the existing Roots blowers can be removed and the blower bay can be modified for the installation of the new blowers. Due to the size of the Roots blowers, removal of the blowers may require removing the existing roof and lifting the blower out of the bay using a large crane.

3.3 System Controls and Instrumentation

The Tapia WRF's existing facility control system operates through a network of local Programmable Logic Controllers (PLC) communicating with a Master PLC. The local PLCs perform the majority of the process functions based on local conditions or field instruments. Operation conditions and data are relayed back to the Master PLC for monitoring and coordination with other WRF processes. The WRF's Master PLC also communicates with an existing Supervisory Controls and Data Acquisition (SCADA) system to provide a graphical interface with the entire PLC network. The operators use the SCADA system to monitor, control and communicate with the local process PLCs (via the Master PLC). SCADA also provides alarming and auto-dialing to alert operators of alarm conditions and can be used to change pre-programmed set points in the field PLCs.

The Process Air Upgrades will deploy a new local PLC (i.e., Blower Master PLC) designed to control both the new blowers, the existing Roots Blower and air flow to the new fine bubble aeration system and to the Other Process Air components. The new Blower Master PLC will communicate directly with the WRF's Master PLC to allow for SCADA monitoring and control.

From a local control perspective, the new Blower Master PLC will communicate and control its local network, which consists of the two individual blower PLCs, the existing Roots Blower, field process instruments and modulating valves. The new Process Air control strategy is based on the Blower Master PLC controlling the blowers by using the air requirements of the Secondary Aeration Basins, which uses the bulk of the air flows and has the highest-pressure requirement. As a result, the air requirements for the Other Process Air components will be satisfied before the Secondary Process air requirements can be met. Each of the Other Process Air components will need to be individually valved and metered to ensure it will receive the required air flow.

Within the Secondary Aeration Process, the air flow control will be based on the Fully Open Valve (FOV) control strategy. Each basin will be equipped with a Dissolved Oxygen (DO) sensor along with a modulating valve and an air flow meter on the main air supply lateral to each basin. During normal 2-train operation, all of the basins, with the exception of FOV Basin, will modulate their air supply valve to maintain an operator-selected DO set point (all valves start at fully open position before modulating) . The FOV Basin designation can be assigned to any basin but since Basin No. 5 contains the largest aeration zone for the furthest train from the blowers, it is theoretically the last basin to have its air requirement satisfied and will typically be the FOV basin. The modulating valve for the FOV Basin will remain fully open at all time in this control sequence. Once the DO set points are met for all of the other basins, the Blower Master PLC can then increase or decrease the process blower(s) air flow to satisfy the FOV Basin's DO set point. During operation of the West train only, Basin No. 2 will typically be dedicated as the FOV Basin. The installation of the modulating valve and air flow meter also allows for independent air flow metering to each basin for process flexibility and customization.

One of the main advantages of the FOV control strategy is the elimination of pressure spikes within the Process Air system that can surge and damage the blowers. With one main air valve always fully open, the possibility of pressure spikes due to accidental closing of the valves is greatly reduced.

3.4 Other Process Air Design Considerations

The Process Air Upgrades address in this report include the improvements to the Secondary Aeration Basins and the Process Air Blowers. Improvements to the Channel Air System was performed by the JPA in 2015. Other future improvements may need to be addressed include the RAS Re-aeration basins' spiral roll aeration system upgrades, fixing underground air leaks in the existing Process Air main header piping, and flow metering of the Other Process Air System, such as air flow to each of the different channels.

The RAS Re-aeration basins currently operate with two-thirds of the basins in the anoxic condition with one-third in the aerobic condition. The basins are equipped with spiral roll aeration system along the entire length of the basins. The average total air flow to the basins is approximately 900 scfm. Replacing the spiral roll diffusers with retrievable fine bubble is estimated to be approximately $72,000 for 14 new grids. Assuming that the equipment cost is roughly 15% of the total construction cost due to the smaller scale of the project, the RAS Re-aeration System Upgrades construction cost is estimated to be nearly $480,000. The benefit from the improvements will be an approximately 400 scfm or a 6% improvements to the Process Air System total air flow at the current 6.8 MGD treatment capacity. This would be an initial annual power savings of approximately $19,000, resulting in a payback period of more than 25 years. Therefore, any upgrades to the RAS Re-aeration basins should be deferred due to the minimal cost benefits.

Evidence of air leaks in the underground portions of the Process Air main header pipe was clear during the recent rain events. Video evidence shows air bubbles fizzing through cracks along asphalt pavements that are within the vicinity of the main air header. The 2011 evaluation estimated that approximately 500 scfm were leaking from the Process Air system through the underground pipes. It is not clear how this value was estimated but the leakage rate is likely to have increased due to the continued corrosion of the steel air piping. Depending on the leakage rate, the impact to the Process Air System can be significant. The cost of repairing the main air header will be dependent on the leakage rate, the extent of the damage and the type of repair required. Leaks with greater pipe structural damage would require pipe replacement. Leaks as a result of pitting corrosion may be repaired using an interior epoxy coating or insitu liner, which is a less expensive alternative than pipe replacement. Epoxy coating is estimated at approximately $1,000 per foot for a 36 – 42 inch diameter pipe (based on a 100 ft repaired section of pipe). Further investigation of the leakage will be required before a recommendation can be made.

4 Cost Estimates

4.1 Engineer's Opinion of Probable Cost for the Fine Bubble Aeration Upgrades

The engineer's opinion of cost for the retrievable fine bubble aeration system is provided in Table 15 below and includes the capital and construction costs associated with the fine bubble installation and basin modifications. The cost estimate is categorized into demolition, basin modifications, mechanical, and electrical & controls, and includes labor cost. Since the JPA has options to include provisions for future equipment installation, the costs of the provisions are separated under Optional Improvements. The total construction cost without the optional improvements is estimated at **$1,497,00**. The total construction cost with the optional improvements is estimated at $2,115,000. Both costs include 20% contingency. Detailed cost breakdown is provided in Appendix C.

Table 15: Summary of Engineer's Opinion of Cost for the Retrievable Fine Bubble Aeration System

Las Virgenes Tapia Aeration Upgrades					
PDR Cost Breakdown - Retrievable Fine Bubble Diffusers					
Item	Unit	Quantity	Unit Price		Total
Demolition for Construction				$	98,400
Basin Modifications				$	184,500
Mechanical				$	520,640
Electrical Equipment & Materials				$	10,000
Electrical Installation				$	12,500
Instrumentation and Control System				$	146,200
Optional Improvements				$	399,480
Subtotals and Fees					
Subtotal 1 - Recommended Improvements				$	972,240
	20%		Contingency	$	194,448
Subtotal "A"				$	1,166,688
Applied to A	10%		Contractor Overhead & Profit	$	116,669
Applied to A	10%		General Conditions	$	116,669
Applied to (A + B + C)	3%		Bonding and Insurance	$	42,001
***Applied only to Equipment & Materials**	9.5%		*Sales Tax	$	54,777
TOTAL COST - Subtotal 1				$	1,496,803
*Taxable Equipment & Materials	$ 576,600				
Subtotals and Fees					
Subtotal 2 - Optional Improvements				$	399,480
	20%		Contingency	$	79,896
Subtotal "A"				$	479,376
Applied to A	10%		Contractor Overhead & Profit	$	47,938
Applied to A	10%		General Conditions	$	47,938
Applied to (A + B + C)	3%		Bonding and Insurance	$	17,257.54
***Applied only to Equipment & Materials**	9.5%		*Sales Tax	$	25,650
TOTAL COST - Subtotal 2				$	618,159
*Taxable Equipment & Materials	$ 270,000				
SUBTOTAL 1				$	1,496,803
SUBTOTAL 2 (Optional Improvements)				$	618,159
TOTAL COST				$	2,114,962

4.2 Engineer's Opinion of Probable Cost for the Process Air Blower Upgrades

The engineer's opinion of cost for the Process Air Blower Upgrades are provided in Table 16 below and includes the capital and construction costs associated with the blower installation and piping modifications. Since it is undetermined whether the JPA will install Turbo or Turblex blowers, the cost estimate used the Turblex blowers' capital cost to provide a more conservative estimate.

The cost estimate is categorized into demolition, mechanical and electrical & controls, and includes labor. Salvage value for the two existing Roots Blowers and the air piping were also included. The salvage value was estimated based on current scrap metal price of steel at $0.05 per pound plus an estimated perceived value based on market demand. The perceived valued was based on internet research of multistage blowers. Comparable used blowers based on horsepower were not available but smaller, used 100HP and 250-HP Hoffman blowers were priced at approximately $12,000 and $20,000, respectively. Therefore, a conservative perceived value for the blowers were estimated at $35,000 for both blowers.

The total construction cost for the Process Air Blower Upgrades is estimated at **$1,211,000**. The cost includes a 20% contingency. Detailed cost breakdown is provided in Appendix C.

Table 16: Summary of Engineer's Opinion of Cost for the Process Air Blowers

Las Virgenes Tapia Aeration Upgrades					
PDR Cost Breakdown -Turblex Blower					
	Item	Unit	Quantity	Unit Price	Total
Demolition for Construction					**$ 25,360**
Mechanical Equipment & Installation					**$ 644,160**
Electrical Equipment & Installation					**$ 117,700**
Instrumentation and Control System					**$ 10,560**
Subtotals and Fees					
	Subtotal				**$ 797,780**
		20%		Contingency	$ 159,556
	Subtotal "A"				**$ 957,336**
	Applied to A	10%		Contractor Overhead & Profit	$ 95,734
	Applied to A	10%		General Conditions	$ 95,734
	Applied to (A + B + C)	3%		Bonding and Insurance	$ 34,464
	***Applied only to Equipment & Materials**	9.5%		*Sales Tax	$ 63,536
				Subtotal Costs	**$ 1,246,803**
				Salvage Value	**$ 36,125**
				Total Costs	**$ 1,210,678**
	*Taxable Equipment & Materials	$ 668,800			

Exempt per Gov't Code 6103

RETURN TO: Eric Schlageter
Las Virgenes Municipal Water District
4232 Las Virgenes Road
Calabasas, CA 91302-1994

NOTICE OF EXEMPTION
(State Guidelines 15062)

County Clerk's Filing Stamp

TO: Los Angeles County Clerk
12400 Imperial Highway
Norwalk, CA 90650

FROM: Las Virgenes Municipal Water District (Applicant/Lead Agency)
4232 Las Virgenes Road
Calabasas, CA 91302-1994

Project Name: Tapia Water Reclamation Facility Process Air Improvements

Project Location: Malibu Canyon Road, Los Angeles County (see Figure 1)

County: Los Angeles

Description of Nature, Purpose, and Beneficiaries of Project:

Operated by the Las Virgenes Municipal Water District (LVMWD)/Triunfo Sanitation District (TSD) Joint Power Authority (JPA), the Tapia Water Reclamation Facility (WRF) is a wastewater treatment facility that provides tertiary treatment for municipal wastewater from domestic, commercial, and industrial sources within the JPA's service area. **Figure 1** shows the regional and vicinity map of the proposed project. In 2011, an evaluation of the Tapia WRF Process Air System was performed; it concluded that the blowers and aeration diffusers needed to be upgraded as a result of age and inefficiencies. The Tapia WRF Process Air Improvements (proposed project) would consist of upgrades including the replacement of existing swing arm diffusers with a full floor aeration system and replacement of three process air blowers with high-efficiency blowers. These upgrades would improve the Oxygen Transfer Efficiency and the overall energy efficiency by about 15% as well as save the JPA up to 40% annually on power cost.

The proposed project includes the removal of the existing spiral-roll diffusers in most of the aeration basins, installation of full floor coverage with fine bubble aeration system, and replacement of three Roots air blowers. New air piping, valves, and instrumentation would also be installed for needed air connection and controls.

Figure 2 shows the current four-stage Bardenpho Secondary Treatment process. The Process Air System is composed of the aeration components of the Secondary Treatment process, including the Secondary Process Aeration System and Process Air blowers. The fine bubble aeration diffusers installed within the Secondary Aeration Basins and the Reactivated Sludge (RAS) Re-Aeration Basins make up the Secondary Process Aeration System. The six secondary aeration basins are configured in two plug-flow treatment trains (East and West) with three passes, each arranged in a serpentine configuration. The East Train consists of basins 4, 5, and 6, while the West Train consists of basins 1, 2, and 3.

Figure 3 shows the proposed upgrade to the Process Air System with the new fine bubble aeration diffusers. The proposed configuration is similar to the existing process; however, the size and location of each aerobic and anoxic zone would differ, and other modifications include relocation of the internal mixed-liquor recycle stream, installation of wall baffles, and requirements for carbon addition. In order to not affect the effluent quality, construction of the proposed full floor aeration system would require each basin to undergo construction in a series so that each train is completed before transitioning to the next remaining train. Construction activities include draining of each basin prior to its construction, and grouting to level existing sloped basin floors.

Of the six air blowers in the Tapia WRF, three are Roots 900 HP single-stage centrifugal blowers, which are each housed within its own blower bay north of the old digesters and east of the headworks within the WRF site. The proposed project would install three new high-efficiency blowers to replace the existing Roots blowers. **Figure 4** shows the proposed blower layout within the existing Roots blower bay. Since the majority of the process air demand is supplied by one Roots blower, two proposed blowers would be installed without interrupting current operation before the third blower would be installed. For construction of the proposed blowers, a large crane would be required in order to remove the existing roof and to remove the blowers out of the bay and then install the new blowers.

Name of Public Agency Approving
and Carrying out this Project: Las Virgenes Municipal Water District
4232 Las Virgenes Road, Calabasas, CA 91302

Contact Person: Eric Schlageter

Area Code 818 Phone 251-2142

Exempt Status: (check one)

____ Ministerial (Sec 21080(b)(1); (State Guidelines Sec. §15268)
____ Declared Emergency (Sec 21080(b)(3); State Guidelines Sec. §15269(a))
____ Emergency Project (Sec 21080(b)(4); (State Guidelines Sec. §15269(b)(c))
__x__ Categorical Exemption (State Guidelines Sec. §15301)
____ Categorical Exemption (State Guidelines Sec. §15302)
____ Categorical Exemption (State Guidelines Sec. §15303)
____ Categorical Exemption (State Guidelines Sec. §15306)
____ Statutory Exemption State code number (State Guidelines §15282)

Reasons why project is exempt:

LVMWD has made the determination that the proposed Tapia WRF Process Air Improvements at the Tapia WRF is exempt from California Environmental Quality Act (CEQA) by statute (California Code of Regulations, Title 14, Chapter 3, Article 19). Categorical exemptions include repair or minor alteration of existing mechanical equipment under CEQA Guidelines Section 15301. Class 1 consists of operation, repair, maintenance, or minor alteration of existing public structures, facilities, or mechanical equipment involving negligible expansion of use beyond that existing at the time of the lead agency's determination (CEQA Guidelines Section 15301).

The proposed project includes the replacement of the existing spiral-roll aeration system, installation of full floor coverage, fine bubble aeration system, and replacement of the three Roots 900 HP air blowers to improve transfer efficiency. All of these improvements constitute as repair and minor alterations of existing mechanical equipment at an existing facility. The proposed project would occur within the existing 10-acre footprint of the treatment facility site. As such, the construction and operation of the proposed project would not have any impacts on environmental resources.

Staff Member Responsible for Preparation

District Secretary

Date

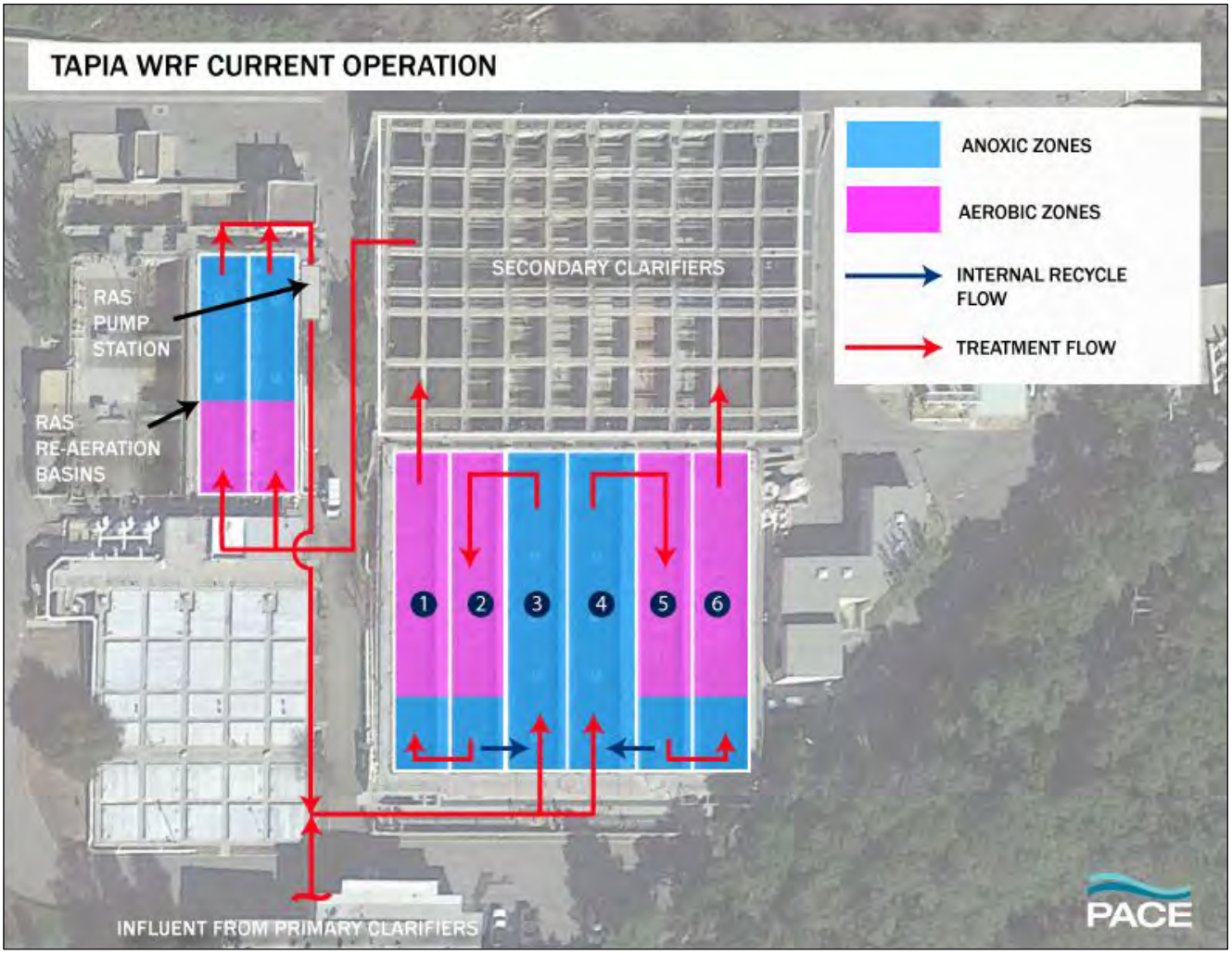
Path: J:\GIS\Projects\17xxxx\D170134_Tapia\03_MXDs_Projects\Fig_1_ProjLoc.mxd, rt 2/14/2017

SOURCE: ESRI; ESA, 2017

Tapia WRF

Figure 1
Regional and Vicinity Map

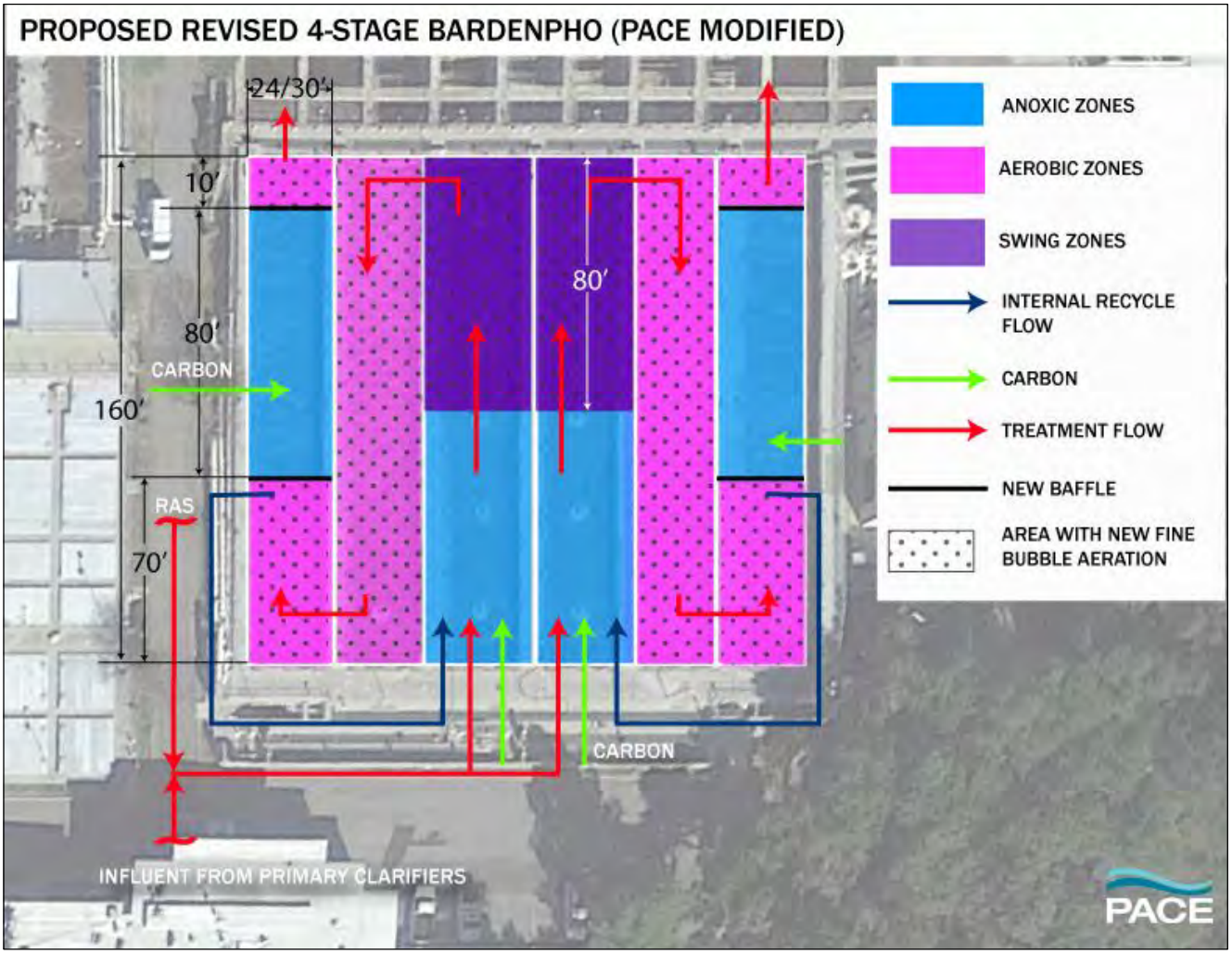
ESA



SOURCE: PACE

Tapia WRF

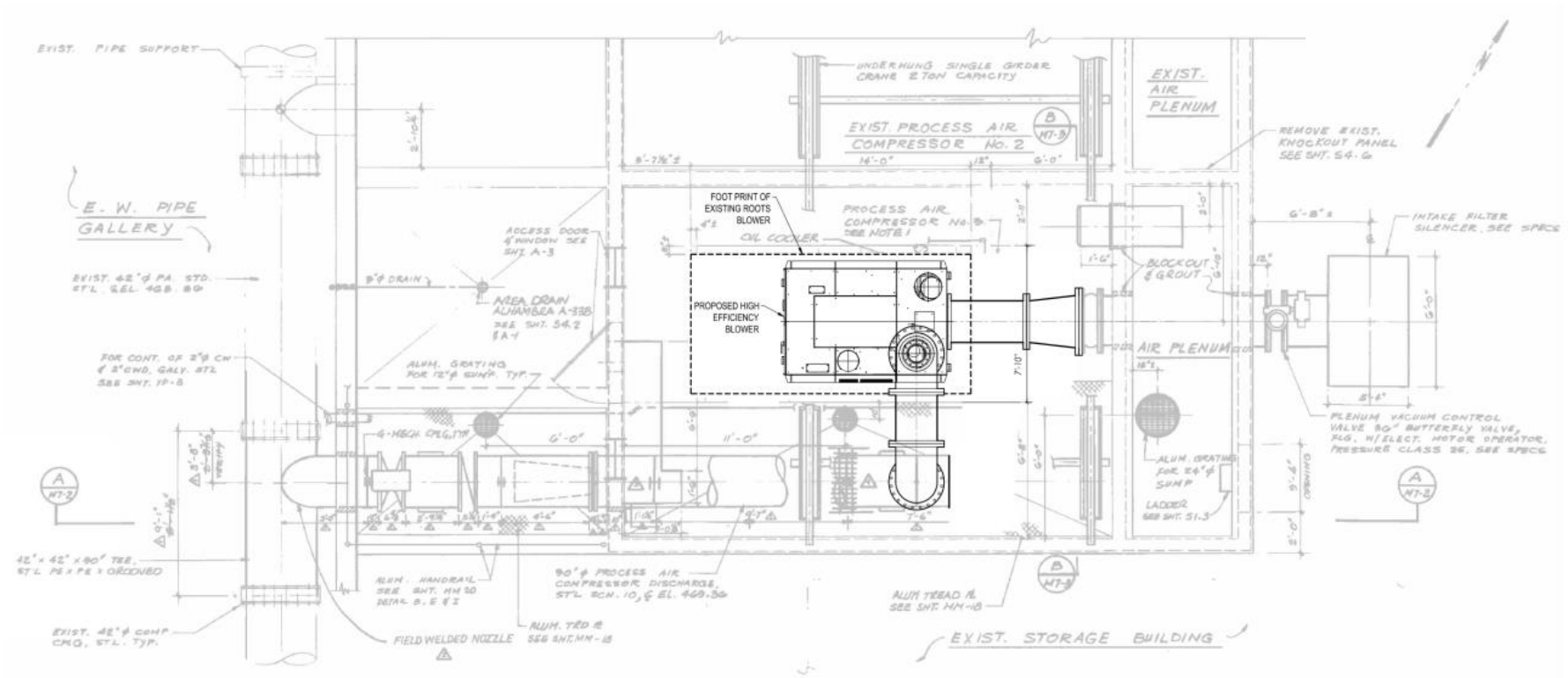
Figure 2
Tapia WRF Current Secondary Process Configuration



SOURCE: PACE

Tapia WRF

Figure 3
Proposed Revised 4-Stage Bardenpho
Secondary Treatment Process



SOURCE: PACE

Tapia WRF

Figure 4
Proposed Air Blower Layout in Existing Blower Bay

ESA

Las Virgenes-Triunfo Joint Powers Authority
Tapia Water Reclamation Facility Process Air Upgrades

Request for Proposals
Retrievable Fine Bubble Aeration System

Date: May 1st, 2017
Proposals Due: Monday, June 5th, 2017 at 3:00 PM

NOTICE IS HEREBY GIVEN that the Board of Directors of Las Virgenes-Triunfo Joint Powers Authority invites and will receive proposals from all interested equipment vendors for a Retrievable Fine Bubble Aeration System in conformance with the following performance specification in **PDF format** (hard copy optional). The price proposal shall be received no later than **3:00 PM (Pacific Time) Monday, June 5th , 2017**.

This request for proposal is for a retrievable fine bubble aeration system as part of the current process air upgrades at the Las Virgenes-Triunfo Joint Powers Authority (JPA) Tapia Water Reclamation Facility (WRF) located in Calabasas, CA. One equipment vendor will be pre-selected and will form the basis of the full-scale design that will be incorporated into the WRF's modification design plans. The modification design plans are scheduled to be completed by end of Summer 2017, with construction within the 2017 and 2018 calendar year.

Vendors have the option to provide multiple proposals for all equipment that can satisfy these performance specifications. Equipment vendor's offering will be evaluated based on the following criteria. See PROPOSAL REVIEW & GRADING section below for the weighting and definition of criteria.

- Capital Cost
- Life Cycle Cost
- Fabrication/ Material of Construction
- Performance
- Installation Requirements
- References
- Retrievability
- Supply Bond
- Performance Bond
- Completion of Supply
- Delivery Schedule

This request for proposals was prepared by Pacific Advanced Civil Engineering, Inc. (PACE) at the direction of the JPA. The JPA and PACE will review the proposals and select the preferred equipment vendor to form the basis of design for the project. The JPA and PACE reserve the right to reject any and all proposals. Vendors should contact PACE with all questions regarding this proposal. All questions shall be submitted via email and should be directed to Mr. Duong Do, Pacific Advanced Civil Engineering, Inc. at ddo@pacewater.com.

In order to be placed on the vendor's list, vendors shall register for free as a document holder for this project on Ebidboard by going to *www.LVMWD.com/Ebidboard* and following the links to this project. Addendum notifications will be issued through Ebidboard.com, but may also be provided by calling PACE. Although

Ebidboard will fax and/or email all notifications to registered vendor after the District uploads the information, Vendors are responsible for obtaining all addenda and updated documents.

All terms and conditions contained in the Performance-based Specifications and Contract Documents shall become part of the contract. The Board of Directors of Las Virgenes Municipal Water District reserves the right to reject any and all proposals and to waive any and all irregularities in any proposal. The Board of Directors of the District reserves the right to select the schedule(s) under which the proposals are to be compared and contract(s) awarded.

Final Proposals shall be submitted via email in PDF format to:
ddo@pacewater.com

Optional hardcopies can be sent to:
Pacific Advanced Civil Engineering, Inc.
Attention: Duong Do, P.E.
17520 Newhope St. – Ste. 200
Fountain Valley, CA 92708
Phone: (714) 481-7223
Fax: (714) 481-7299

BY ORDER OF THE GOVERNING BODY OF
LAS VIRGENES-TRIUNFO JOINT POWERS AUTHORITY

_____
Dated

James Wall
Chair of the Board

1.0 PROPOSAL REQUIREMENTS

The Proposal shall include, at a minimum, the following information:

1. Fixed Price Proposal for the base system offering with a detailed Scope of Supply shall include:
   a. Capital equipment cost
   b. Price list of standard spare parts and system consumables, including availability and lead time of spare parts
   c. Cost of Supply Bond and a Willingness Statement to provide a Supply Bond at time of purchase in the amount of 100% of the contract equipment price *(See Exhibit A)*
   d. Cost of Performance Guarantee Bond and a Willingness Statement to provide a Performance Bond at the time of purchase for process guarantee of 2 years in the amount of 100% of the contract equipment price (*See Exhibit B*). If the guaranteed efficiencies are not attained using reasonable standard field measurements, the District will allow the Vendor to perform corrective action, such as furnishing and installing additional measures, including new equipment if necessary (at Vendor's cost), in order to meet the guaranteed efficiency, prior to execution on the bond.
   e. Cost associated with the following:
      i. Assembly Supervision during Construction
      ii. Installation inspection
      iii. Start-up/ Testing
      iv. Training
   f. F.O.B. Jobsite
   g. All pricing, including spare parts and consumables, shall be guaranteed until September of 2018 after offering has been received and a notice of selection has been issued by the LVMWD. At the end of the holding period, the selected vendor agrees the inflation rate shall not exceed more than a 1% increase per quarter for 1-year, or to the inflation rate stated by the Los Angeles Tender Price Index determined by Rider Levett Bucknall, whichever of the two is lower. The District reserves the right to cancel its dealing with the selected Vendor at any time prior to issuing a purchase order.
2. Maintenance requirements and schedule
3. Manufacturer's Standard Equipment Warrantee terms for a minimum of 2 years
4. Manufacturer's Standard Process Guarantee terms
5. Installation Reference List with current contact information and phone numbers
6. Detailed design calculations showing compliance with the proposed applications
7. Performance information listed in this RFP, including items listed on Exhibit C
8. Shop drawings showing the following for the fine bubble aeration equipment and all required ancillary equipment:
   a. Proposed system layout for each basin: proposed diffuser grids and grid layouts based on the geometry of the existing basins with recommended setbacks and separation dimensions.
   b. Locations and sizes for all process connections
   c. Alternative Retrieval mechanism(s), if applicable
   d. Onsite assembly requirements for the system
9. Detailed description of diffuser retrieval/removal from the basin and placement back into the basin <u>using District supplied crane</u> for maintenance and/or repair, including list of required equipment necessary for retrieval process. Vendor may also include, as an option, an alternative retrieval

mechanism. Vendor shall provide separate cost for purchase of the Vendor-supplied retrieval mechanism.

10. Provide schedule to include the following:
    a. Time required to generate an acceptable submittal for the Engineers review.
    b. Time required to manufacture the equipment once the submittal has been approved by the Engineer.
    c. Time for delivery of equipment to the site.
11. Provide pricing options on all replacement and spare parts.
12. Completed Equipment Summary List *(See Exhibit C)*
13. All bonding company shall have a policy-holder rating of A+ and a financial rating of "Class XV" in the most recent edition of "Best Key Rating Guide". The bonding company shall be licensed to do business in the State of California.

2.0 PROPOSAL REVIEW & GRADING

In order to select the best fine bubble aeration equipment for the application, the following methodology will be used. Each criterion will be assigned a weight; the higher the weight, the more important the aspect is to the project. Then, each equipment solution proposed will be rated on a scale, with the highest score indicating most competitive or best. For each criterion, the score and the weight will be multiplied together. The scores will then be added together for each solution to arrive at the total score. The equipment with the highest score will be the recommended selection. Omission of information for any of the listed criteria categories will result in a score of zero (0) for that criteria category. Equipment not meeting the minimum requirements as stated in the General Design Requirement section will not be considered.

Criteria	Weight	Vendor 1	Vendor 2	Vendor 3	Vendor 4	Vendor 5
		Scoring Scale				
Capital Cost	*5*					
Performance	*5*					
Fabrication/ Material of Construction	*5*					
20-Year Life Cycle Cost	*5*					
Reference List	*5*					
Retrievability	*4*					
Completion of Supply	*4*					
Installation Requirements	*3*					
Delivery Schedule	*3*					
Performance Bond	*y/n*					
Supply Bond	*y/n*					
Total Score						

Definitions and Scoring:

Capital Cost: The Fixed Price Proposal cost to purchase and deliver the complete equipment F.O.B. jobsite, along with all the associated requirements listed on 1a – 1g of the Section 1 Proposal Requirements. Cost within 5% of the lowest is scored the same.

20-yr Life Cycle Cost:	Evaluation of capital cost and O&M over 20-year period in today's value based on 5% annual interest rate. Cost within 5% of the lowest is scored the same.
O&M Costs:	Diffuser & related equipment replacement, labor, and other operation and maintenance costs on a yearly basis. O&M Cost shall also include electrical cost based on Vendor's guaranteed SOTE. Evaluation shall include a 10% annual replacement of diffusers
Fabrication/ Material of Construction:	Durability/quality of materials of construction. Higher durability and higher quality of construction will be scored higher
Performance:	Performance of the system will be based on Standard Oxygen Transfer Efficiency (SOTE) for different process air rates and treatment flows. Also evaluation of flux rates; pressure losses etc. See Section 4.0 for design requirements and Exhibit C. The higher the SOTE, the higher the score. Efficiencies within 0.5% of the higher SOTE will be scored the same. For example, in a situation where the SOTEs are 31%, 31.5%, and 32%. 32% and 31.5% will be scored the same, while 31% will be scored lower.
Installation Requirements:	Requirements for aeration piping connections; basin floor requirements; manufacturer supplied support system; etc. Systems with minimal field installation or modifications will be scored higher.
Retrievability Requirements:	Requirements for retrieving/ removing the submerged diffusers for maintenance or repair using District-provided overhead crane, including the placement of the aeration grids back into service. Systems that can be retrieved or removed with minimum requirements and staff will be scored higher. Vendors have the option to provide its own retrieval mechanism; in which case, <u>both retrieval options will need to be shown</u>. Simplicity and minimal requirements will be scored higher.
Supply Bond:	Willingness to provide a Supply Bond for 100% of the equipment's contract amount according to the terms of *Exhibit A.* Proposals not accepting the terms of the Supply Bond will not be considered.
Performance Bond:	Willingness to agree to terms of the Performance Bond *(Exhibit B)* for 100% of the equipment's contract amount and to provide a performance guarantee for 2 years on the equipment. Proposals not accepting the terms of the bond will not be considered.
Completion of Supply:	The completeness of the proposal to include all requested information for evaluation of the proposal without inferences from the Engineer or the District.

Reference List:	List of similar equipment installations, including WRF process; number of units; reference current contact information (WRF name, location, person, phone number). Each vendor shall provide an installation list with contact information for a minimum of 5 systems in operation in the United States of America (no more than 10 references). 2 of the 5 installations shall be a retrievable-type installations. The District will attempt 3 calls to each reference (up to 5 successful references only – 2 of which must be retrievable type). Each successful references shall be asked to rank their overall experiences from 1 – 10 (10 being highest). Scores will be based on average response ranking from 5 references. Non-responses will be given a ranking of 1. Bids from manufacturers lacking the U.S. installation requirements for US-installed retrievable systems, but meeting all technical and performance requirements of these specifications, may be considered by the District if the manufacturer provides a satisfactory five (5) year maintenance bond in lieu of evidence of US installation and operation. Maintenance bond shall be for 100 percent of the contract value of the equipment. The cost of such bonding shall be included in the Base Bid price at the time of proposal.
Delivery Schedule:	Proposed equipment will be at the job site when needed. Submittals shall include a schedule outlining the anticipated time to construct equipment and deliver to job site. The schedule shall be broken down into fabrication time and delivery time. The total time required from notice of selection to arrival of equipment on site shall be clearly indicated.

3.0 PROJECT INFORMATION

Background

The Tapia WRF, located in Calabasas, CA, was designed for an average dry weather flow (DWF) of 16.1 MGD and peak DWF of 28 MGD. In anticipation of meeting effluent ammonia and Nitrate-Nitrite as Nitrogen (NOx) limits required by the Waste Discharge Requirements Order R4-2010-0165, the plant was retrofitted for biological nutrient removal (BNR) operations which limited the average dry weather flow capacity to 12 MGD. Since the BNR process is limited to approximately 12 MGD the process air upgrades will be designed to provide sufficient aeration capacity to 12 MGD.

Treatment at the plant includes screening, grit removal, primary treatment, BNR secondary treatment, secondary clarification, tertiary filtration, chlorination and dechlorination as depicted in Figure 1.

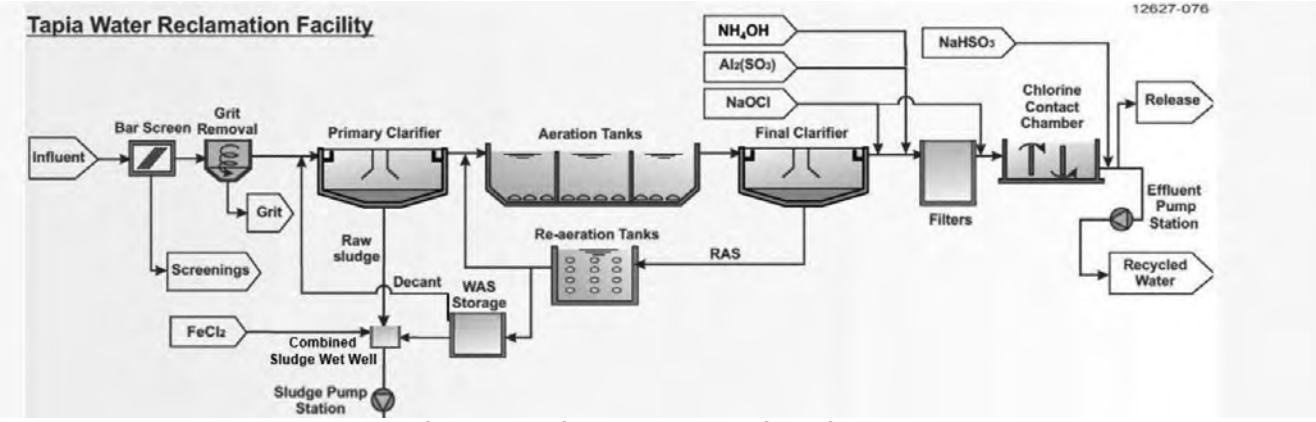


Figure 1: Tapia WRF Process Flow Diagram

Primary effluent (PE) and Return Activated Sludge (RAS) are combined at the head of the selector channel prior to entering secondary treatment. The secondary treatment process is a 4-stage Bardenpho Activated Sludge Process in a serpentine configuration consisting of 6 aeration basins. The 6 aeration basins are configured as two plug flow treatment trains with three passes as shown in Figure 2 below. Each basin, with the exception of basin 4, is approximately 160 ft long by 30 ft wide and has an average operating water level is 14.1 ft. This results in an approximate volume of 508,000 gallons per aeration basin and a total volume of approximately 3.1 MG. In the current serpentine configuration, the West Train consists of basins 1, 2, and 3, while the East Train consists of basins 4, 5, and 6. The 6 aeration basins can also operate in a parallel configuration; however, it is only used when bypass of one of the basins is necessary for repair or maintenance. Primary effluent and Mixed Liquor (ML) in the selector channel is fed to the first pass of each of the two treatment trains. The first pass is the first-stage anoxic zone with 5 floating mixers. The second pass is primarily the second-stage aerobic zone with the start of the third-stage anoxic zone at the end of the second pass. An internal mixed liquor recycles (IMLR) returns ML at the end of the second pass to the head of the first pass at a rate of three times the plant influent (3Q). The third pass of each treatment train contains the continuation of the third-stage anoxic zone, followed by the final fourth-stage aerobic zone.

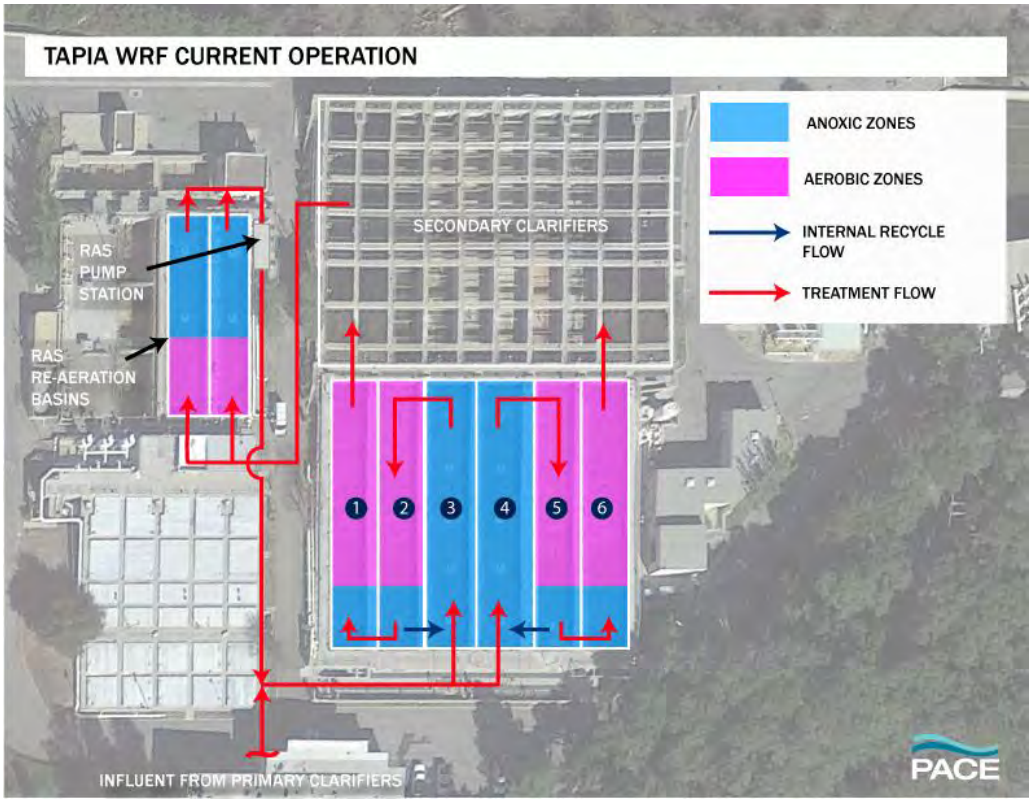


Figure 2:Tapia WRF Existing 4-Stage Bardenpho Secondary Process Configuration

Including the modifications done after the BNR upgrades, aeration and mixing within the Secondary Aeration Basins is performed using fine bubble diffuser grids installed to promote a spiral-roll. To promote the formation of the spiral-roll, the basin wall structure has an angle or "Y" configuration as shown in section A below. For areas within the basins that are dedicated anoxic zones, surface or floating mixers are also installed. As part of the BNR upgrades, the east side of each aeration basin is equipped with a recirculation piping network which recirculates the sewage in each basin through a submersible pump. Figure 3 illustrates the existing layout of the aeration basins.

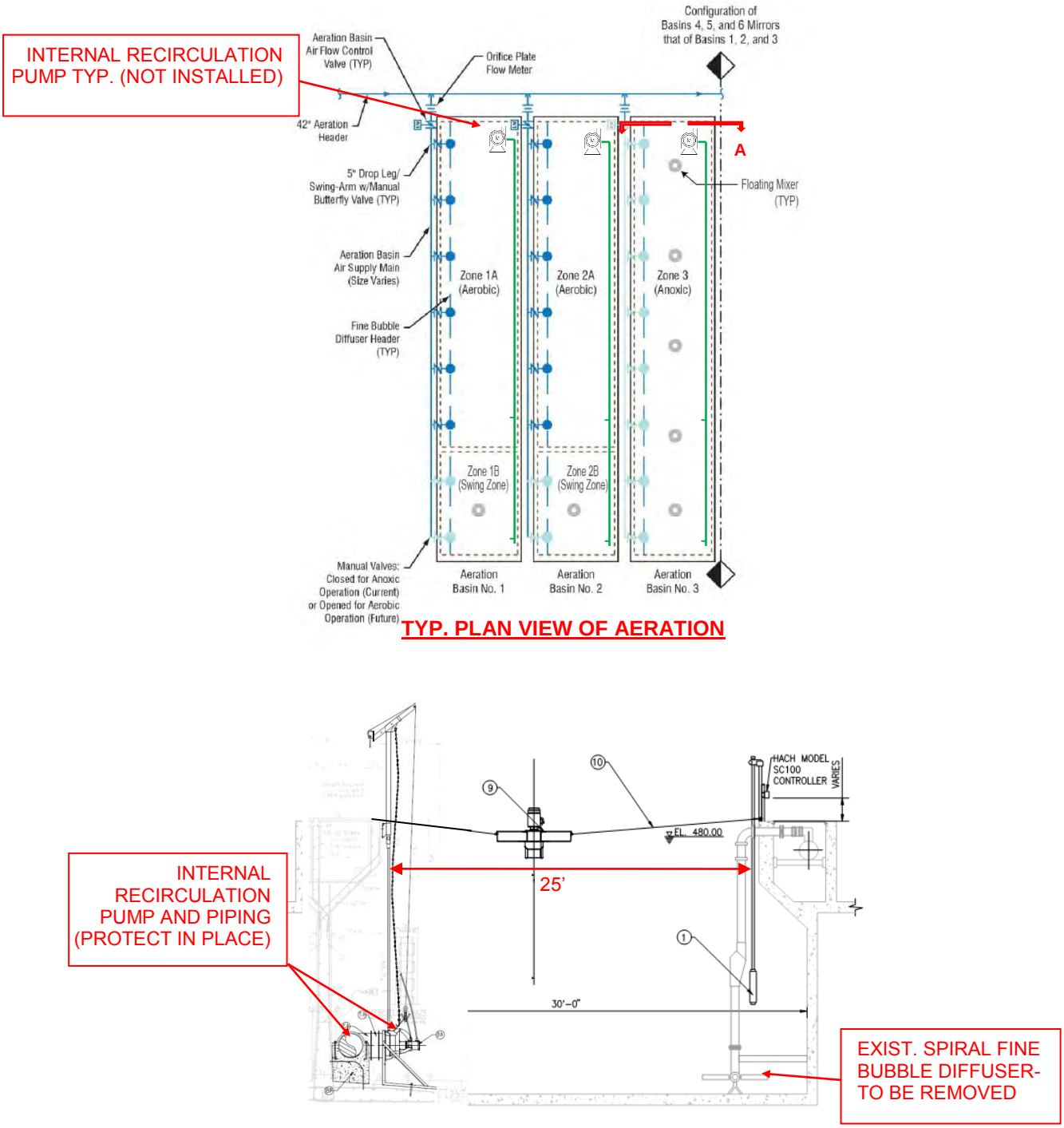


Figure 3: Existing Aeration Basin Layout and Section View

4.0 DESIGN REQUIREMENTS AND SPECIFICATIONS

The LVMWD is upgrading the existing Tapia WRF process air system to improve process and energy efficiencies. As part of the upgrades, the District plans to install a new retrievable fine bubble aeration system into the existing aeration basins coupled with new high efficiency blowers.

As part of the air process upgrades, the aeration basins' spiral-roll diffusers will be removed and replaced with a new retrievable fine bubble system that can provide a higher, full-floor density coverage, which will result in higher Oxygen Transfer Efficiency (OTE) and lower air flow requirements. To allow for the installation of a full-floor diffuser system, the basin floor will be grouted and leveled to create a suitable surface for the installation of the new diffuser system. The placement and floor coverage of the new diffuser system will be determined based on the locations of the different aerobic zones in the Revised 4-Stage Bardenpho Process (see Figure 4 below). However, to allow the District's staff flexibility to adjust and modify the aerobic zones as needed, fine bubble diffusers will also be placed in some anoxic zones to create swing zones. Swing zones will allow more air to be added to the process, especially during low flow conditions, reducing the air flux rate and improving the OTE. New submersible mixers will be required in swing zones to provide mixing during anoxic periods.

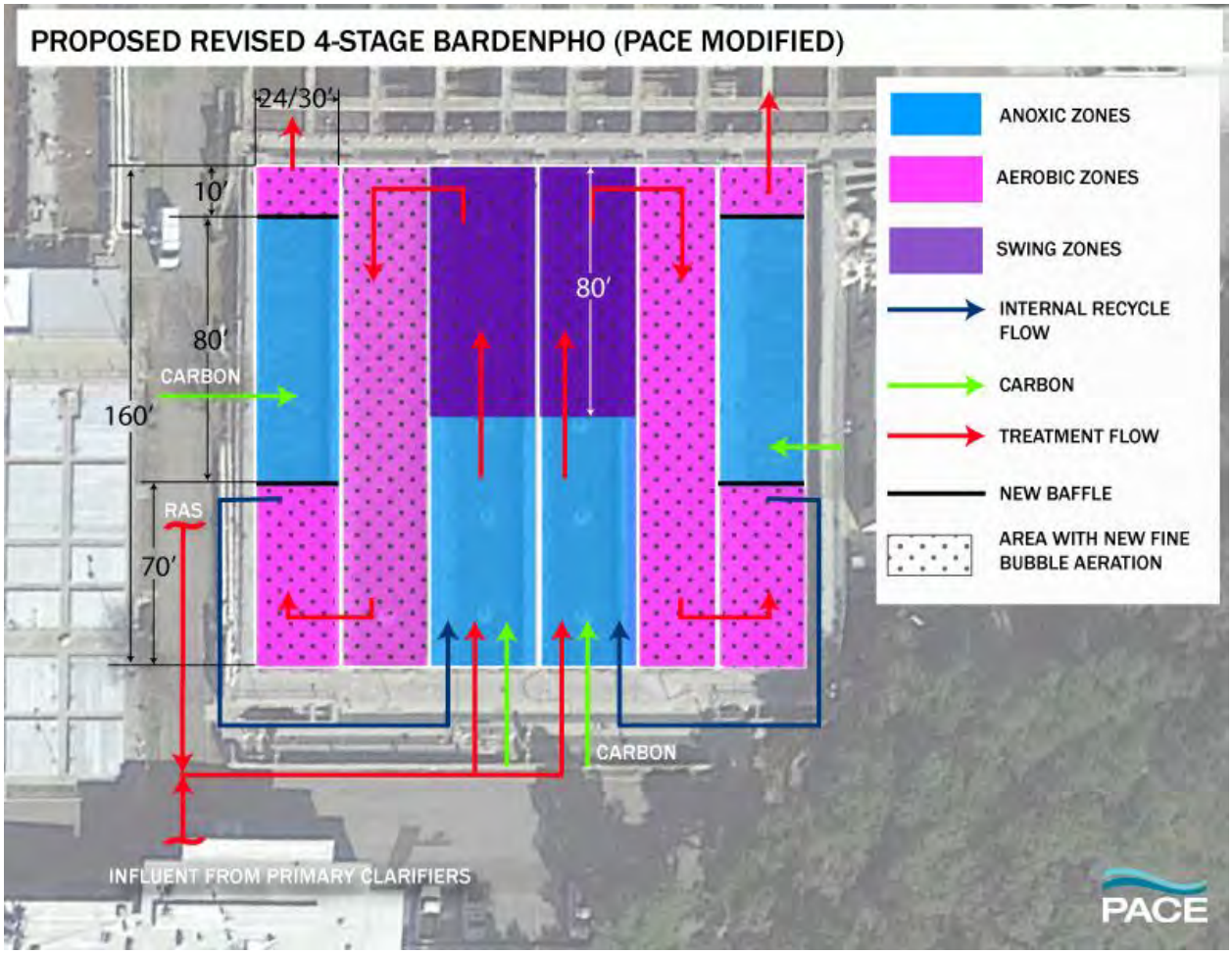


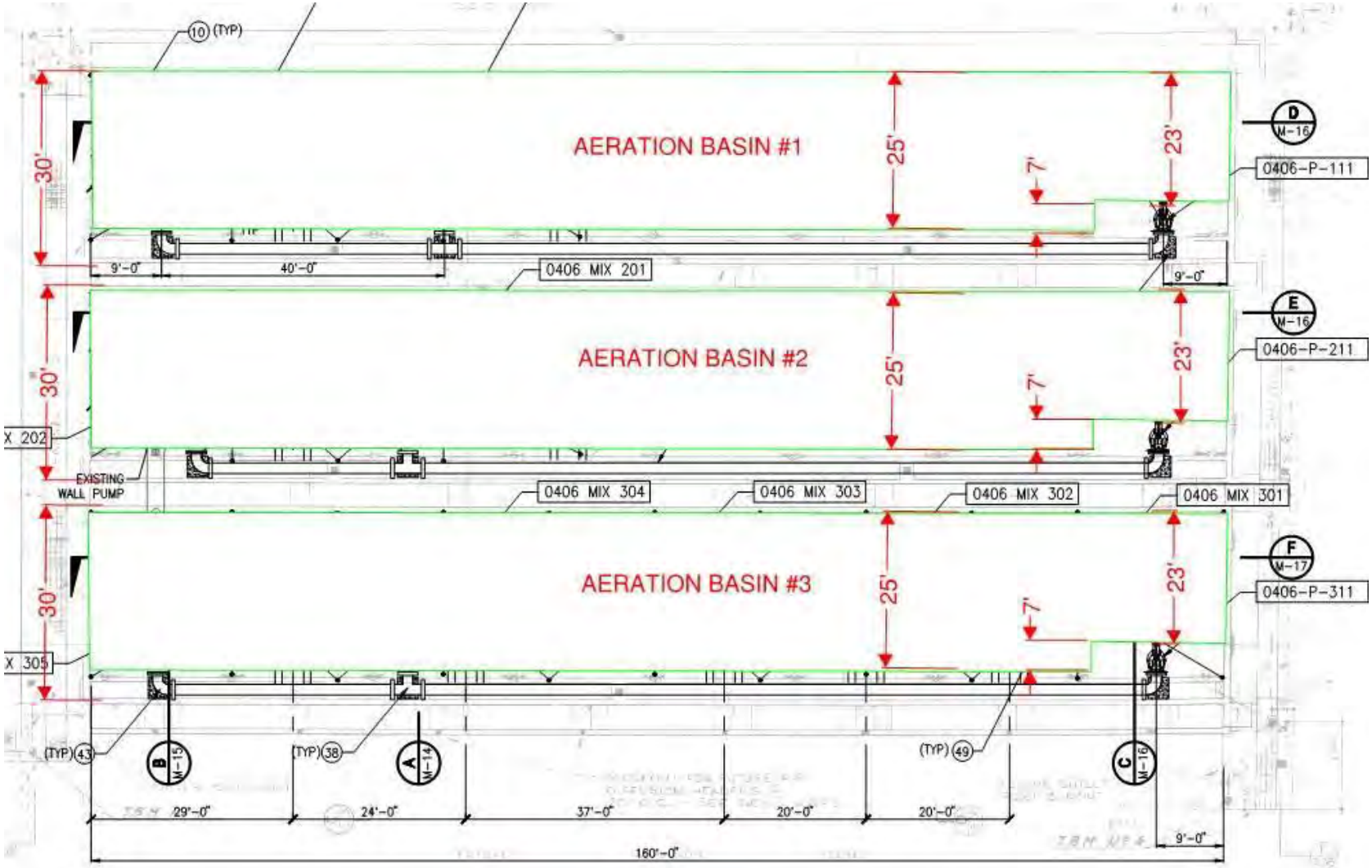
Figure 4: Proposed Areas with Fine Bubble Aeration

However the existing recirculation network and pump inside each basin will be protected in place. This will limit the available basin bed width for a new diffuser grid to 23 feet in the area surrounding the pump and 25' along the length of the basin. Figure 5 below shows the available bed surface area for a new aeration diffuser system in each basin.

The Standard Oxygen Transfer Efficiency (SOTE) is how well oxygen transfers into water at standard operating condition. Therefore Table 1 lists the minimum SOTE required for the Tapia WRF's fine bubble aeration system based on typical fine bubble aeration SOTE of 2.1% per foot submergence at the lower flow conditions and 1.7% per foot submergence at the higher flow conditions. All conditions are based on a total diffuser submergence depth of 13.5 ft. The table also identifies the air requirements for both average and peak OTR loading for various flow conditions based on the minimum SOTE.

Table 1: Aeration Design Parameters based on Minimum SOTE

Flow (MGD)	Ave OTR (lbs/day)	Max OTR (lbs/day)	Min Design SOTE %	SCFM (ave)	SCFM (max)
5.5	8,654	14,136	28	2,950	4,819
6.8	10,114	16,108	28	3,448	5,492
7.5	11,304	17,513	27	3,996	6,191
9.3	14,212	21,276	25	5,426	8,123
10	18,052	23,284	24	7,180	9,261
11	19,244	24,681	24	7,653	9,816
12	21,319	26,030	24	11,656	14,233



AVAILABLE BASIN BED
SURFACE AREA
BASINS 1,2,&3
NOT TO SCALE

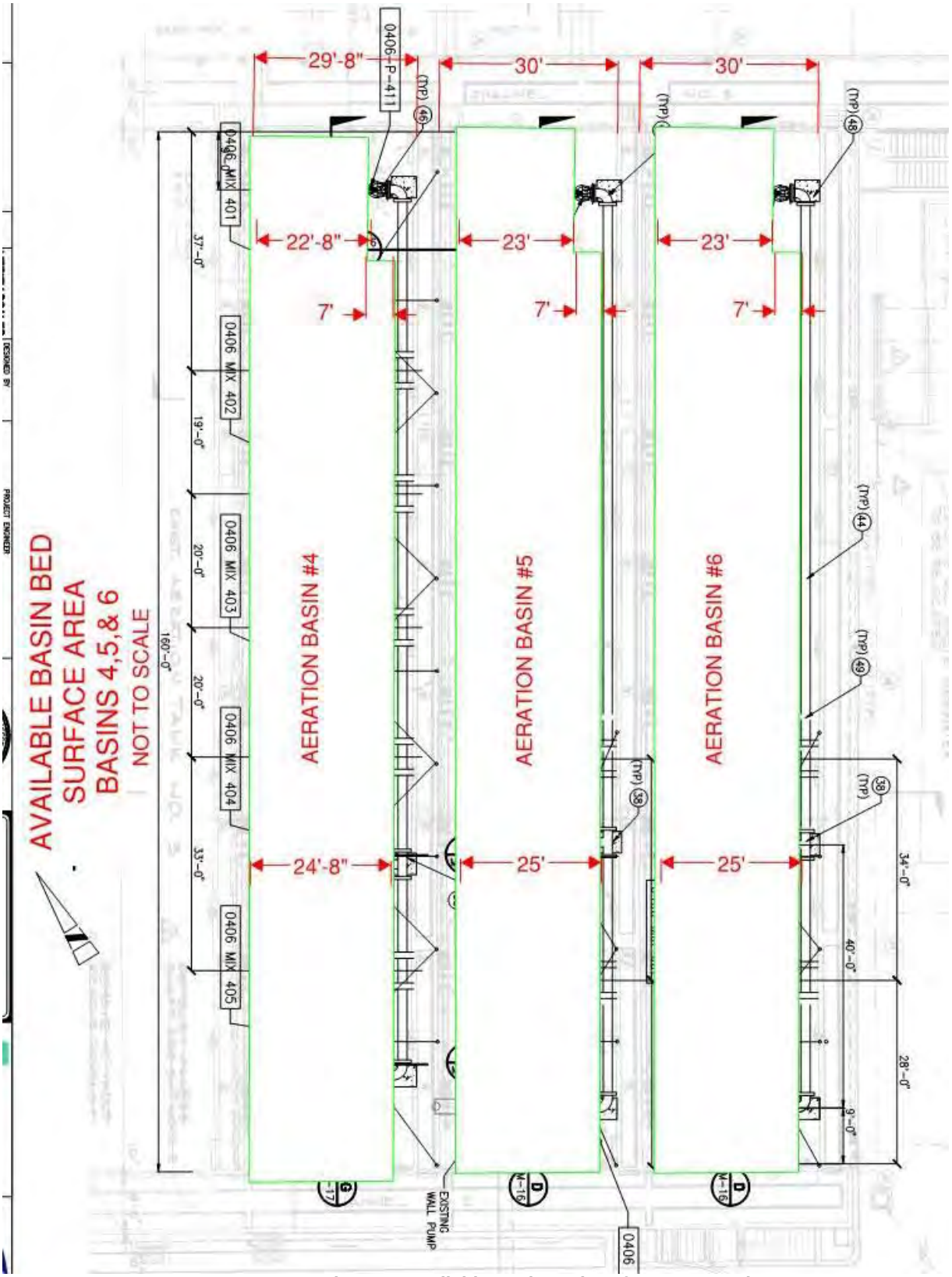


Figure 4: Available Basin Bed Surface Area Basins 1-6

An established fine bubble diffuser manufacturer shall supply a complete retrievable aeration diffuser system to be installed in the Tapia WRF Aeration Basins as identified in Figure 4 above. The retrievable diffusers grids must be capable of being removed from the basin(s) for inspection and maintenance without the need to isolate the respective basin(s) or to dewater the basin(s). The proposed fine bubble diffuser system shall be provided with all necessary hardware and ballasts for proper installation within the existing aeration basins. The fine bubble diffuser system shall meet the performance specifications outlined herein. The vendor shall be responsible for supplying operable diffusers consisting of all pertinent equipment necessary for proper operation of the system. Vendors may propose lifting/ retrieval mechanism for the fine bubble aeration grids if offering is available. The retrievable fine bubble diffuser system shall be designed to meet the following parameter and performance requirements:

Table 2: Project Design Parameters and Requirements.

Parameter	Value
Project Location	Tapia WRF, Calabasas, CA
Wastewater Type	Municipal
Elevation above Sea Level	490-feet
Ambient Temperature Range	20°F - 110°F
Exposure	Submerged, tank opens to ambient condition
Water Temperature Range	55°F - 80°F

Design Parameter	Value
Type of Wastewater Treatment Process	4-Stage Bardenpho
Process Air Upgrades Treatment Design Flow	5.5 - 12.0 MGD
Number of Aeration Basins	6
Basin Nominal Floor Dimensions	160 ft x 30 ft
Basin Nominal Top Dimensions*	156 ft x 25 ft
Nominal Operating Water Depth**	14.5 ft
Nominal Volume per Basin	508,000 gallons
α - Alpha Factor	0.55
B – Beta Factor	0.95
Design Dissolved Oxygen Concentration	2.0 mg/L
Aeration Period	24-hr continuous operation

*"Top Dimensions" refers to the clear opening available to retrieve the diffuser grids from the basin due to the angle or "Y" wall configuration of the basin (See Figure 3).

** Conical floor section in basins will be leveled as part of the project upgrades. Operating water level will be raised to 14.5 from existing 14.1 as part of the basins' upgrades.

Table 3: Influent Conditions and Aeration System Design Parameters

	Flow (MGD)	BOD (mg/L) (Min/Max)	TKN (mg/L) (Min/ Max)	MLSS (mg/L)	OTR (lbs/day) (Ave)	OTR (lbs/day) (Max)	Min Design SOTE (%)*
4-Stage Bardenpho	5.5	160/290	35/ 46	2500	8,654	14,136	28
	6.9	160/ 290	35/ 46	3000	10,114	16,108	28
	7.5	160/290	35/ 46	3000	11,304	17,513	27
	9.3	160/290	46	4000	14,212	21,276	25
	12	184/ 290	50	4500	21,319	26,030	24

*Minimum Design SOTE at Average OTR and based on using **only 80% of installed diffusers due to swing zones**.

Table 4: Effluent Quality Requirements

Effluent Quality Requirements	Value
BOD_5	10 mg/L
Ammonia*	3.1 / 2.3 mg/L
Nitrate - Nitrite	8 mg/L
Phosphorous	3 mg/L

*Effluent Ammonia limits are 3.1 mg/L to Malibu Creek and 2.3 mg/L to Los Angeles River.

Performance

Vendors shall provide retrievable fine bubble aeration equipment capable of the meeting the stated average Oxygen Transfer Rates (OTR) while maintaining the minimum SOTE for each flow condition listed in Table 3 based on the site conditions. The retrievable fine bubble aeration system shall be installed in aerobic and swing zones only based on the existing basin dimensions as shown in Figures 4 and 5. Vendors shall also provide the SOTE at the operating depth for the maximum OTR at all flow conditions listed in Table 3. All values provided shall be **based on only 80% of the installed diffusers**. The reduction to 80% is to take into account that 20% of the diffusers will not be in use due to maintaining the anoxic swing zones.

Vendors shall also provide average and maximum air flux rate through the diffuser and system pressure drop for the flow conditions listed in Table 3. Other requirements include allowable maximum and minimum continuous air flux rates, number of retrievable diffuser grids, number of diffusers per grid, total number of diffusers, and diffuser area. In addition, vendors shall provide all requested information on Exhibit C.

Quality of Construction

The fine bubble diffusers and associated mechanical parts and equipment shall conform to the following standards: ASTM, ANSI, ASME, AISI, and UL. The diffuser membranes shall be constructed of polyurethane, EPDM, or approved equal material. The air supply pipeline connections and fittings shall be of SS, PVC or approved equal materials. All portions of the piping that are within 3-feet of the water surface or above the water surface shall be 304 or 316 SS. All mounting hardware shall be 316 SS. All structural members of the retrievable frame that will be submerged at least 3-feet deep during normal operating condition shall be epoxy coated carbon steel or stainless steel. The retrievable grid's supporting frame shall be designed to be a rigid, self-supporting structure that will support the entire diffuser system without exceeding a deflection of L/360.

Coating for steel members shall meet the following requirements or approved equal:

1. System Type: Modified Epoxy.
2. Surface Preparation: White Metal Blast SSPC-SP 5 with minimum 3.0-mil profile.
3. Primer/Finish (One or More Coats): Series 435 Perma-Glaze; 30.0 to 36.0 mils DFT.
4. Total DFT: 30.0 to 36.0 mils.
5. Tnemec or approved equal

Flexible hose shall be non-kinking, air hose designed for hot air application up to 250 deg F and rated for a minimum of 100 psi. Hose shall be wire reinforced and material shall be rubber, EPDM, PVC, Polyethylene or approved equal. All hose connection shall be 316 SS.

The manufacturer shall provide a written minimum two-year warranty on the retrievable fine bubble diffuser system against defective or deficient materials and workmanship.

Retrievability

Vendors shall provide a description of the retrieval mechanism and/or the recommended diffuser grid removal process from the basin, as well as the placement of the grid back into service. The removal process will be based on using a District-provided crane. Vendors shall provide the recommended clear height and capacity of the crane. Clear height is defined as the clear opening under the crane hoist hook needed to lift the grid above the structural basin by 2 ft and move it to the staging area south of each basin. Please note to include any height needed for a spreader bar, if required.

Operation and Maintenance Requirements

A list of equipment that is anticipated to need replacement during the lifetime of the system shall be provided with frequency of replacement (frequency of diffuser replacement and percentage annually) and cost of replacement (material only).

Quality of Submittal Package

Submittals shall be formatted in a manner that allows quick referencing for pertinent information. All requested information is to be provided so that no inferences will be required by the engineer.

Along with the required submittals, Exhibit C is to be completed and included in each bid. If information requested is not applicable, an explanation must be provided as to why. Bids shall be submitted via e-mail.

The manufacturer of the fine bubble diffuser system shall be completely responsible for the proper design of their system, including but not limited to diffuser membrane disk/panel, grid frame and ballast, mounting/support system, piping fittings, connections and adapters, as well purge assemblies (where applicable). All equipment shall perform and operate as specified.

5.0 PAYMENT TERMS AND CONDITIONS

A. The District shall make an equipment selection based on the criteria of the Performance-based Specifications as required within this RFP. The District shall issue a Letter of Intent to the selected vendor, committing to the purchase of the equipment. At which point, the Engineer shall initiate the Process Air Upgrade Design based on the selected equipment. The equipment vendor shall provide the required technical information and drawings necessary for the design. The District reserves the right to cancel its dealing with the selected Vendor at any time prior to issuing a purchase order.

B. At the completion of the design, the District shall proceed with the selection of a General Contractor (Contractor). The procurement of the selected equipment shall be transferred to the Contractor. The Contractor shall make progress payments on account of the Vendor's Fixed Price on the basis of Vendor's Applications for Payment as follows:

1. 10% on Approved Submittal(s)

    a. Equipment submittal is required prior to the execution of this contract for the Engineer to review and approve, however, billing and payments will not commence until the assigning of this contract to the Construction Contractor where in the Construction Contractor will issue the Notice to Proceed to Order Equipment to the Vendor.

2. 70% on Delivery

3. 15% on Start Up & Training

4. 5% on Delivery of Final O&M Manual(s). Operation & Maintenance Manuals must be submitted and approved prior to shipping equipment to the jobsite.

C. No payment application will be accepted nor will any payments be distributed until this contract has been assigned. After assignment, payments will be made by the Construction Contractor.

May 1, 2017 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Rancho Amendment Bin and Conveyance Modifications Project: Preliminary Design Report, CEQA Determination and Award of Design Contract

SUMMARY:

On September 27, 2016, the Administering Agent/General Manager executed a professional services agreement with MWH Global, Inc., in the amount of $28,505, for a Preliminary Design Report (PDR) to evaluate the Rancho Las Virgenes Composting Facility amendment bin and conveyance system. The PDR was completed and is attached for reference.

Staff requested a proposal from MWH for the project design work because they performed the original design of the facility, prepared the recent PDR evaluating the existing amendment bin and conveyance system and have an in-depth of knowledge of the existing system and process. MWH submitted a design proposal, in the amount of $124,915, which staff believes is competitive given the scope and complexity of the project.

RECOMMENDATION(S):

Receive and file the Preliminary Design Report; find that the work is exempt from the California Environmental Quality Act; accept the proposal from MWH Global, Inc.; and authorize the General Manager to execute a professional services agreement, in the amount of $124,915, for the Amendment Bin and Conveyance Modifications Project.

FISCAL IMPACT:

Yes

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

The cost of the design services is $124,915, which is about 17% of the estimated construction cost. Sufficient funds for the work are available in the approved Fiscal Year 2016-17 JPA Budget. The cost of the work will be allocated 70.6% to LVMWD and 29.4% to

Triunfo Sanitation District.

DISCUSSION:

The amendment storage bin at the Rancho Las Virgenes Composting Facility is oversized, highly complex, deteriorating and has reached the end of its useful life. The bin was designed to receive and store up to 370 cubic yards of amendment, but operations have required less than a third of that quantity, or 120 cubic yards. Due to the bin's large size, the amendment stored within it is not being turned over properly, resulting in corrosion and heavy pitting on the sides of the bin.

The perforated grate, through which blowers send air to reduce the moisture content of the amendment, has become clogged and no longer functions efficiently. The bin itself is difficult and costly to maintain and takes up a large amount of space. In addition, the amendment has a tendency to build up at the front of the bin, requiring operators to open its hatches and distribute the amendment manually using shovels. The manual handling of the amendment near mechanical equipment can pose a safety concern.

Staff recommends the selection of Option No. 2 described in the PDR. The work consists of replacing the existing bin with a smaller version and extending the amendment delivery conveyor to the new bin. Option No. 2 has the lowest Engineer's Estimate at $726,000 and involves demolishing the existing oversized bin, rather than abandoning in in-place.

The work is categorically exempt from the California Environmental Quality Act (CEQA), pursuant to Section 15301(b) of the CEQA Guidelines because it involves only minor alterations to an existing facility with no expansion of use. Attached is a Notice of Exemption that staff proposes to file, pending Board approval of the CEQA determination.

Prepared by: Jared Q. Adams, P.E., Associate Engineer

ATTACHMENTS:

Notice of Exemption
Preliminary Design Report
MWH Design Proposal

Print Form

Notice of Exemption

Appendix E

To: Office of Planning and Research
P.O. Box 3044, Room 113
Sacramento, CA 95812-3044

County Clerk
County of: Los Angeles
12400 Imperial Highway
Norwalk, CA 90650

From: (Public Agency): Las Virgenes Municipal Water Dis
4232 Las Virgenes Road
Calabasas, CA 91302
(Address)

Project Title: Rancho Amendment Bin and Conveyance Modifications

Project Applicant: _____

Project Location - Specific:

The Amendment Building at the Rancho Composting Facility at 3700 Las Virgenes Road

Project Location - City: Calabasas Project Location - County: Los Angeles

Description of Nature, Purpose and Beneficiaries of Project:
The project consists of replacing the existing oversized amendment bin with a smaller bin, extending the existing conveyor system to the new bin, and installing all associated electrical and controls for the amendment delivery system.

Name of Public Agency Approving Project: The Las Virgenes Municipal Water District

Name of Person or Agency Carrying Out Project: _____

Exempt Status: **(check one):**

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☒ Categorical Exemption. State type and section number: Existing Facilities: Section 15301(b)
- ☐ Statutory Exemptions. State code number: _____

Reasons why project is exempt:
The project involves a minor addition to an existing facility with no expansion of use. Based on preliminary environmental review, the project would not have a significant effect on the environment.

Lead Agency
Contact Person: Jared Q. Adams, P.E. Area Code/Telephone/Extension: (818) 251-2147

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: _____ Date: _____ Title: _____

☐ Signed by Lead Agency ☐ Signed by Applicant

Authority cited: Sections 21083 and 21110, Public Resources Code.
Reference: Sections 21108, 21152, and 21152.1, Public Resources Code.

Date Received for filing at OPR: _____

To:
Jared Adams, PE, LVMWD
Eric Schlageter, PE, LVMWD

Date:
February 28, 2017

From:
Roger Stephenson, PE, PhD, MWH
Oliver Slosser, PE, MWH
Connie Adera, EIT, MWH

Reference: 10509845

Subject: Rancho Las Virgenes Compost Facility Bulk Amendment Bin Modifications

Contents

Tables

Figures

1 Introduction

The Las Virgenes-Triunfo Joint Powers Authority (JPA) own and operate the Rancho Las Virgenes Compost Facility (RLVCF) located south of the Las Virgenes Municipal Water District (LVMWD) headquarters at 3700 Las Virgenes Road in Calabasas, CA. The existing amendment process at the RLVCF has been in service for over 20 years and is in need of repairs and improvements. At the request of LVMWD, MWH initiated a study to assess and offer recommendations for modifications to the existing facility in order to address operational challenges encountered at the facility. This study examines the Bulk Amendment Bin deterioration, size, and ease of use, as well as alternative conveyance systems, dust handling, and fire protection. This Technical Memorandum (TM) summarizes these issues and offers alternatives to specifically address the amendment handling process at the facility. Three options for the amendment handling process were developed and compared based on the viability of each option for implementation.

2 Background and Purpose

The RLVCF came online in 1994 to provide beneficial reuse of biosolids generated at the Tapia Water Reclamation Facility (Tapia WRF). The RLVCF provides biosolids treatment through the processes of anaerobic digestion, biosolids dewatering, and composting. The composting process includes the amendment systems, recycle compost system, dewatering, raw compost generation, composting, and storage. As part of the composting process, organic amendment is added to the biosolids cake as a carbon source and bulking agent. The amendment is dropped off, conveyed, screened, and loaded into Bulk Amendment Bin No. 1 (Bulk Amendment Bin) to be used as needed in the raw compost mix.

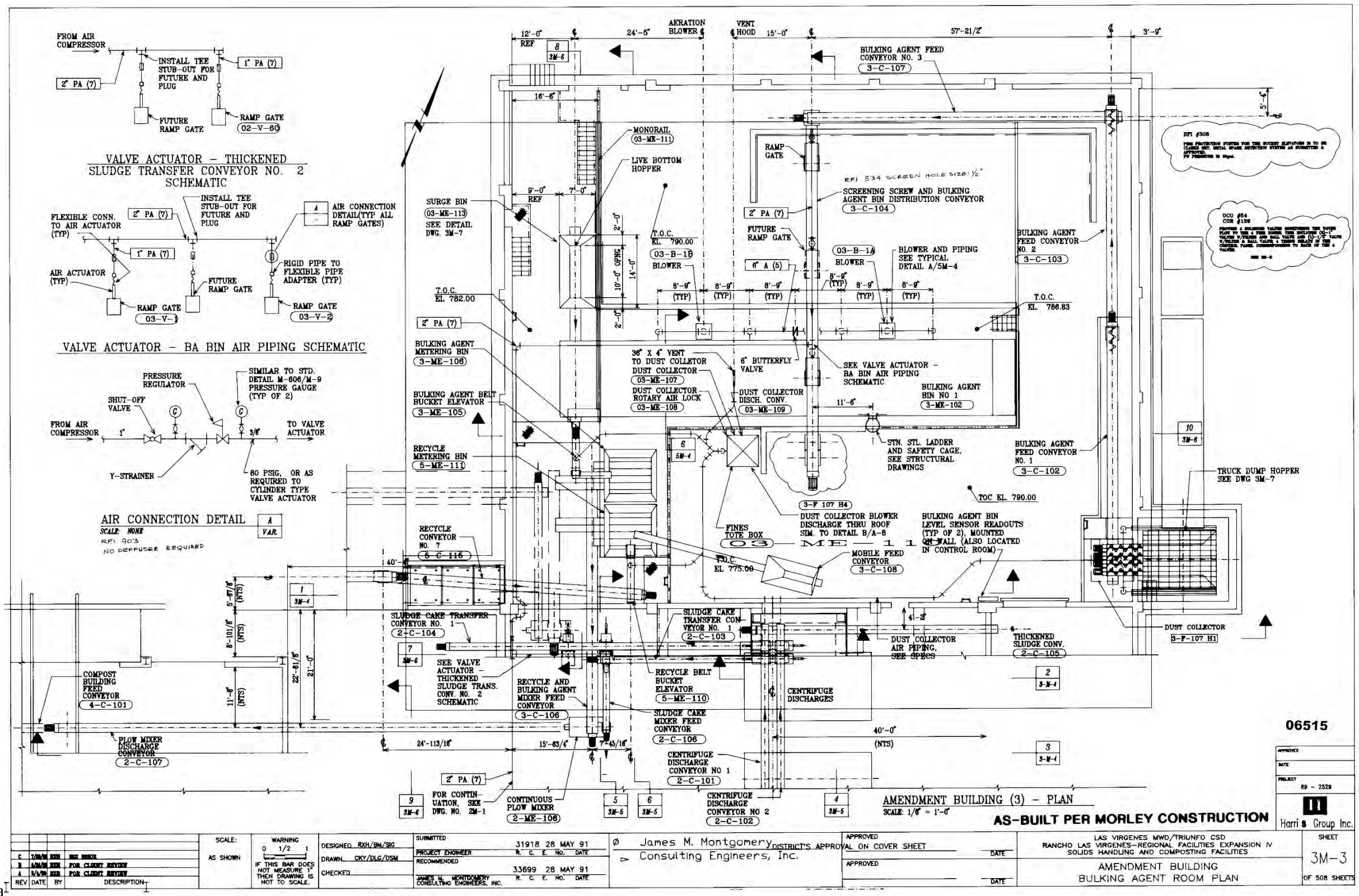
The purpose of this TM is to characterize the overall amendment process at RLVCF, and provide preliminary design of options to improve the overall amendment process. This TM includes concept level costs and markups to as-built drawings to aid LVMWD in choosing a new configuration to their amendment process at RLVCF.

3 Characterization

Amendment Storage Requirements

The RLVCF receives amendment weekly in the form of woodchips, sawdust, and organic material to mix with the digested sludge. The amendment comes either dry or wet and in a variety of sizes. Currently, RLVCF receives sawdust and woodchips in loads of either 45 or 65 cubic yards, depending on the supplier. The delivery frequency varies from once per week to twice per day. Two loads can last for up to four days in the composting process. The current capacity of the Bulk Amendment Bin is 370 cubic yards (9,990 cubic feet). It was originally designed to accommodate a higher amount of biosolids from the Tapia WRF based on the design capacity of 16.1 MGD. Looking at current flow trends, RLVCF has identified a more appropriate capacity of amendment storage of roughly 120 cubic yards (3,240 cubic feet). The layout of the Amendment Building is shown on **Figure 1**.

Figure 1
Amendment Building Layout



Amendment Receiving Area

Amendment deliveries are deposited outside of the Amendment Building at grade on a live bottom feeder, as shown on **Figure 2** and **Figure 3**. The live bottom feeder vibrates to allow amendment to fall through into the Truck Dump Hopper and onto the Amendment Feed Conveyor No. 1. The Truck Dump Hopper is a 16 feet by 16 feet square on the surface with the capacity to hold 63 cubic yards of material. Since loads are dropped off faster than amendment can be used, amendment piles up outside of the Amendment Building. The Amendment Receiving Area is unprotected from rain or runoff.

Improvements to be considered in the Amendment Receiving Area include constructing a canopy over the area to protect from rain and to include a curb or knee wall to guide runoff around the amendment material. The amendment stored indoors creates a dust problem and risk of dust combustion. The dust combustion concerns could potentially be alleviated by allowing increased outdoor storage. Use of the outdoor area for storage of amendment is considered as part of this TM.

Figure 2
Amendment Storage outside of RLVCF

Figure 3
Amendment Receiving Area and Live Bottom Feeder

Conveyance

The amendment is conveyed via a series of shaftless screw conveyors (Amendment Feed Conveyors No. 1, 2, and 3 and Amendment Screening and Distribution Conveyor) in a trough with two levels: the top level screens the finer material (<1") to the bottom conveyor; this finer material is used as amendment. The larger material is conveyed to a hopper for removal. The conveyors require a high level of maintenance for the operators. The bottom conveyor was recently replaced due to damage from wear and tear. The liners and screws are deteriorating from miscellaneous waste in the amendment composition which can include pieces of metal and other harmful items. Additional access hatches would aid the operators in fixing clogged areas. LVMWD staff expressed concerns with the relative length and configuration of the conveyor system and are open to a shorter path of conveyance for the amendment to travel. There is a rolling conveyor available on site but it is not currently used. The current conveyors are shown on **Figure 4**.

Figure 4
Existing Conveyor System and Reserve Amendment Storage Area

Bulk Amendment Bin

The Bulk Amendment Bin is a 370 cubic yard (9,990 cubic feet), storage bin with a live bottom conveyor, a rake back conveyor, and a picker roll, and is shown in **Figure 5** and **Figure 6**. The manufacturer of the amendment bin is Clarke, which is still in business.

Amendment material is dropped into the back and removed from the front, allowing for first in, first out storage. The Bulk Amendment Bin supplies material to the Amendment Metering Bin for addition to the raw compost mix as-needed.

The Bulk Amendment Bin is oversized for current demands and deteriorating. The storage could be reduced to approximately one-third of its size, from 370 cubic yards to 120 cubic yards and still have ample space for the amount of amendment needed based on current and projected demands. Due to the large size of the bin, the amendment is not turning over completely, resulting in corrosion of the bin (sides are heavily pitted) as shown in **Figure 7** and **Figure 8**. When the amendment is wet it causes increased corrosion of the bin. The blowers, which are used to decrease moisture from the Bulk Amendment Bin, are designed to send air through a perforated grating, but are not functioning properly according to the LVMWD operators. Fine material from the amendment clogs the perforated holes, blocking airflow and preventing the amendment from properly drying. When the perforations are drilled to be cleared out they quickly fill up again.

Figure 5
Bulk Amendment Bin Rollers

Figure 6
Bulk Amendment Bin Side View

Figure 7
Bulk Amendment Bin Corrosion on Rollers and Side Panel

Figure 8
Interior Corrosion in Bulk Amendment Bin

Figure 9
Exterior Damage and Corrosion in Bulk Amendment Bin

Overall, the Bulk Amendment Bin is large and difficult to maintain, and takes up a large amount of the building space. The hatches at the back are difficult to close. Sometimes the amendment builds up at the front of the bin and cannot be removed mechanically, requiring operators to open the front-hatches and shovel the amendment manually. This is done near large blades in the bin, presenting a safety concern.

Reserve Amendment Storage Area
When the Bulk Amendment Bin is out of operation, the screened amendment falls through a gate into a pile on the floor in the large, concrete Reserve Amendment Storage Area, and from there is manually loaded into the Amendment Surge Bin (Surge Bin). This storage area is shown in **Figure 4** above.

Surge Bin
The Surge Bin volume is 30.4 cubic yards (820 cubic feet) with a 7-feet by 14-feet footprint, shown in **Figure 10**. The Surge Bin is open to the upper floor to receive amendment, and has a long hopper and a shaftless screw conveyor in a trough on the lower floor to bring the amendment to the Amendment Metering Bin. The Surge Bin functions well except that it is not large enough to meet the storage demands and it must be manually loaded from the Reserve Amendment Storage Area.

Figure 10
Surge Bin

Dust Collection and Fire Protection

There is a dust collection system at the Truck Dump Live Bottom Feeder, the Bulk Amendment Bin, and the Bulking Agent Elevator and the Recycle Belt Bulking Elevator; however, the Amendment Building maintains a high level of dust in the air. The combustible dust from the amendment presents a significant fire and explosion danger. Currently the chutes, Bulk Amendment Bin, and conveyance have UV sensors to trigger water to spray when smoke is detected. In addition, outdoor storage described in this TM may help alleviate the dust levels and associated fire hazard within the building.

Large Material Hoppers

The hoppers for larger-sized material often experiences bridging when the material is wet (when it is emptied “bridges” of material remain stuck in the hopper). Access hatches would aid the maintenance staff in addressing this issue.

4 Options to Improve the Bulk Amendment Bin

After a site visit to the RLVCF and discussion with LVMWD staff and operators, MWH has identified two options to address the Bulk Amendment Bin issues that LVMWD is experiencing. MWH contacted suppliers and developed preliminary costs for these two options which consist of: (1) adaptation or replacement of the Surge Bin to accept additional storage directly from the conveyor system while abandoning the current Bulk Amendment Bin in place, and (2) replacement of the Bulk Amendment Bin with a smaller unit. Option 1 is further subdivided into Option 1A and 1B; replacement of the existing surge bin, and modification of the existing surge bin, respectively. Modifications to the Amendment Receiving Area to allow for outdoor storage of the amendment is also discussed and can be done in conjunction with either option to allow for more outdoor storage and decreased dust within the building.

Amendment Bin Option 1 – Surge Bin Adaptation

Option 1A

The stored capacity goal is 120 cubic yards. Option 1A demolishes the existing surge bin, installs a new 120 cubic yard surge bin with trough conveyor, and abandons the Bulk Amendment Bin in place. This new bin should accommodate the full 120 cubic yards and can be sized as 9-feet wide by 24-feet high by 16-feet long. Using the surge bin the primary amendment storage will require a new 54-feet long screw conveyor to transfer the amendment mechanically from the Screening Screw and Bulking Agent Distribution Conveyor 3-C-104 drop gate to the new surge bin. The trough conveyor beneath the new surge bin will connect to the amendment bucket elevator. This new surge bin includes four internal screws acting as a live bottom across the full width to prevent the material from piling up along the walls. The surge bin is more complex than the existing surge bin; the live bottom hopper is shown in **Figure 11.**

Figure 11
Internal Screws in surge bin live bottom hopper

Picture courtesy of Austin Mac, Inc.

A new 54-feet long conveyor is needed to transport the amendment from the existing conveyor to the surge bin, instead of manual loading. Since the screening screw elevation is 808 feet, and the new surge bin is potentially 5.5 feet taller than the existing surge bin (805.5), there is enough elevation for a new conveyor to accommodate a taller surge bin based on supplied drawings.

Design Criteria

The design criteria for the Option 1A are provided in **Table 1 Option 1A Design Criteria.**

Table 1
Option 1A Design Criteria

Equipment	Size	Dimensions	Details
New Surge Bin	120 cu yds	9-ft x 24-ft x 16-ft	(4) internal 23 feet-8 inch internal screws (4) 10 HP drives supports to floor
New Screw Conveyor	54 ft long	23 ½-in dia. x 24-in pitch	Supports to floor
Trough Screw Conveyor	30 ft long	23 ½-in dia. x 24-in pitch	Supports to floor Hopper cross conveyor discharge with conveyor to amendment bucket elevator
Detailed information from the Quotation 15294 by Austin-Mac, Inc., provided in Appendix B			

Option 1B

Alternatively, Option 1B modifies the current surge bin, adds a second surge bin, and abandons the Bulk Amendment Bin in place. The existing surge bin can hold 30 cubic yards; 90 additional cubic yards are required. To accommodate the majority of this extra demand, a second surge bin can be placed next to the current surge bin. Approximate sizing of this new surge bin is 20-feet long, 8-feet wide, 14-feet tall and can hold 80 cubic yards. To meet the additional 10 cubic yards required, the existing surge bin can be adapted by increasing the height and/or width of the hopper. Note the new 80 cubic yard surge bin is higher than the existing surge bin and 1 foot wider. Note the new surge bin for Option 1B also includes four internal screws acting as a live bottom across the full width to prevent the material from piling up along the walls. The additional surge bin is more complex than the existing surge bin. The live bottom hopper is shown in **Figure 11** above**.**

A new 54-foot long conveyor is also needed to transport the amendment from the existing conveyor to the surge bins, instead of manual loading. Since the screening screw elevation is 808 feet, and the new surge bin is potentially 3.5 feet taller than the existing surge bin (803.5), there is plenty of elevation for a new conveyor to accommodate a taller surge bin. This new 80 cubic yard surge bin will be the primary storage and the existing surge bin will be loaded manually and used to supplement storage. Furthermore, the trough conveyors for the two surge bins will not operate together, but will be side-by-side and must both connect to the Bulking Agent Belt Bucket Elevator.

Design Criteria

The design criteria for the Option 1B are provided in **Table 2.**

Table 2
Option 1B Design Criteria

Equipment	Size	Dimensions	Details
New Surge Bin	80 cu yds	8-ft x 14-ft x 20'-ft	(4) internal 20-feet screws (4) 10 HP drives supports to floor
New Screw Conveyor	54 ft long	23 ½-in dia. x 24-in pitch	Supports to floor
Trough Screw Conveyor	30 ft long	23 ½-in dia. x 24-in pitch	Supports to floor Hopper cross conveyor discharge with conveyor to amendment bucket elevator
Detailed information from the Quotation 15294 by Austin-Mac, Inc., provided in Appendix B			

Options 1A and 1B must incorporate a method for access to the lower conveyor motor, access for conveyor liner replacement, and removal of the stairs to accommodate the extra space needed for the surge bin modifications. New stairs can be added in the southwest corner of the room if determined necessary. Additionally, the design must include a way to open the surge bin from the upper level when manual loading is required. This could consist of vertical gates and bolted panels on the bin for removal as needed. Doors or a hatch may open too easily when bumped or disturbed.

Process Schematics and Drawings

Figure 12 and Figure 13 show a schematic of Option 1A and Option 1B. **Figure 14** and **Figure 15** show the layout and section of Option 1A while **Figure 16** and **Figure 17** show the layout and section view of Option 1B on the existing as-builts for the RLVCF facility.

Figure 12
Process Schematic of Option 1A

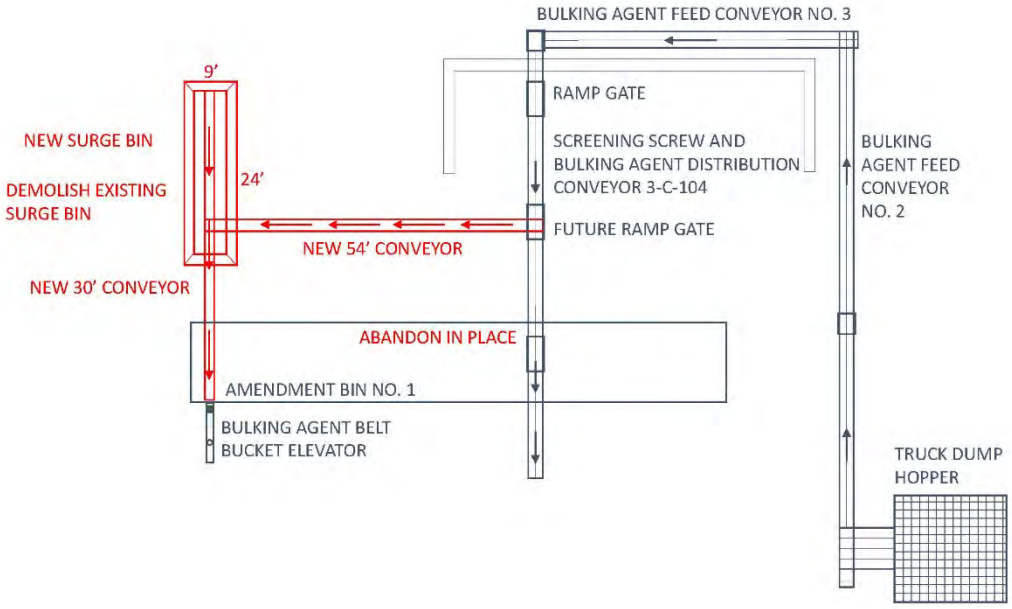


Figure 13
Process Schematic of Option 1B

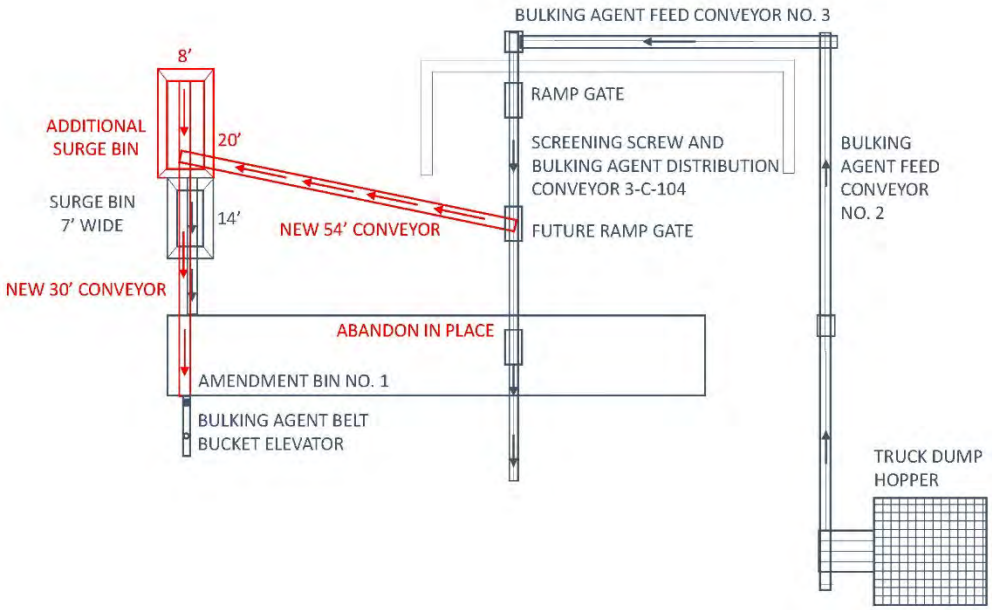


Figure 14
Layout of Option 1A

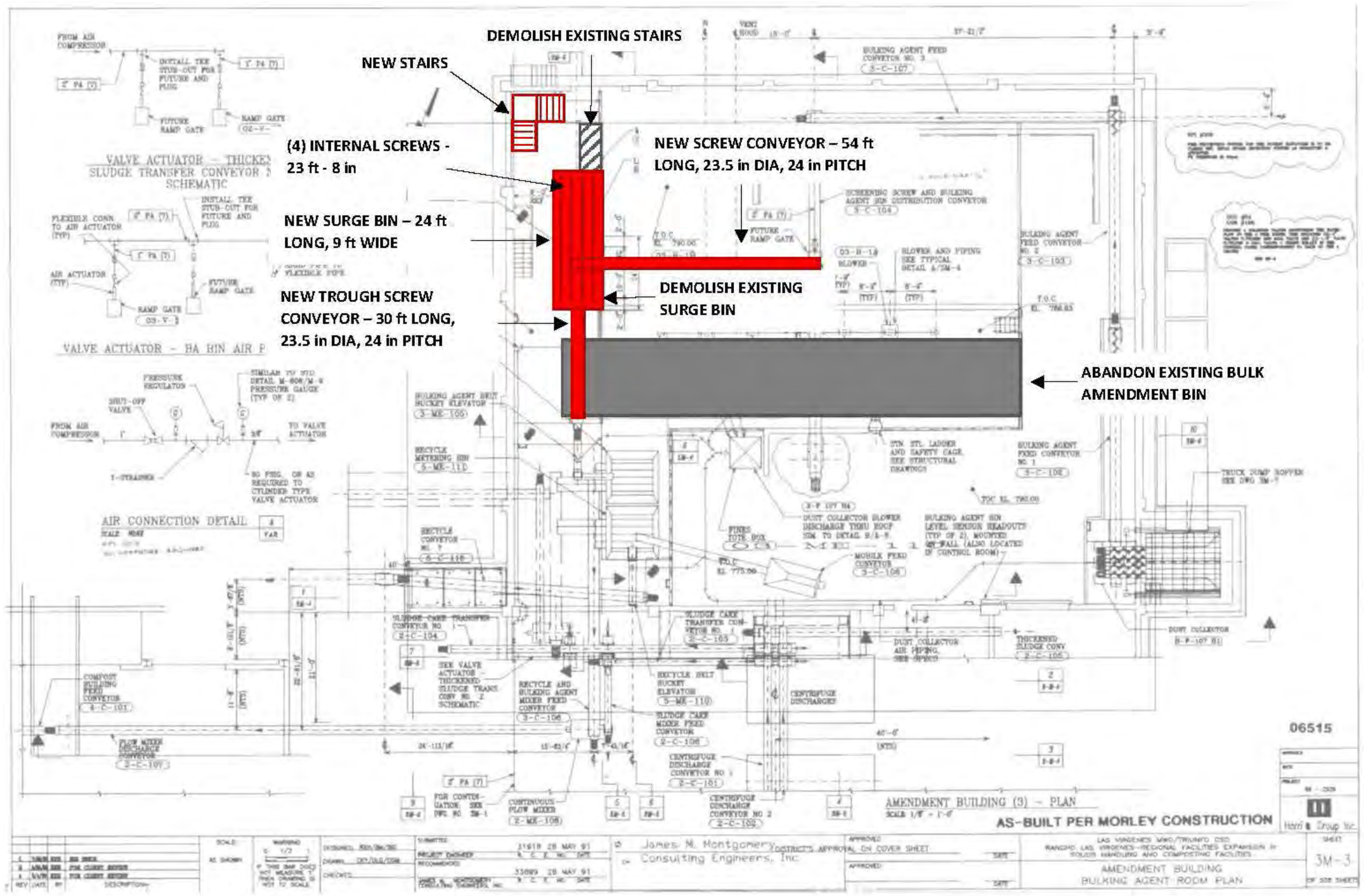


Figure 15
Section of Option 1A

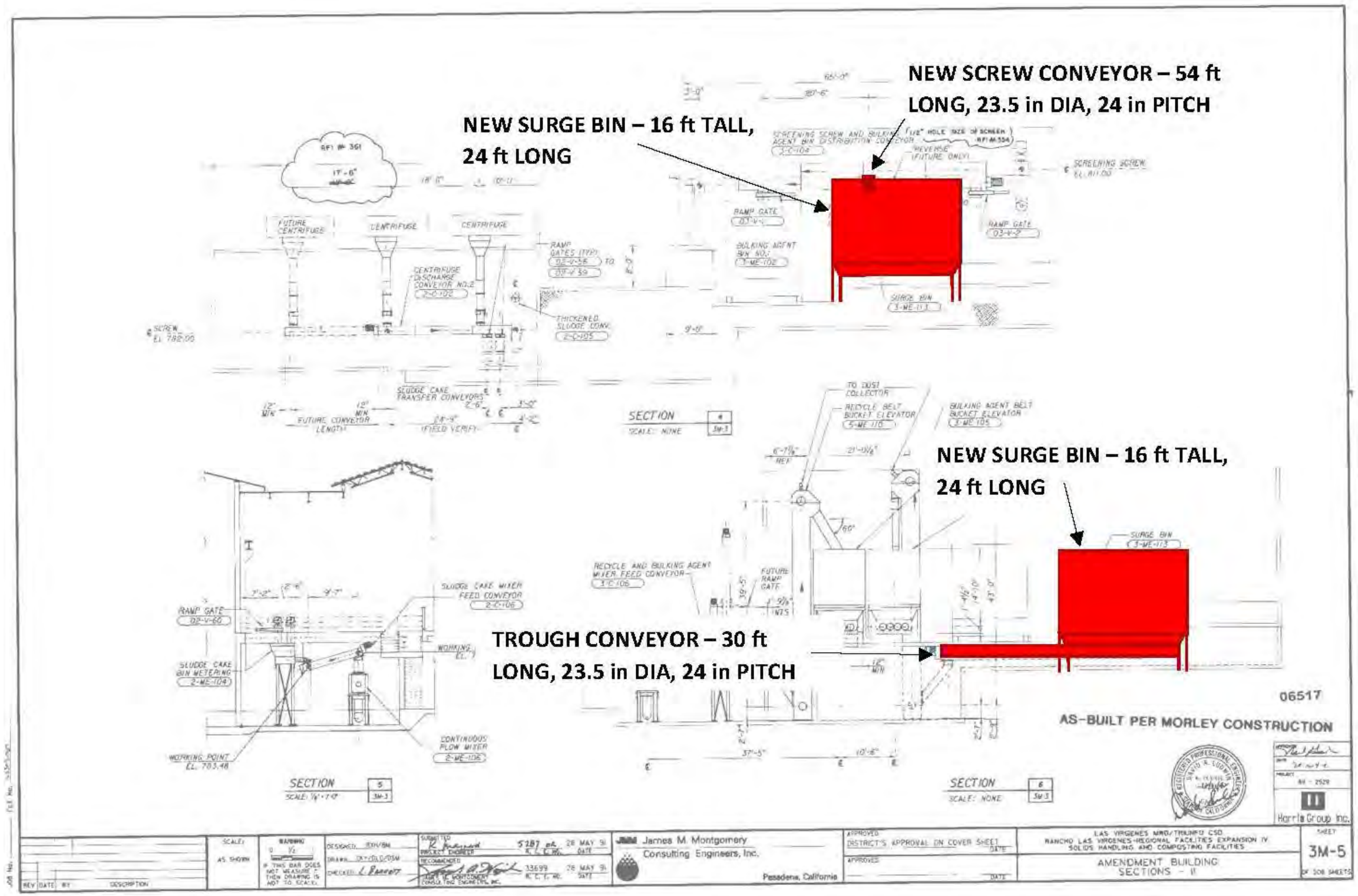


Figure 16
Layout of Option 1B

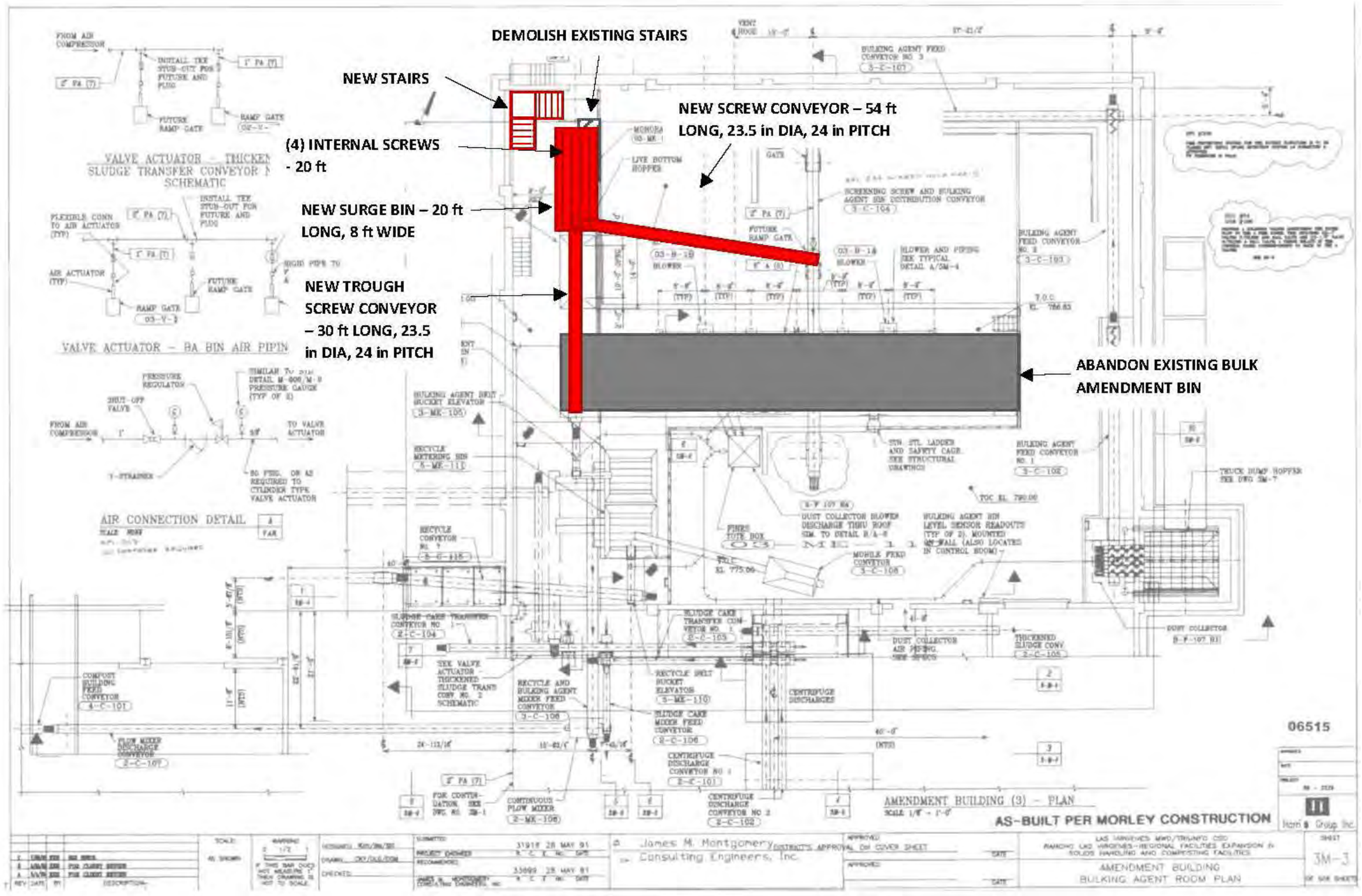
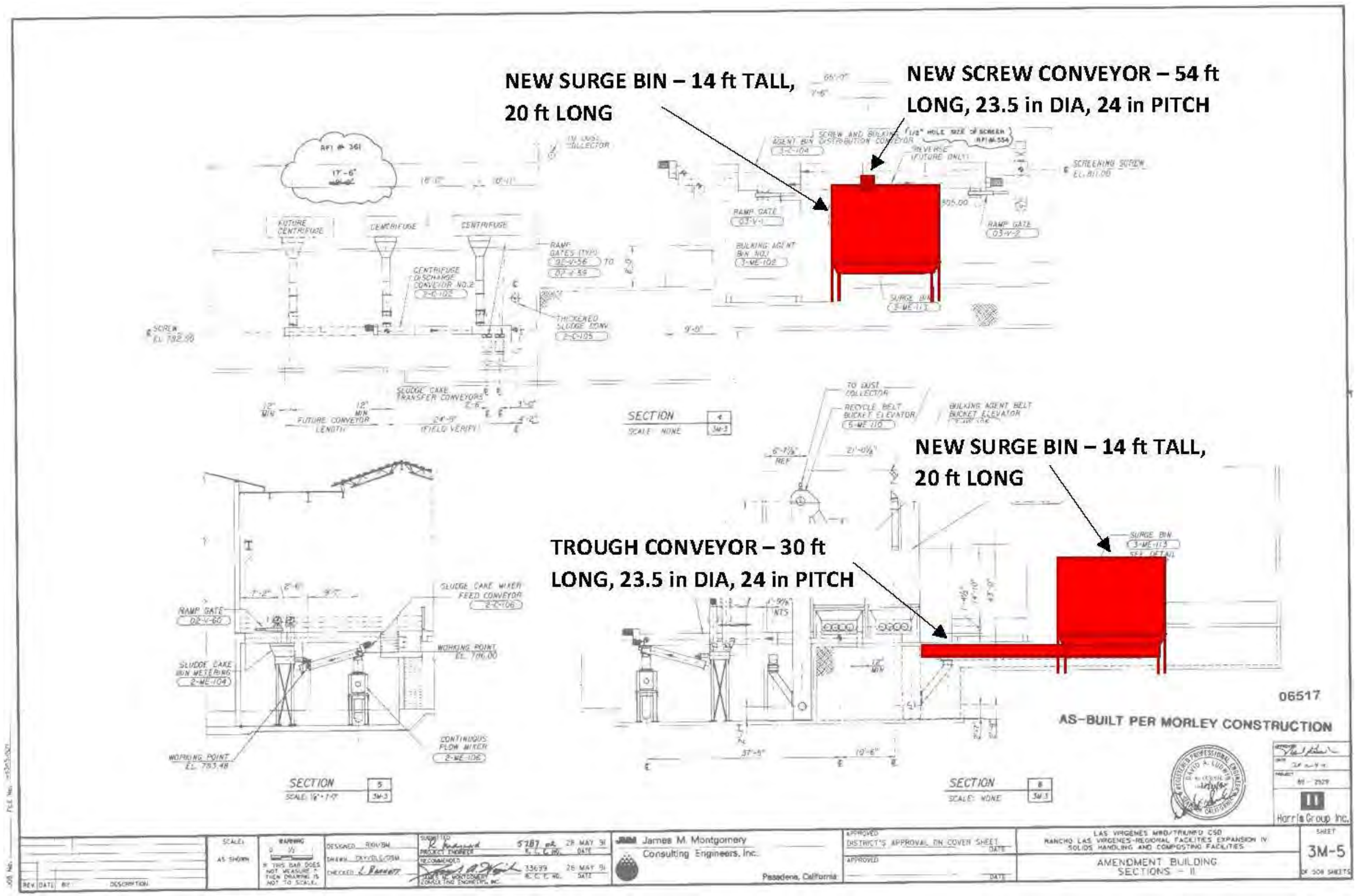


Figure 17
Section of Option 1B



Cost Assessment

To establish a baseline cost for each of the options, the amendment bin and conveyor manufacturer, Austin-Mac, provided a quote, as well as the manufacturer's representative, Coombs-Hopkins, representing Custom Conveyor Corporation (CCC). Note the costs provided by Austin-Mac are from a detailed quote whereas the costs provided by CCC are rough estimates. Capital Cost Estimates for Options 1A and 1B are presented in **Table 3** and **Table 4**, respectively.

Table 3
Capital Cost Estimate for Option 1A

Description	Quantity	Unit	Cost
New Surge Bin and Conveyor System Equipment[1]	1	ea	$ 418,350
Purchase New Materials[2]	1	ls	$ 12,500
Labor & Equipment[3]	1	ls	$ 35,160
Subcontractors[4]	1	ls	$ 14,500
Subtotal			**$ 480,500**
Construction Allowances[5]	72%		$ 343,600
Total			**$ 824,100**

[1]Cost taken from Austin-Mac's quotation 15294
[2]Contractor shop drawing preparation and material modifications
[3]The Labor Laborer, sheetmetal worker, millwright, foreman, pickup for the demolition of stairs, floor support installation, conveyor and bin assembly
[4]Rental crane, mobilize and demobilize rental crane, electrical power connect & motor starter, painting or coatings
[5]Refer to Appendix A: Opinion of Probably Cost for detailed list of construction allowances

Table 4
Capital Cost Estimate for Option 1B

Description	Quantity	Unit	Cost
New Surge Bin and Conveyor System Equipment[1]	1	ea	$ 395,275
Purchase New Materials[2]	1	ls	$ 15,000
Labor & Equipment[3]	1	ls	$ 35,160
Subcontractors[4]	1	ls	$ 14,500
Subtotal			**$ 459,900**
Construction Allowances[5]	72%		$ 328,900
Total			**$ 788,800**

[1]Cost taken from Austin-Mac's quotation 15294
[2]Contractor shop drawing preparation and material modifications
[3]Laborer, sheetmetal worker, millwright, foreman, pickup, demolition of stairs
[4]Rental crane, mobilize and demobilize rental crane, electrical power connect & motor starter, painting or coatings
[5]Refer to Appendix A: Opinion of Probably Cost for detailed list of construction allowances

Amendment Bin Option 2 – Bulk Amendment Bin Replacement

Overview

Option 2 demolishes the existing Bulk Amendment Bin and installs a new 120 cubic yard Bulk Amendment Bin. This option considers the replacement of the current Bulk Amendment Bin with one that is smaller and easier to operate. The new bin should have a capacity of 120 cubic yards

with a rakeback conveyor, live bottom conveyor, and picker roll. Since the bin will be smaller, an additional upper conveyor is needed to convey the amendment from Screening Screw and Bulking Agent Bin Distribution Conveyor 3-C-104 to the new bin.

Design Criteria

The design criteria for Option 2 are provided in **Table 5.**

Table 5
Option 2 Design Criteria

Equipment	Size	Dimensions	Details
New Bulk Amendment Bin	120 cu yds	10 ft-6 in x 24 ft x 14 ft	(6) internal 23 feet-8 inch long screws, 18 inch dia (6) 10 HP drives (2) top leveling screws Picker roll system at discharge end Discharge cross conveyor to feed existing bucket feed conveyor supports to floor
New Screw Conveyor	18 ft long	23 ½ in dia. x 24 in pitch	10 HP drive From Conveyor 3-C-104 drop gate to new bin
Detailed information from the Quotation 15294 by Austin-Mac, Inc., provided in **Appendix B**			

Process Schematics and Drawings

Figure 18 shows a process schematic of Option 2. **Figure 19** and **Figure 20** show the layout and section of Option 2 on the existing as-builts for the RLVCF facility.

Figure 18
Process Schematic of Option 2

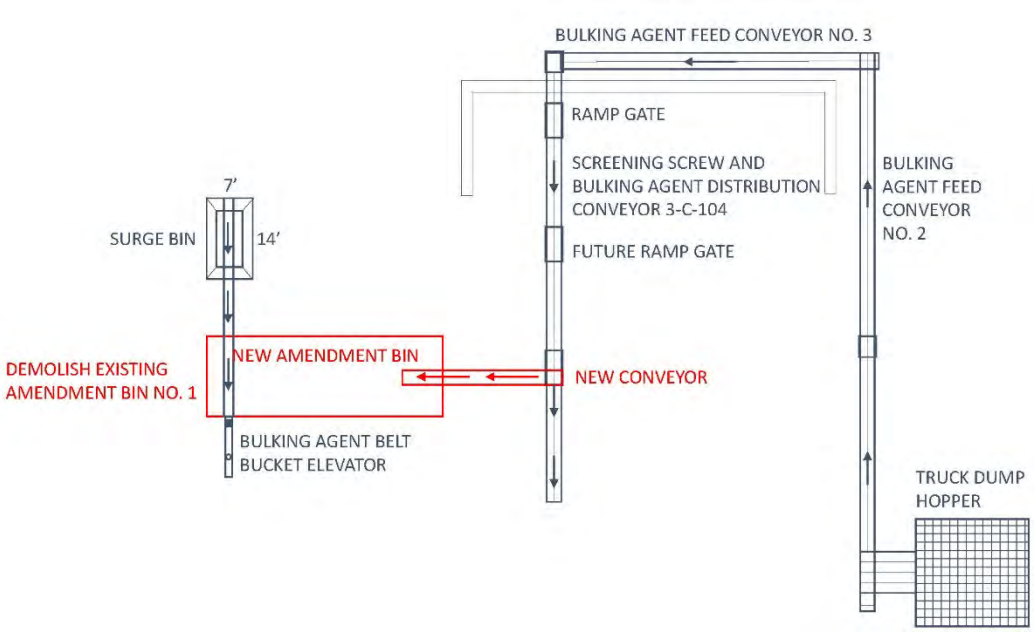


Figure 19
Layout of Option 2

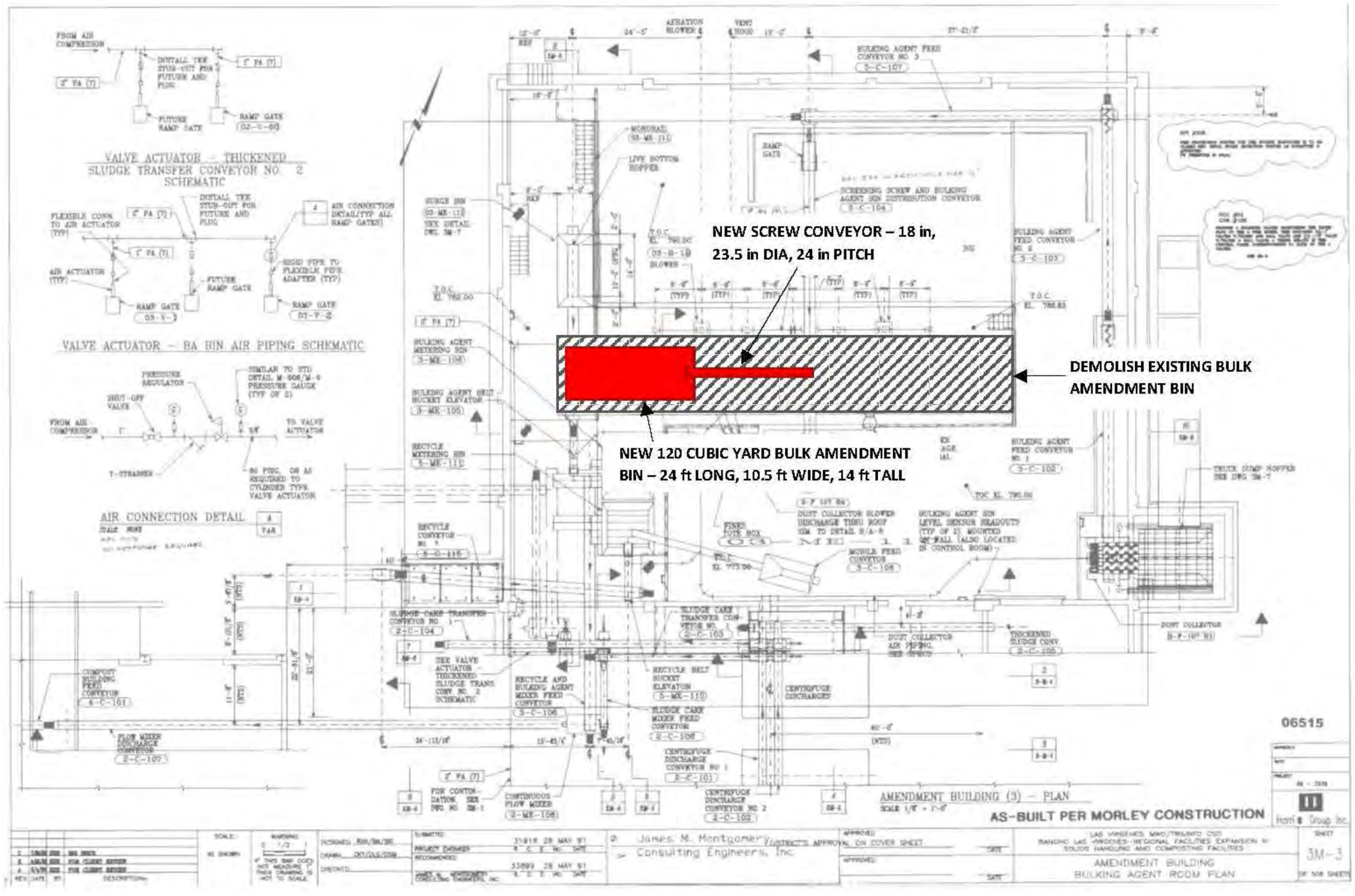
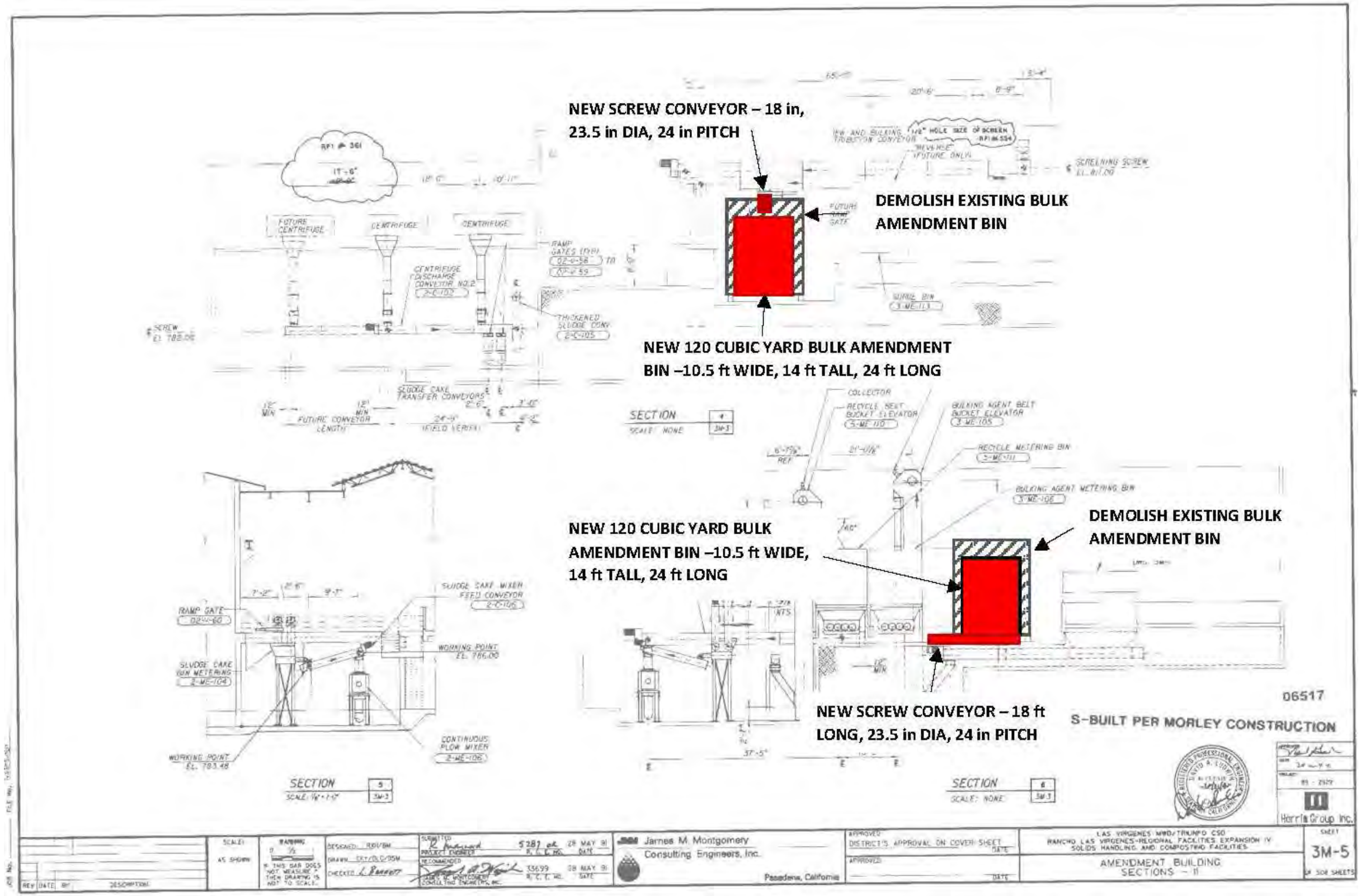


Figure 20
Section of Option 2



Cost Assessment

Capital Costs for Option 2 are presented in **Table 6**.

Table 6
Capital Cost Estimate for Option 2

Description	Quantity	Unit	Cost
New Amendment Bin and Conveyor System Equipment[1]	1	ea	$ 336,780
Purchase New Materials[2]	1	ls	$ 15,000
Labor & Equipment – Demo Amendment Bin[3]	1	ls	$ 25,200
Labor & Equipment – Install of New Equipment	1	ls	$ 42,540
Subcontractors[4]	1	ls	$ 14,500
Subtotal			**$ 434,000**
Construction Allowances[5]	72%		$ 292,000
Total			**$ 726,000**

[1]Cost taken from Austin-Mac's quotation
[2]Contractor shop drawing preparation and material modifications
[3]Laborer, sheet metal worker, millwright, foreman, pickup
[4]Rental crane, mobilize and demobilize rental crane, electrical power connect & motor starter, painting or coatings
[5]Refer to Appendix A: Opinion of Probably Cost for detailed list of construction allowances

The capital cost for the demolition of the existing amendment bin is broken down into more detail in **Table 7**.

Table 7
Demolition of Existing Amendment Bin Costs

Description	Quantity	Unit	Cost per Hour	Cost
Laborer (5)[1]	200	hr	$ 60	$ 12,000
Torch[2]	40	hr	$ 20	$ 800
Forklift	40	hr	$ 25	$ 1,000
Operator (1)	40	hr	$ 70	$ 2,800
Shears at Exterior	40	hr	$ 125	$ 5,000
Foreman	40	hr	$ 75	$ 3,000
Pickup	40	hr	$ 15	$ 600
Haul-off for Scrap Recycled[3]	40	hr	$ 0	$ -
Subtotal				**$ 25,200**
Allowances	72%			$18,200
Total				**$43,400**

[1]Laborers' tasks to include unbolting/torching sections of the amendment into sections for outside reduction by shears.
[2]Assume abatement is not required for any LBP
[3]Trucking haul-off costs are assumed to be equal to the salvage credit for the scrap steel.

Amendment Receiving Area Options

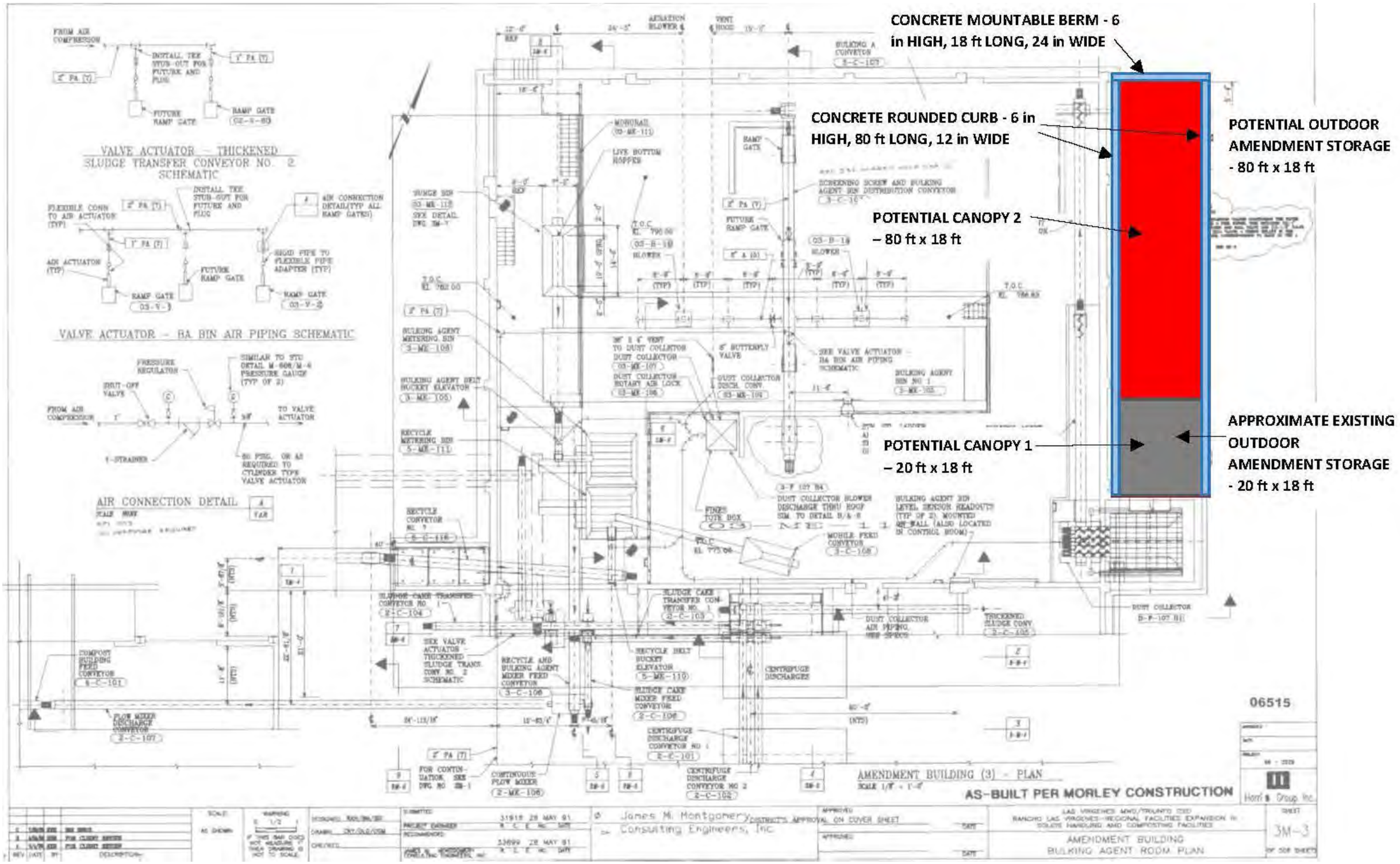
Overview

Improvements to be considered in the Amendment Receiving Area include constructing a canopy over the area to protect from rain and to include a curb or knee wall to guide runoff around the amendment material. The Amendment Receiving Area is currently storing woodchips and sawdust in an area approximately 20 feet by 18 feet (Canopy 1). If this area is increased to include the entire length of the building, it can be approximately 80 feet by 18 feet (Canopy 2). A typical concrete curb height on private property is 6 inches high. Trucks can enter the area by driving over a 6-inch concrete mountable berm that will prevent runoff from entering the area. The canopy will require a 12-inch wide concrete curb to mount the steel plate at the bottom of the canopy columns. For this reason, the concrete curb must be on both of the long sides, parallel to the building wall of the Amendment Receiving Area.

Drawing

A plan-view drawing of the canopy and amendment receiving area options is shown in **Figure 21**.

Figure 21
Amendment Receiving Area Upgrade Plan



Cost Assessment

Cost estimates for adding a canopy and curb around the expanded area, as well as for the current sized area, is included in **Table 7**.

Table 8
Cost Estimate for Modifications to Amendment Receiving Area

	Potential Canopy 1			Potential Canopy 2		
Description	**Quantity**	**Unit**	**Cost**	**Quantity**	**Unit**	**Cost**
New Asphalt Curb - 6"x1' wide	20	Lf	$2,000	80	Lf	$4,000
Concrete Mountable Berm- 6"x1.5' wide	720	Lf	$13,000	18	Lf	$1,800
PEM Canopy	360	Sf	$18,000	1440	Sf	$57,600
Dust Collection	360	Sf	$9,000	1440	Sf	$21,600
Subtotal			**$42,000**			**$85,000**
Construction Allowances[1]	72%		$30,240	72%		$61,200
Total			**$72,240**			**$146,200**

[1]Refer to **Appendix A**: Opinion of Probably Cost for detailed list of construction allowances

Other Considerations

The modifications recommended in this TM should have an effect on the overall amount of dust within the building and the functioning of the existing dust collection system. Dust collection and levels of dust within the building should be reassessed while modifications to the amendment process are being designed.

5 Summary

Table 8 summarizes the capital costs for all options discussed in this TM.

Table 9
Capital Costs for Combinations of Evaluated Options

	Amendment Bin Modification			
	Option 1A	**Option 1B**	**Option 2**	**None**
Canopy Option 1	$ 888,240	$ 854,240	$ 798,240	$ 72,240
Canopy Option 2	$ 962,200	$ 928,200	$ 872,200	$ 146,200
No Canopy	$ 816,000	$ 782,000	$ 726,000	--

6 References

LVMWD. Operations and Maintenance Manual for the Process Overview, Auxiliary and Utility Systems at the Rancho Las Virgenes Solids Handling Facility. Volume I. March 1995. MWH.

LVMWD. Operations and Maintenance Manual for the Compost Process At the Rancho Las Virgenes Solids Handling Facility. Volume IV. March 1995. MWH.

7 Appendix A: Opinion of Probable Construction Costs (OPCC)

LVMWD
Rancho Las Virgenes Compost Facility
Compost Upgrade Options
5% Design

Opinion of Probable Construction Costs (OPCC)

Currency: USD-United States-JANUARY 2017 Dollar

Grand Total Price: $ 2,570,000

Area	GC	Description	Quantity	UOM	Unit Cost	Total Cost	Comments	Final Total
1	A	**Replace Surge Bin**	1	ls	*$487,890*	**$487,890**		*$816,000*
1	P	***Purchase New Materials***						
2	P	Prepare Contractor Shop Drawings for (e) Eqp Modifications	1	ls	$7,500	$7,500		
3	P	New Surge Bin & Conveyor System (Austin-Mac, Inc.)	1	ls	$418,350	$418,350	New 120 cubic yard surge bin with (4) internal 23'8" screws, (4) 10 HP drives, supports to floor. Trough screw conveyor below, 30' long, 23 ½" dia., 24" pitch New screw conveyor - 54' long, 23 ½" dia., 24" pitch with supports to floor	
4	P	Modification Materials	1	ls	$5,000	$5,000		
5	P	***Labor & Equipment***			*$42,540*		demo stairs, etc. = 2 days	
6	P	Laborer	120	hr	$60	$7,200	install floor supports = 3 days	
7	P	Sheetmetal Worker (1)	120	hr	$70	$8,400	Assemble conveyor + bins on-site = 5 days	
8	P	Millwright (1.5)	180	hr	$73	$13,140	Set conveyor + new bin = 1 day	
9	P	Foreman	120	hr	$75	$9,000	Hookup & commission new equipment = 3 days	
10	P	Forklift	120	hr	$25	$3,000		
11	P	Pickup	120	hr	$15	$1,800	= say 15 days	
12	P	***Subcontractors***			*$14,500*			
13	P	Rental Crane - 20-30 Ton	8	hr	$250	$2,000		
14	P	Mob/Demob Rental Crane	1	ls	$1,500	$1,500		
15	P	Electrical Power Connect & Motor Starter	1	ls	$7,500	$7,500		
16	P	Instrumentation & Controls Allowance	1	ls	$0	$0	not required, manual operation	
17	P	Painting or Coatings	1	ls	$3,500	$3,500		
1	B	**Increase Size of Surge Bin**	1	ls	*$467,315*	**$467,315**		*$782,000*
1	P	***Purchase New Materials***						
2	P	Prepare Contractor Shop Drawings for (e) Eqp Modifications	1	ls	$7,500	$7,500		
3	P	New Surge Bin & Conveyor System (Austin-Mac, Inc.)	1	ls	$395,275	$395,275	New 80 cubic yard surge bin with (4) internal 20' screws, (4) 10 HP drives, supports to floor. Trough screw conveyor below, 30' long, 23 ½" dia., 24" pitch New screw conveyor - 54' long, 23 ½" dia., 24" pitch with supports to floor	
4	P	(e) Bin Modification Materials	1	ls	$7,500	$7,500		
5	P	***Labor & Equipment***			*$42,540*		demo stairs, etc. = 2 days	
6	P	Laborer	120	hr	$60	$7,200	Increase height of (e) surge bin say 4', install floor supports = 3 days	
7	P	Sheet metal Worker (1)	120	hr	$70	$8,400	Assemble conveyor + bins on-site = 5 days	
8	P	Forklift	120	hr	$25	$3,000		
9	P	Millwright (1.5)	180	hr	$73	$13,140	Set conveyor + new bin = 1 day	
10	P	Foreman	120	hr	$75	$9,000	Hookup & commission new equipment = 3 days	
11	P	Pickup	120	hr	$15	$1,800	= say 15 days	
12	P	***Subcontractors***			*$14,500*			
13	S	Rental Crane - 20-30 Ton	8	hr	$250	$2,000		
14	S	Mob/Demob Rental Crane	1	ls	$1,500	$1,500		
15	S	Electrical Power Connect & Motor Starter	1	ls	$7,500	$7,500		
16	S	Instrumentation & Controls Allowance	1	ls	$0	$0	not required, manual operation	
17	S	Painting or Coatings	1	ls	$3,500	$3,500		
2		**Replace Amendment Bin**	1	ls	*$434,020*	**$434,020**		*$726,000*
1	P	***Purchase New Materials***						
2	P	Prepare Contractor Shop Drawings for (e) Eqp Modifications	1	ls	$7,500	$7,500		
3	S	New Amendment Bin & Conveyor System	1	ls	$336,780	$336,780	New 120 cubic yard surge bin with (6) internal 23'8" long screws, 18" dia, (6) 10 HP drives, (2) top leveling screws, Picker roll system at discharge end, discharge cross conveyor to feed existing bucket feed conveyor, supports to floor New screw conveyor - 18' long, 23 ½" dia., 24" pitch with supports to floor	
4	P	(e) Bin Modification Materials	1	ls	$7,500	$7,500		
5	P	***Labor & Equipment - Demo (e) Admendment Bin***			*$25,200*		demo (e) bin, ~15'hx15' wide x 45' long	
6	P	Laborer (5)	200	h	$60	$12,000	unbolt/torch sections for outside reduction by shears	
7	P	Torch	40	h	$20	$800	* assume abatement not required for any LBP	
8	P	Forklift	40	h	$25	$1,000		
9	P	Operator (1)	40	h	$70	$2,800		
10	P	Shears at Exterior	40	h	$125	$5,000		
11	P	Foreman	40	h	$75	$3,000		
12	P	Pickup	40	h	$15	$600		
13	P	Haul-off for Scrap Recycle	1	ls	$0	$0	= trucking haul-off costs = salvage credit for scrap steel	
14	P	***Labor & Equipment - Install of New Equipment***			*$42,540*			
15	P	Laborer	120	hr	$60	$7,200	install floor supports = 3 days	
16	P	Sheet metal Worker (1)	120	hr	$70	$8,400	Assemble conveyor + bins on-site = 5 days	
17	P	Forklift	120	hr	$25	$3,000		
18	P	Millwright (1.5)	180	hr	$73	$13,140	Set conveyor + new bin = 1 day	
19	P	Foreman	120	hr	$75	$9,000	Hookup & commission new equipment = 3 days	
20	P	Pickup	120	hr	$15	$1,800	= say 15 days	
21	P	***Subcontractors***			*$14,500*			
22	S	Rental Crane - 20-30 Ton	8	hr	$250	$2,000		
23	S	Mob/Demob Rental Crane	1	ls	$1,500	$1,500		
24	S	Electrical Power Connect & Motor Starter	1	ls	$7,500	$7,500		
25	S	Instrumentation & Controls Allowance	1	ls	$0	$0	not required, manual operation	
26	S	Painting or Coatings	1	ls	$3,500	$3,500		
3	A	**Modifications to Outdoor Feeder Area - Small Canopy**	1	ls	*$47,400*	**$47,400**		*$79,000*
1	S	New Asphalt Curb - 6"x1' wide	20	lf	$100	$2,000		
2	S	Concrete Mountable Berm - 6"x1.5' wide	720	lf	$18	$13,000		
3	S	PEM Canopy	360	sf	$50	$18,000		
4	S	Fire Suppression	360	sf	$15	$5,400	allowance	
5	S	Dust Collection	360	sf	$25	$9,000	details TBD, neg air/vent, no capture	
3	B	**Modifications to Outdoor Feeder Area - Large Canopy**	1	ls	*$99,400*	**$99,400**		*$166,000*
1	S	New Asphalt Curb - 6"x1' wide	80	lf	$50	$4,000		
2	S	Concrete Mountable Berm - 6"x1.5' wide	18	lf	$100	$1,800		
3	S	PEM Canopy	1,440	sf	$40	$57,600		
4	S	Fire Suppression	1,440	sf	$10	$14,400	allowance	
5	S	Dust Collection	1,440	sf	$15	$21,600	details TBD, neg air/vent, no capture	
					Running Subtotal:	**$1,536,025**		

Stantec — Pasadena

JLL — 2/1/2017

LVMWD
Rancho Las Virgenes Compost Facility
Compost Upgrade Options
5% Design

Opinion of Probable Construction Costs (OPCC)

Currency: USD-United States-JANUARY 2017 Dollar

Grand Total Price: $ 2,570,000

Area	GC	Description	Quantity	UOM	Unit Cost	Total Cost	Comments	Final Total
A		**Startup/Commission/Owner Training**	1	ls		**$0**		
1	P	Pre-commissioning	-	hrs	$75	**$0**	included above	
2	P	Vendor Support	-	ls	$2,500	**$0**		
3	P	Commissioning	-	hrs	$75	**$0**		
4	P	Training	-	hrs	$100	**$0**		
5	P	Startup Expendables	-	ls	$0	**$0**	testing water by others	
					Running Subtotal:	**$1,536,025**		
6	P	Estimating Accuracy, Unlisted Items Allowance	1	ls	10.0%	**$153,603**	on running subtotal	
					Running Subtotal:	**$1,689,628**	**Direct Construction Cost (DCC)**	
B		**Construction Allowances**				**$878,728**		
1		Prime Contractor General Conditions	1	ls	5%	**$59,000**		
2		Subcontractor General Conditions	1	ls	5%	**$26,000**		
3		Market Factor	1	ls	0.0%	**$0**	Premium for uncompetitive conditions, logistics, complexity,	
4		Construction Phasing Factor	1	ls	0.0%	**$0**	Premium for interfaces, constraints, etc.	
5		Subcontractor Markups	1	ls	12%	**$64,630**	H/O Overheads, Job Fee & Risk, insur, bond	
6		Prime Contractor OH&P on Subs	1	ls	7%	**$42,225**	Oversight + Risk	
7		Prime Contractor OH&P on Self-Perform	1	ls	11.0%	**$136,000**	Job Fee + Risk	
8		Contractor Insurance Program	1	ls	2.5%	**$50,437**	Performance/Payments Bonds, Genl Liability	
9		State Sales Taxes	1	ls	9%	**$72,377**	On Materials at 40% of running subtotal	
10		Design/Estimating Contingency	1	ls	20%	**$428,059**	Unknowns	
				1.6721	**Running Subtotal:**	**$2,568,360**	**Base Construction Cost (BCC)**	
C		**Project Allowances**				**$0**		
1		Escalation	1	ls	0%	**$0**	Current costs	
2		Construction Change Contingency	1	ls	0%	**$0**	Excluded, initial construction costs only	
					Running Subtotal:	**$2,570,000**	**Total Construction Costs (TCC)**	
D		**Owner Allowances**				**$0**		
1		Design to Construction Documents Allowance	1	ls	0.0%	**$0**	Excluded	
2		CM Oversight	1	ls	0.0%	**$0**	"	
3		Owner PM, Permitting, Legal, Procurement, Etc.	1	ls	0.0%	**$0**	"	
				1.6731				Check Total
					Grand Total:	**$2,570,000**	**Total Project Cost (TPC)**	***$2,569,000***

Cost Range: **$2,100,000** **$3,200,000**

Assumes the scope is not changed, significant risk events do not occur and project control is excellent.

Qualifications:

1) This OPCC is classified as a Class 4 cost estimate per AACE guidelines. Stated accuracy range = -20% to + 25%
2) This OPCC is not intended to be a predictor of lowest bid. Rather the intent is to represent fair market value assuming competitive conditions.
3) Pricing basis = 1st Qtr 2017, escalation to midpoint of construction is included
4) Pricing assumes competitive market conditions at time of tender (+3 bidders/trade).
5) Escalation from the current pricing level (11/2016) to the midpoint of construction is unknown and excluded.
5) Special Inspections not included.
6) Owner costs and permit fees excluded

OPCC Disclaimer

The client hereby acknowledges that MWH has no control over the costs of labor, materials, competitive bidding environments, unidentified field conditions, financial and/or commodity market conditions, or any other factors likely to affect the OPCC of this project, all of which are and will unavoidably remain in a state of change, especially in light of high market volatility attributable to Acts of God and other market forces or events beyond the control of the parties. As such, Client recognizes that this OPCC deliverable is based on normal market conditions, defined by stable resource supply/demand relationships, and does not account for extreme inflationary or deflationary market cycles. Client further acknowledges that this OPCC is a "snapshot in time" and that the reliability of this OPCC will degrade over time. Client agrees that MWH cannot and does not make any warranty, promise, guarantee or representation, either express or implied that proposals, bids, project construction costs, or cost of O&M functions will not vary significantly from MWH's good faith **Class 4 OPCC**

AACE International **CLASS 4** Cost Estimate - Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. Typically, engineering is 10% to 40% complete. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Virtually all Class 4 estimates use stochastic estimating methods such as cost curves, capacity factors, and other parametric and modeling techniques. Expected accuracy ranges are from -15% to -30% on the low side and +20% to 50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 20 hours or less to perhaps more than 300 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).

8 Appendix B: Austin-Mac Quotation

AUSTIN-MAC, INC.

2739 Sixth Ave South
P.O. Box 3746
Seattle, WA 98124-3746
(206) 624-7066 FAX (206) 682-4442

QUOTATION

Q 15294

PLEASE INDICATE THE
ABOVE NUMBER WHEN ORDERING

TO: MWH
Connie Adera
PH: (626) 568-6111

QUOTATION DATE	SALESPERSON
1/16/2017	David Martin
INQUIRY DATE	**INQUIRY # / NAME**
1/3/2017	Connie

EST. SHIP DATE	SHIP VIA	FOB	FREIGHT	TERMS
12-14 weeks	TRUCK	plant	paid	to be determined

QTY	DESCRIPTION	PRICE	AMOUNT
1	**23 1/2" DIA X 24" PITCH X 54'-0" LONG SCREW CONVEYOR MATL: AMENDMENT 1308 CFH**		
	WITH SUPPORTS TO FLOOR	**BUDGET**	
	304 SS TROUGH, 8620 SCREW, 20 HP DRIVE	**COST**	**$ 418,350.00**
	FROM CONVEYOR 3-C-104 DROP GATE TO NEW BIN	**ALL**	
		OPTION 1 A	
1	**NEW SURGE BIN 120 CU YDS CAPACITY 9' X 24' X 16'**		
	(4) 18" DIA X VARIES PITCH X 23'-8" LONG SCREWS CONVEYOR MATL: AMENDMENT 1308 CFH		
	WITH SUPPORTS TO FLOOR		
	ALL A36, A/R 400 SCREW FLIGHTS, (4) @ 10 HP DRIVES		
1	**23 1/2" DIA X 24" PITCH X 30'-0" LONG SCREW CONVEYOR MATL: AMENDMENT 1308 CFH**		
	WITH SUPPORTS TO FLOOR		
	HOPPER CROSS CONVEYOR DISCHARGE		
	WITH CONVEYOR TO AMENDMENT BUCKET ELEVATOR		
	E-STOP CORD: AB LIFE LINE 3, UL LISTED		
	ZERO SPEED SWITCH: SIEMENS MSP-12 WITH MFA-4P		
	THREE, 1 DAY ON SITE, INSPECT, TEST, STARTUP, TRAIN		
	PE SIGNED AND STAMPED SUPPORTS, CA		
	DRAWINGS AND O & M MANUAL		
	FREIGHT TO SITE INCLUDED.		
	TAX NOT INCLUDED		

WE ARE PLEASED TO SUBMIT THE ABOVE QUOTATION FOR YOUR CONSIDERATION. SHOULD YOU PLACE AN ORDER, BE ASSURED IT WILL RECEIVE OUR PROMPT ATTENTION. THIS QUOTATION IS SUBJECT TO THE STANDARD TERMS AND CONDITIONS ATTACHED, AND IS VALID FOR 30 DAYS. THEREAFTER

BY ACCEPTED DATE

SIGN AND RETURN WHEN ORDERING

THANK YOU!

AUSTIN-MAC, INC.

2739 Sixth Ave South
P.O. Box 3746
Seattle, WA 98124-3746
(206) 624-7066 FAX (206) 682-4442

QUOTATION

Q 15294

PLEASE INDICATE THE
ABOVE NUMBER WHEN ORDERING

TO: MWH
Connie Adera
PH: (626) 568-6111

QUOTATION DATE	SALESPERSON
1/16/2017	David Martin
INQUIRY DATE	**INQUIRY # / NAME**
1/3/2017	Connie

EST. SHIP DATE	SHIP VIA	FOB	FREIGHT	TERMS
12-14 weeks	TRUCK	plant	paid	to be determined

QTY	DESCRIPTION	PRICE	AMOUNT
1	**23 1/2" DIA X 24" PITCH X 54'-0" LONG SCREW CONVEYOR MATL: AMENDMENT 1308 CFH** ***WITH SUPPORTS TO FLOOR*** **304 SS TROUGH, 8620 SCREW, 20 HP DRIVE FROM CONVEYOR 3-C-104 DROP GATE TO NEW BIN**	**BUDGET COST ALL OPTION 1 B**	**$ 395,275.00**
1	**NEW SURGE BIN 80 CU YDS CAPACITY, COVERED (4) 18" DIA X VARIES PITCH X 20'-0" LONG SCREWS CONVEYOR MATL: AMENDMENT 1308 CFH ALL A36, A/R 400 SCREW FLIGHTS, (4) @ 10 HP DRIVES**		
1	**KEEP EXISTING SURGE BIN CAN, RUN BOTH BINS**		
1	**23 1/2" DIA X 24" PITCH X 30'-0" LONG SCREW CONVEYOR MATL: AMENDMENT 1308 CFH** ***WITH SUPPORTS TO FLOOR*** **HOPPER CROSS CONVEYOR DISCHARGE WITH CONVEYOR TO AMENDMENT BUCKET ELEVATOR**		
	E-STOP CORD: AB LIFE LINE 3, UL LISTED **ZERO SPEED SWITCH:** SIEMENS MSP-12 WITH MFA-4P **THREE, 1 DAY ON SITE, INSPECT, TEST, STARTUP, TRAIN** **PE SIGNED AND STAMPED SUPPORTS, CA** **DRAWINGS AND O & M MANUAL** **FREIGHT TO SITE INCLUDED.** **TAX NOT INCLUDED**		

WE ARE PLEASED TO SUBMIT THE ABOVE QUOTATION FOR YOUR CONSIDERATION. SHOULD YOU PLACE AN ORDER, BE ASSURED IT WILL RECEIVE OUR PROMPT ATTENTION. THIS QUOTATION IS SUBJECT TO THE STANDARD TERMS AND CONDITIONS ATTACHED, AND IS VALID FOR 30 DAYS. THEREAFTER

BY ACCEPTED DATE

SIGN AND RETURN WHEN ORDERING

THANK YOU!

AUSTIN-MAC, INC.

2739 Sixth Ave South
P.O. Box 3746
Seattle, WA 98124-3746
(206) 624-7066 FAX (206) 682-4442

QUOTATION

Q 15294

PLEASE INDICATE THE
ABOVE NUMBER WHEN ORDERING

TO: MWH
Connie Adera
PH: (626) 568-6111

QUOTATION DATE	SALESPERSON
1/16/2017	David Martin
INQUIRY DATE	**INQUIRY # / NAME**
1/3/2017	Connie

EST. SHIP DATE	SHIP VIA	FOB	FREIGHT	TERMS
12-14 weeks	TRUCK	plant	paid	to be determined

QTY	DESCRIPTION	PRICE	AMOUNT
1	**NEW BULK AGENT BIN 120 CU YDS VOLUME** **LOCATED AT LOCATION OF CURRENT BIN** **(6) 18" DIA X VARIES PITCH X 23'-8" LONG SCREWS** **CONVEYOR MATL: AMENDMENT 1308 CFH** **10'-6 X 24' X 14' TALL WITH SUPPORTS TO FLOOR** **ALL A36, A/R 400 SCREW FLIGHTS, (6) @ 10 HP DRIVES** **BIN WILL HAVE (2) TOP LEVELING SCREWS AND** ***PICKER ROLL SYSTEM AT DISCHARGE END*** **BIN HAS DISCHARGE CROSS CONVEYOR TO FEED** **EXISTING BUCKET FEED CONVEYOR**	**BUDGET COST ALL OPTION 2**	**$ 336,780.00**
1	**23 1/2" DIA X 24" PITCH X 18'-0" LONG SCREW** **CONVEYOR MATL: AMENDMENT 1308 CFH** **304 SS TROUGH, 8620 SCREW, 10 HP DRIVE** **FROM CONVEYOR 3-C-104 DROP GATE TO NEW BIN**		
	E-STOP CORD: AB LIFE LINE 3, UL LISTED **ZERO SPEED SWITCH:** SIEMENS MSP-12 WITH MFA-4P **THREE, 1 DAY ON SITE, INSPECT, TEST, STARTUP, TRAIN** **PE SIGNED AND STAMPED SUPPORTS, CA** **DRAWINGS AND O & M MANUAL** **FREIGHT TO SITE INCLUDED.** **TAX NOT INCLUDED**		

WE ARE PLEASED TO SUBMIT THE ABOVE QUOTATION FOR YOUR CONSIDERATION. SHOULD YOU PLACE AN ORDER, BE ASSURED IT WILL RECEIVE OUR PROMPT ATTENTION. THIS QUOTATION IS SUBJECT TO THE STANDARD TERMS AND CONDITIONS ATTACHED, AND IS VALID FOR 30 DAYS. THEREAFTER

BY ACCEPTED DATE

SIGN AND RETURN WHEN ORDERING

THANK YOU!

AUSTIN-MAC, INC.

2739 Sixth Ave South
P.O. Box 3746
Seattle, WA 98124-3746
(206) 624-7066 FAX (206) 682-4442

QUOTATION

Q **14285**

PLEASE INDICATE THE
ABOVE NUMBER WHEN ORDERING

TO: MWH
Connie Adera
PH: (626) 568-6111

QUOTATION DATE	SALESPERSON
1/16/2017	David Martin
INQUIRY DATE	**INQUIRY # / NAME**
1/3/2017	Connie

EST. SHIP DATE	SHIP VIA	FOB	FREIGHT	TERMS
12-14 weeks	TRUCK	plant	paid	to be determined

QTY	DESCRIPTION	PRICE	AMOUNT
1	**23 1/2" DIA X 24" PITCH X 54'-0" LONG SCREW CONVEYOR MATL: AMENDMENT 1308 CFH**		
	WITH SUPPORTS TO FLOOR	**FOR OPTION 1**	
1	**SHAFTLESS SCREW**: 23 1/2" DIA X 24" PITCH X 53'-8" LG 1 X 4" OUTER , 3/4" X 3" INNER, 8620 BAR, RIGHT HAND 3 7/16" BOLTED END SHAFT		
1	**TROUGH:** 24" ANGLE FLANGED U-TROUGH, 10 GA 304 SS. 3/8" TROUGH END PLATES AND END FLANGES, SS. (1) INLET CHUTES 10 GA CEMA 300. ONE DISCHARGE SPOUT, 10 GA SS. COVERS 5' LONG, 304 SS BOLTED AND GASKETED. BOTTOM DRAIN 2 1/2" PIPE. UHMW DUAL COLOR LINER 1/2" THICK FULL LENGTH. SIDE HOLD DOWN ANGLE, BOLT IN, 304 SS. SUPPORT LEGS, ALL 304 SS INCLUDED		
1	**MOTOR:** 20 HP, 1800 RPM, TEFC, ELECT C-FACE 3 PH, 60 HZ, 460 V, TECO, NP, PREM EFF		
1	**REDUCER:** SEW EURODRIVE SCREW MOUNT CLASS 2, SF=2.3, 40 RPM, M1 MOUNT, 3 7/16" SHAFT.		
1	**E-STOP CORD:** AB LIFE LINE 3, UL LISTED		
1	**ZERO SPEED SWITCH:** SIEMENS MSP-12 WITH MFA-4P		
	THREE, 1 DAY ON SITE, INSPECT, TEST, STARTUP, TRAIN		
	PE SIGNED AND STAMPED SUPPORTS, CA		
	DRAWINGS AND O & M MANUAL		
	FREIGHT TO SITE INCLUDED, TAX NOT INCLUDED IF NEEDED		

WE ARE PLEASED TO SUBMIT THE ABOVE QUOTATION FOR YOUR CONSIDERATION. SHOULD YOU PLACE AN ORDER, BE ASSURED IT WILL RECEIVE OUR PROMPT ATTENTION. THIS QUOTATION IS SUBJECT TO THE STANDARD TERMS AND CONDITIONS ATTACHED, AND IS VALID FOR 30 DAYS. THEREAFTER

BY ACCEPTED DATE

SIGN AND RETURN WHEN ORDERING

THANK YOU!

AUSTIN-MAC, INC.

2739 Sixth Ave South
P.O. Box 3746
Seattle, WA 98124-3746
(206) 624-7066 FAX (206) 682-4442

QUOTATION

Q 14285

PLEASE INDICATE THE
ABOVE NUMBER WHEN ORDERING

TO: MWH
Connie Adera
PH: (626) 568-6111

QUOTATION DATE	SALESPERSON
1/16/2017	David Martin
INQUIRY DATE	**INQUIRY # / NAME**
1/3/2017	Connie

EST. SHIP DATE	SHIP VIA	FOB	FREIGHT	TERMS
12-14 weeks	TRUCK	plant	paid	to be determined

QTY	DESCRIPTION	PRICE	AMOUNT
1	**LIVE BOTTOM AMENDMENT BIN COVERED, 120 CUYDS**		
	CONVEYOR MATL: AMENDMENT 1308 CFH		
	WITH SUPPORTS TO FLOOR CA, PE STAMPED DESIGN	**OPTION #1 & 2**	
4 or 6	**SCREW**: 18" DIA X VARIABLE PITCH X 19'-8" LG	**SIZE WILL**	
	3/8" A/R 400 SECTIONAL FLIGHTS FULLY WELDED TO	**VARY**	
	14" SCH 80 PIPE, 3 7/16" BOLTED END SHAFT	**LOCATION**	
4 or 6	**MOTOR:** 10 HP, 1800 RPM, TEFC, ELECT C-FACE	**OPTION #1**	
	3 PH, 60 HZ, 460 V, TECO, NP, PREM EFF	**NARROWER**	
4 or 6	**REDUCER:** SEW EURODRIVE SCREW MOUNT		
	CLASS 2, SF=1.5, 13 RPM, M1 MOUNT, 3 7/16" SHAFT.		
1	**E-STOP CORD:** AB LIFE LINE 3, UL LISTED		
1	**ZERO SPEED SWITCH:** SIEMENS MSP-12 WITH MFA-4P		
1	**HOPPER:** 8' WIDE X 24' LONG, 16' +TALL		
	1/4", A36, PLATE WALLS WITH 8" X 1/4" SQUARE TUBE		
	COLUMNS AND HOOPS AROUND HOPPER.		
	TROUGH BOTTOM 3/8" A36 WITH REMOVABLE TROUGH		
	1/2" END PLATES. ONE DISCHARGE & INLET SPOUT.		
	ULTRA SONIC LEVEL SENSORS IN BIN		
	PRIMED AND PAINTED OUTSIDE		
2	**TOP LEVELING SCREWS 14" X 14 P X 24' LONG**		
1	**PICKER ROLL SYSTEM AT DISCHARGE.**		
	THREE, 1 DAY ON SITE, INSPECT, TEST, STARTUP, TRAIN		
	DRAWINGS AND O & M MANUAL		
	FREIGHT TO SITE INCLUDED		

WE ARE PLEASED TO SUBMIT THE ABOVE QUOTATION FOR YOUR CONSIDERATION. SHOULD YOU PLACE AN ORDER, BE ASSURED IT WILL RECEIVE OUR PROMPT ATTENTION. THIS QUOTATION IS SUBJECT TO THE STANDARD TERMS AND CONDITIONS ATTACHED, AND IS VALID FOR 30 DAYS. THEREAFTER

BY ACCEPTED DATE

SIGN AND RETURN WHEN ORDERING

THANK YOU!

AUSTIN-MAC, INC.

2739 Sixth Ave South
P.O. Box 3746
Seattle, WA 98124-3746
(206) 624-7066 FAX (206) 682-4442

QUOTATION

Q 14285

PLEASE INDICATE THE
ABOVE NUMBER WHEN ORDERING

TO: MWH
Connie Adera
PH: (626) 568-6111

QUOTATION DATE	SALESPERSON
1/16/2017	David Martin
INQUIRY DATE	**INQUIRY # / NAME**
1/3/2017	Connie

EST. SHIP DATE	SHIP VIA	FOB	FREIGHT	TERMS
12-14 weeks	TRUCK	plant	paid	to be determined

QTY	DESCRIPTION	PRICE	AMOUNT
1	**23 1/2" DIA X 24" PITCH X 30'-0" LONG SCREW CONVEYOR MATL: AMENDMENT 1308 CFH**		
	WITH SUPPORTS TO FLOOR	**FOR**	
	HOPPER CROSS CONVEYOR DISCHARGE	**OPTION 1**	
	WITH CONVEYOR TO AMENDMENT BUCKET ELEVATOR		
1	**SHAFTLESS SCREW**: 23 1/2" DIA X 24" PITCH X 29'-8" LG 1 X 4" OUTER , 3/4" X 3" INNER, 8620 BAR, RIGHT HAND 3 7/16" BOLTED END SHAFT		
1	**TROUGH:** 24" ANGLE FLANGED U-TROUGH, 10 GA 304 SS. 3/8" TROUGH END PLATES AND END FLANGES, SS. (1) INLET CHUTES 10 GA CEMA 300. ONE DISCHARGE SPOUT, 10 GA SS. COVERS 5' LONG, 304 SS BOLTED AND GASKETED. BOTTOM DRAIN 2 1/2" PIPE. UHMW DUAL COLOR LINER 1/2" THICK FULL LENGTH. SIDE HOLD DOWN ANGLE, BOLT IN, 304 SS. SUPPORT LEGS, ALL 304 SS INCLUDED		
1	**MOTOR:** 10 HP, 1800 RPM, TEFC, ELECT C-FACE 3 PH, 60 HZ, 460 V, TECO, NP, PREM EFF		
1	**REDUCER:** SEW EURODRIVE SCREW MOUNT CLASS 2, SF=2.3, 40 RPM, M1 MOUNT, 3 7/16" SHAFT.		
1	**E-STOP CORD:** AB LIFE LINE 3, UL LISTED		
1	**ZERO SPEED SWITCH:** SIEMENS MSP-12 WITH MFA-4P		
	THREE, 1 DAY ON SITE, INSPECT, TEST, STARTUP, TRAIN		
	PE SIGNED AND STAMPED SUPPORTS, CA		
	DRAWINGS AND O & M MANUAL		
	FREIGHT TO SITE INCLUDED, TAX NOT INCLUDED IF NEEDED		

WE ARE PLEASED TO SUBMIT THE ABOVE QUOTATION FOR YOUR CONSIDERATION. SHOULD YOU PLACE AN ORDER, BE ASSURED IT WILL RECEIVE OUR PROMPT ATTENTION. THIS QUOTATION IS SUBJECT TO THE STANDARD TERMS AND CONDITIONS ATTACHED, AND IS VALID FOR 30 DAYS. THEREAFTER

BY ACCEPTED DATE

SIGN AND RETURN WHEN ORDERING

THANK YOU!

April 11, 2017

TO: Jared Adams, PE
Associate Engineer
Las Virgenes Municipal Water District
4232 Las Virgenes Road
Calabasas, CA 91302

RE: Rancho Las Virgenes Composting Facility Amendment Bin and Conveyance Design

Dear Mr. Adams,

Thank you for the opportunity to submit our proposal for the design of the Rancho Las Virgenes Composting Facility Amendment Bin and Conveyance Facility (Project). MWH, Now Part of Stantec (MWH) has included a proposed scope of work and fee schedule for your consideration.

The work will be based on the District's preferred facility option, as described in MWH's recent evaluation of the existing amendment process at Las Virgenes Municipal Water District (District) and Triunfo Sanitation District's Rancho Las Virgenes (RLV) Composting Facility. MWH will prepare detailed design documents suitable for bidding and construction, and provide subsequent response to Request for Information (RFI) and submittal support during construction of the facility. Bid Support and Engineering Services during Construction (ESDC) are included as optional tasks.

The MWH Team for this design will be comprised of James Borchardt, PE, as Technical Director, along with Oliver Slosser, PE, who will serve as Project Manager. MWH expects this project will take five months to complete from the Notice to Proceed to the completion of the design.

Please feel free to contact Oliver Slosser at (626) 568-6063 or James Borchardt at (626) 568-6283 with any questions. Thank you again for your consideration and we look forward to working with you.

Sincerely,

Oliver Slosser, PE
Project Manager

James Borchardt, PE
Vice President
Project Technical Lead

Attachments:
Fee Proposal

April 11, 2017

Scope of Services

Project Description

This document describes the project parameters and engineering work for the Amendment Bin and Conveyance Design Project for the RLV Compost Facility. District and MWH have identified necessary improvements to the amendment bin and conveyor system at the RLV Compost Facility, as described in the Preliminary Design Report titled "Rancho Las Virgenes Compost Facility Bulk Amendment Bin Modifications" (March 2017). The project consists of demolition of the 370 cubic yard bulk amendment bin and replacement with a smaller 120 cubic yard amendment bin. The scope of work of this project consists of the following:

- Project Management, progress meetings, and quality control.
- Demolition plans detailing order and extent of demolition, and items to be salvaged or protected-in-place.
- Design of the new amendment bin and conveyor system documented in a Final Design Package.
- An Opinion of Probable Construction Cost
- RFI and Submittal review and responses.
- Optional Tasks: Bid Support and Engineering Services During Construction (ESDC)

Each of these tasks is described in greater detail in this document. Where applicable, the anticipated work products are listed following each subtask description. A review period of 1 week by District staff is assumed for each submittal. District will collate and validate all comments from reviewers prior to issuance to MWH. District and MWH will discuss and agree upon comments to be incorporated. Agreed-upon comments will be incorporated into the final documents. It is assumed that District approval of documents will be issued in writing.

Scope of Work

The Project work will be carried out using a 2-step design delivery approach of 90% detailed design and 100% construction documents. Each design step will consist of a specific list of work products and deliverables, which are identified in the individual sections. One design review workshop will be conducted with the District's personnel and key individuals from the MWH team; the design review workshop will be conducted at the 90% submittal stage.

TASK 1: Detailed Design

MWH will prepare 90% progress drawings, 90% progress specifications, and will draft and complete calculations suitable for the District's review. Drawings and specifications at the 90% level of completion will be complete using standard MWH design, CAD, and technical specifications. MWH assumes the District will be responsible for distributing 90% drawings and specifications internally and collecting comments to be sent to MWH. MWH has budgeted 6 hours to review District comments.

Work Product: Detailed Design (90%) Development drawings and specifications. The deliverables will be submitted to the District as electronic PDF files.

TASK 2: Construction Documents

MWH will prepare construction documents consisting of finalized drawings, finalized specifications, and a bid schedule for competitive bidding. MWH will modify the detailed design documents to reflect agreed-upon final review comments from the District, applicable regulatory agencies, and MWH's quality control review team. The final construction documents will be at the level of completion suitable for public bidding and construction. MWH will submit electronic PDF versions of the Construction Documents for the District to print for advertisement, bid, and award.

MWH assumes the following list of drawings will be sufficient to design the modifications to the RLV Compost Facility and will comprise the final list of drawings for this design effort:

Sheet Number	Description
G-1	Title/Sheet List/Location/Key Map
G-2	Notes
GM-1	Mechanical Details – Pipe Supports, Conveyors
DM-1	Demo Plan (Amendment Bin)
M-1	Mechanical Plan
M-2	Mechanical Section (Walkway Platform)
GS-1	Structural Details
S-1	Conveyor Plan
S-2	Foundation Plan
GE-1	Electrical Symbols, Abbreviations, and General Notes
GE-2	Electrical Standard Details
DE-1	Demolition Single Line Diagram, Details
E-1	Revised Single Line Diagram, Details
E-2	Control Schematics
E-3	Conduit Plan/Conduit and Wire Schedule
GI-1	General Instrumentation I
GI-2	General Instrumentation II
I-1	P&ID

Work Products: Final workshop notes, documenting the key decisions and responses to the District's comments will be submitted to the District. One set of final contract documents, and an opinion of probable cost. These will be delivered as PDF files to the District.

TASK 3: Opinion of Probable Construction Cost

The Opinion of Probable Construction Cost (OPCC) for this Scope of Work will be prepared in accordance with the cost estimate classes defined by the Association for the Advancement of Cost Engineering. A Class III level estimate will be developed as part of Task 2 Detailed Design. The OPCC will be submitted to the District for review within two weeks following the submission of the 90% Detailed Design documents.

It is noted that MWH has no control over costs of labor, materials, competitive bidding environments and procedures, unidentified field conditions, financial and/or market conditions, or other factors likely to affect the OPCC of this Project, of which are and will unavoidably remain in a state of change, in light of the high volatility of the market attributable to Acts of God and other market events beyond the control of the parties. District further acknowledges that this is a "snapshot in time" and that the reliability of this OPCC will inherently degrade over time. District agrees that MWH cannot and does not make any warranty, promise, guarantee, or representation, either express or implied, that proposals, bids, project construction costs, or cost of operation or maintenance will not vary substantially from MWH's good faith OPCC.

TASK 4: RFI and Submittal Review

During the construction phase of the work MWH will provide support services consisting of:

- Review of Or-Equal Submittals: MWH assumes 3 hours of review per "Or-Equal" submittal and has budgeted for 2 "Or-Equal" submittals.
- Requests for Information: MWH assumes 2 hours per request for information and has budgeted for a total of 15 request for information.
- Shop Drawing Review: MWH will provide up to 5 hours of review on shop drawings forwarded by the District for compliance with the requirements of the Contract Documents. MWH will transfer comments as required and return them to the District.
- Technical Manual Review: MWH will provide up to 4 hours of review on technical manual submittals for equipment and controls. Technical manuals will be reviewed for conformance with the requirements of the contract documents.

TASK 5: Project Management, Coordination and Quality

This task will consist of monitoring of work, scheduling of work activities, general administration, invoicing, and calling in to regularly scheduled progress meetings with District staff. The scope of this task assumes a 5-month project schedule. Specific work activities will consist of:

- Project Administration: MWH will prepare monthly invoices to the District using MWH's standard format. MWH will also use District Standard Payment Request Form. MWH proposes that this project be invoiced monthly on an hourly rate not-to-exceed basis.
- Meetings and Progress Reports: MWH will keep the District advised of Project progress. MWH will conduct conference calls via telephone with District staff once per month to review Project status and discuss Project issues.

Work Product: Monthly status reports and invoices. Status meetings over the anticipated duration of the Project are assumed.

Optional Tasks

Task 6: Bidding Services

MWH will assist District in providing clarification and prepare addenda as needed for questions that may arise during the bidding process. MWH will attend the pre-bid meeting, if any. MWH will assist District to evaluate bids received and recommend award of bid.

Task 7: Engineering Services during Construction

MWH will assist the District to conduct Engineering Services during Construction consisting of:

- 7.1 Project Administration: MWH will provide project administration services for each authorized optional task, similar to those identified in Task 5.
- 7.2 Additional Engineering Support: Additional Engineering Support: MWH will provide additional support during the construction phase of the work. MWH has assumed time for an additional 10 requests for information as part of this task. These hours may alternatively be used for review of "Or-Equal" submittals, Shop drawing review, or technical manual review.
- 7.3 Construction Meetings: MWH will attend the Pre-Construction Conference and on-site construction progress meetings over the course of the construction project. MWH has assumed a total of 56 hours for this task.
- 7.4 Inspections, Startup Testing & Validation: MWH will provide discipline engineers to review installed work as needed. A total of one half day of the electrical engineer's time and one half day of an instrumentation engineer's time will be provided to attend equipment and control startup testing and validation.
- 7.5 Record Drawings: The Construction Documents prepared as part of Task 2 will require the Contractor to mark a set of Contract Drawings to reflect any changes made during construction. Upon receipt of these documents, MWH will modify the CAD files produced in Task 2 and deliver a revised set of CAD files and a combined acrobat file. It is assumed that MWH will not be responsible for reproduction.
    - Work Product: One electronic copy in AutoCAD and PDF of project record drawings.
- 7.6 Update of Operations and Maintenance Manuals: MWH will update and expand on any applicable sections of the Operation and Maintenance Manuals for the Facility. This task will include updating the design concepts and operation modes, excluding specific manufacturer product information, parts list and maintenance procedures. MWH will update the Operation and Maintenance Manuals for the Project, as designed and constructed. MWH will include an addendum to the current Operations and Maintenance manual to be added by the District. The final Operation and Maintenance Manuals for the Project will include, but not be limited to the following:
    - A brief description of the Project and how the Project will fit into the overall operation of the compost amendment system;

- MWH and manufacturers' recommendations concerning equipment and facility maintenance, including methods and schedules for maintenance, parts lists, recommended spare parts to be maintained on hand, and manufacturers' and vendors' names, addresses, and telephone numbers.
- Data and maintenance instructions concerning any engineering features, protective coating, or other features provided or used in the construction.
- MWH will submit the updated draft Operation and Maintenance Manuals to District during the Final Design phase of the Project. MWH will submit the final Operation and Maintenance Manuals to District before equipment startup and testing, and acceptance of the construction contract work by District, subject to delivery of the portions of the O&M Manual required from the Contractor. A total of 24 hours have been budgeted for the updates to the O&M Manual.

Work Product: One electronic copy – Draft and Final Operations and Maintenance Manual including available manufacturers' product cut sheets on CD.

Basis of Design Scope and Fee Development

The following Summary of Project Assumptions along with the Scope of Work forms the basis of detailed design work effort. Other assumptions made are indicated in the List of Additional Assumptions at the end of this section.

Summary of Project Assumptions

The following assumptions are made within this Scope of Services:

1. Construction of new amendment bin will be located within the space currently occupied by the existing amendment bin to be demolished.
2. Additional conveyor is necessary to bring the amendment from the existing conveyor to the new amendment bin.
3. The electrical work assumes that there are available spaces and electrical system capacity in the existing MCC to accommodate this new equipment. This scope of work does not include expanding capacity of the existing electrical system (primary or standby power, as applicable).
4. Lighting changes are not part of this scope of work.
5. District specifications will be used as the basis for the general conditions and front end specifications. MWH master specifications, in CSI 2004 format, will be used as the basis for all technical specifications.
6. The contract documents will be developed as a single bid package.
7. The design (design through issuance of bid documents) work on this Project will last 5 months from Notice to Proceed.
8. Landscaping – landscape design services are not included.
9. Site survey and geotechnical – existing site surveys and geotechnical information will be relied upon exclusively.
10. Hazardous material assessment of facilities to be demolished or modified will be provided by the District.

11. The design will be based on federal, state, and local codes and standards in effect on the effective date of the Notice to Proceed. Any changes in these codes may necessitate a change in scope. Planning and Building Department review and approval will not be required.
12. No equipment pre-purchase or pre-negotiation will be required.
13. The drawings will follow MWH standards. MicroStation will be used to develop the drawings. Final drawings will be provided in AutoCad and PDF formats.
14. A review period of 1 week by District is assumed for each submittal. District will collate and validate all comments from reviewers prior to issuance to MWH. Comments will be incorporated into the final document(s). District approval of documents will be issued in writing.
15. It is assumed that a Categorical Exemption from the California Environmental Quality Act is appropriate for the project.
16. All submittals and RFIs listed in Task 6 are assumed to be submitted electronically.
17. The District will be responsible for all printing of drawings, specification and other deliverables.

Period of Performance:

The following timeline demonstrates the period of performance for the Project:

90% Submittal: 4 months subsequent to Notice-to-Proceed
Construction Set: 5 months subsequent to Notice-to-Proceed

Fee Development

See the attached proposed estimate for not-to-exceed dollars for the Project.

RANCHO LAS VIRGENES COMPOST FACILITY
Amendment Bin and Conveyance Design
MWH Fee Estimate

Date: 4/11/2017

Activity No.	ACTIVITY DESCRIPTION	Principal Professional I	Supervising Professional	Senior Professional	Professional	Designer	Administrative Assistant	TOTAL HOURS (Project Engineering / Management)	LABOR FEE (Project Engineering / Management)	MWH SUBTOTAL	Other Direct Costs	TOTAL PROJECT COST (15% Markup added to Other Direct Costs)
	Contract Hourly Rate	$ 250	$ 190	$ 150	$ 130	$ 110	$ 115					
1.0	**Detailed Design Development**	**32**	**52**	**68**	**76**	**112**	**0**	**340**	**$ 50,280**	**$ 50,280**	**$ -**	**$ 50,280**
1.1	90% Design Drawings	24	36	40	48	96		244	$ 35,640	$ 35,640	$ -	$ 35,640
1.2	90% Design Specifications	8	16	24	24	16		88	$ 13,520	$ 13,520	$ -	$ 13,520
1.3	90% Comments Review			4	4			8	$ 1,120	$ 1,120	$ -	$ 1,120
2.0	**Construction Document Development**	**12**	**28**	**24**	**24**	**24**	**0**	**112**	**$ 17,680**	**$ 17,680**	**$ -**	**$ 17,680**
2.1	100% Design Drawings	8	24	16	16	16		80	$ 12,800	$ 12,800	$ -	$ 12,800
2.2	100% Design Specifications	2	4	4	4	8		22	$ 3,260	$ 3,260	$ -	$ 3,260
2.3	Bid Schedule	2		4	4			10	$ 1,620	$ 1,620	$ -	$ 1,620
3.0	**Construction Cost**	**8**	**0**	**8**	**8**	**0**	**0**	**24**	**$ 4,240**	**$ 4,240**	**$ -**	**$ 4,240**
3.1	Construction Cost Estimate	8		8	8			24	$ 4,240	$ 4,240	$ -	$ 4,240
4.0	**RFI and Submittal Review**	**0**	**5**	**12**	**24**	**4**	**0**	**45**	**$ 6,310**	**$ 6,310**	**$ -**	**$ 6,310**
4.1	RFI and Submittal Review		5	12	24	4		45	$ 6,310	$ 6,310	$ -	$ 6,310
5.0	**Project Management**	**2**	**2**	**16**	**16**	**0**	**32**	**68**	**$ 9,040**	**$ 9,040**	**$ 500**	**$ 9,615**
5.1	Project Administration			8	8		32	48	$ 5,920	$ 5,920	$ -	$ 5,920
5.2	Meetings and Progress Reports	2	2	8	8			20	$ 3,120	$ 3,120	$ 500	$ 3,695
TOTAL - Tasks 1.0 - 5.0 (Without Optional Tasks)		**54**	**87**	**128**	**148**	**140**	**32**	**589**	**87,550**	**87,550**	**500**	**88,125**
Optional Tasks												
6.0	**Bidding Services**	**4**	**0**	**16**	**16**	**0**	**4**	**40**	**$ 5,940**	**$ 5,940**	**$ -**	**$ 5,940**
6.1	Bidding Services	4		16	16		4	40	$ 5,940	$ 5,940	$ -	$ 5,940
7.0	**Engineering Services During Construction**	**16**	**14**	**88**	**34**	**40**	**8**	**200**	**$ 29,600**	**$ 29,600**	**$ 1,250**	**$ 30,850**
7.1	Project Administration			16			8	24	$ 3,320	$ 3,320	$ -	$ 3,320
7.2	Additional Engineering Support		2	8	10			20	$ 2,880	$ 2,880	$ -	$ 2,880
7.3	Construction Meetings	4		44	8			56	$ 8,640	$ 8,640	$ 500	$ 9,140
7.4	Inspections, Start-Up and Final Acceptance	8	8	8				24	$ 4,720	$ 4,720	$ -	$ 4,720
7.5	Preparation of Record Documents			4	8	40		52	$ 6,040	$ 6,040	$ 500	$ 6,540
7.6	Update of Operations and Maintenance Manuals	4	4	8	8			24	$ 4,000	$ 4,000	$ 250	$ 4,250
TOTAL FOR OPTIONAL TASKS		**20**	**14**	**104**	**50**	**40**	**12**	**240**	**35,540**	**35,540**	**1,250**	**36,790**
TOTAL WITH OPTIONAL TASKS		**74**	**101**	**232**	**198**	**180**	**44**	**829**	**123,090**	**123,090**	**1,750**	**124,915**

May 1, 2017 JPA Board Meeting

TO: JPA Board of Directors

FROM: General Manager

Subject : Heal the Bay's "Bring Back the Beach" Event: Attendance

---

SUMMARY:

Each year the environmental group Heal the Bay holds its "Bring Back the Beach" Event in Santa Monica as one of its key fundraising activities. This year the event will be held on Thursday, May 18, 2017, at the Santa Monica Pier. Attached is a copy of the event flyer.

Over the years, JPA Directors have attended the event to build relationships, not only with Heal the Bay, but also with other environmental group representatives attending the function. Previously, the JPA reserved a 10-seat table, but when costs rose from $3,000 to $5,000, it was decided to only send the Chairs of each Board, or their designees. Individual seats for the event are $600.

RECOMMENDATION(S):

Authorize one Board Member from each agency and the Administering Agent/General Manager to attend the Heal the Bay "Bringing Back the Beach" Event at a cost of $600 per person.

FISCAL IMPACT:

Yes

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

Sufficient funds for the event are available in the adopted Fiscal Year 2016-17 JPA Budget. Historically, the expense has been charged to the "Watershed Programs" portion of the JPA's Administration Budget, which is allocated 70.6% to LVMWD and 29.4% to Triunfo Sanitation District.

Prepared by: David W. Pedersen, Administering Agent/General Manager

ATTACHMENTS:

Bring Back the Beach Flyer


Heal THE Bay
BRING BACK THE BEACH
2017 ANNUAL AWARDS GALA
THURSDAY, MAY 18, 2017
5:30 PM
SANTA MONICA PIER
HONORING THE ACCOMPLISHMENTS OF
KTLA 5 AND SHARON LAWRENCE
BEACH CHIC ATTIRE
A SWEATER OR JACKET AND
PIER-FRIENDLY FOOTWEAR ARE ENCOURAGED
PLEASE VISIT HEALTHEBAY.ORG/BBB
FOR ONLINE REGISTRATION AND EVENT INFORMATION
the Energy Coalition
KROQ
LAcarGUY

ITEM 10A

INFORMATION ONLY

May 1, 2017 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Rancho Las Virgenes Composting Facility Switchgear Failure: End of Emergency

---

SUMMARY:

On February 23, 2017, the JPA Board declared an emergency for storm-related damages to the switchgear at the Rancho Las Virgenes Composting Facility and authorized the Administering Agent/General Manager to the procure goods and services necessary for temporary operations and permanent repairs. The repairs are complete, and there is no longer a need for the declaration of emergency.

On March 7, 2017, Governor Brown approved the two attached proclamations, declaring a state of emergency for counties throughout the State, including Los Angeles County, due to impacts from the atmospheric river storms beginning on January 18 and February 1, 2017. Given that the damages to the switchgear were storm-related, the JPA may be eligible for reimbursement for the work. Staff is coordinating with the County of Los Angeles, Office of Emergency Management to apply for the available financial assistance.

FISCAL IMPACT:

Yes

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

The total cost of the work was $109,863.25. The purchase order to Hampton Tedder, in the amount of $57,278.08, was for the repair of the switchgear and was approved by the Administering Agent/General Manager based on the emergency authorization, for an amount not to exceed $60,000, approved by the Board on February 23, 2017. The cost of the work, less any reimbursement, is allocated 70.6% to LVMWD and 29.4% to Triunfo Sanitation District.

Following is a summary of the costs:

Item	Description	Amount
Hampton Tedder	Switchgear repair	$57,278.08
Quinn	Generator Rental	$19,744.84
Sawyer Petroleum	Fuel	$3,695.97
SC Fuels	Fuel	$7,200.99
Staff Labor	Labor hours	$21,943.37
Total		**$109,863.25**

Prepared by: David R. Lippman, PE, Director of Facilities and Operations

ATTACHMENTS:

Late-January Emergency Proclamation
February Emergency Proclamation

Executive Department

State of California

PROCLAMATION OF A STATE OF EMERGENCY

WHEREAS beginning on January 18, 2017, an atmospheric river storm system swept across California, bringing high winds and substantial precipitation, severely impacting counties throughout the State; and

WHEREAS this storm system caused dangerous flash flooding, erosion, and substantial mud and debris flows; and

WHEREAS this storm system caused significant damage to roads and highways throughout the State; and

WHEREAS the circumstances of the storm damage, by reason of their magnitude, are or are likely to be beyond the control of the services, personnel, equipment and facilities of any single local government and require the combined forces of a mutual aid region or regions to combat; and

WHEREAS under the provisions of section 8558(b) of the Government Code, I find that conditions of extreme peril to the safety of persons and property exist due to the storm damage.

NOW, THEREFORE, I, EDMUND G. BROWN JR., Governor of the State of California, in accordance with the authority vested in me by the state Constitution and statutes, including the Emergency Services Act, and in particular, section 8625 of the Government Code, **HEREBY PROCLAIM A STATE OF EMERGENCY** to exist within Alameda, Calaveras, Contra Costa, El Dorado, Fresno, Humboldt, Kern, Los Angeles, Marin, Mendocino, Napa, Nevada, Orange, Plumas, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Siskiyou, Solano, Sonoma, Tuolumne, Trinity, Ventura, and Yolo Counties.

IT IS HEREBY ORDERED THAT:

1. The California Department of Transportation shall formally request immediate assistance through the Federal Highway Administration's Emergency Relief Program, Title 23, United States Code section 125, in order to obtain federal assistance for highway repairs or reconstruction.

2. The Office of Emergency Services shall provide assistance to El Dorado, Kern, Los Angeles, Mendocino, Napa, Orange, Riverside, Sacramento, San Diego, San Luis Obispo, San Mateo, Santa Barbara, Santa Cruz, Tuolumne, Trinity, and Yolo counties, under the authority of the California Disaster Assistance Act, Government Code section 8680 et seq. and California Code of Regulations, Title 19, section 2900 et seq.

3. All agencies of the state government utilize and employ state personnel, equipment, and facilities for the performance of any and all activities related to this state of emergency consistent with the direction of my Office of Emergency Services and the State Emergency Plan.

I FURTHER DIRECT that as soon as hereafter possible, this proclamation be filed in the Office of the Secretary of State and that widespread publicity and notice be given of this proclamation.

IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 1st day of March 2017.

EDMUND G. BROWN JR.
Governor of California

ATTEST:

ALEX PADILLA
Secretary of State

Executive Department

State of California

PROCLAMATION OF A STATE OF EMERGENCY

WHEREAS beginning on February 1, 2017 an atmospheric river storm system swept across California, bringing high winds and substantial precipitation severely impacting counties throughout the State; and

WHEREAS due to extreme conditions throughout the state, this storm system caused dangerous flash flooding, erosion, and substantial mud and debris flows; and

WHEREAS this storm system caused significant damage to roads and highways throughout the State; and

WHEREAS the counties throughout the state have been experiencing repeated storms and as a result have not had time to mitigate the cascading impacts of the storms; and

WHEREAS state and local officials are still assessing the full scope of the damage caused by this storm system, with preliminary estimates totaling tens of millions of dollars; and

WHEREAS the circumstances of the storm damage, by reason of their magnitude, are or are likely to be beyond the control of the services, personnel, equipment and facilities of any single local government and require the combined forces of a mutual aid region or regions to combat; and

WHEREAS under the provisions of section 8558(b) of the Government Code, I find that conditions of extreme peril to the safety of persons and property exist due to the storm damage.

NOW, THEREFORE, I, EDMUND G. BROWN JR., Governor of the State of California, in accordance with the authority vested in me by the state Constitution and statutes, including the California Emergency Services Act, and in particular, section 8625 of the Government Code, **HEREBY PROCLAIM A STATE OF EMERGENCY** to exist for Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kern, Kings, Lake, Lassen, Los Angeles, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tuolumne, Ventura, Yolo, and Yuba Counties.

IT IS HEREBY ORDERED THAT:

1. The California Department of Transportation shall formally request immediate assistance through the Federal Highway Administration's Emergency Relief Program, Title 23, United States Code section 125, for the counties listed above, as appropriate, in order to obtain federal assistance for highway repairs or reconstruction.

2. The Office of Emergency Services shall provide assistance under the authority of the California Disaster Assistance Act, California Government Code section 8680 et seq. and California Code of Regulations, Title 19, section 2900 et seq. where appropriate and based upon eligible damage assessments.

3. All agencies of the state government utilize and employ state personnel, equipment, and facilities for the performance of any and all activities related to this state of emergency consistent with the direction of my Office of Emergency Services and the State Emergency Plan.

I FURTHER DIRECT that as soon as hereafter possible, this proclamation be filed in the Office of the Secretary of State and that widespread publicity and notice be given of this proclamation.

IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 1st day of March 2017.

EDMUND G. BROWN JR.
Governor of California

ATTEST:

ALEX PADILLA
Secretary of State

ITEM 10B

INFORMATION ONLY

May 1, 2017 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : 2016 Bioassessment Monitoring Report: Approval of Purchase Order

---

The Las Virgenes-Triunfo Joint Powers Authority approved funding for this matter in the Joint Powers Authority Budget. On March 28, 2017, the LVMWD Board, as the Administering Agent of the Joint Powers Authority, authorized the General Manager to approve a purchase order to Aquatic Bioassay Consulting Laboratories, Inc., in the amount of $43,351, for the 2016 bioassessment monitoring report.

SUMMARY:

Since 2006, the JPA has submitted an annual bioassessment monitoring report to the Los Angeles Regional Water Quality Control Board as required by Tapia's NPDES Permit. The report is intended to assess the "eco-health of the stream" by measuring the physical condition of the receiving waters and its biological communities. The work involves sampling and characterizing the habitat potential of the creek, as well as identifying and quantifying the species of benthic macroinvertebrates and algae at eight different receiving water stations.

In 2010, new requirements were established for the JPA to conduct sampling and taxonomic identification of algal biomass taken from the substrate. This task is labor intensive and requires the use of specialized consultants and laboratories. As a result, the overall cost of the bioassessment monitoring has increased. The cost of the 2016 bioassessment monitoring report was $43,351.

FISCAL IMPACT:

Yes

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

Sufficient funds for the work are available in the adopted Fiscal Year 2016-17 JPA Budget. The cost of the work is allocated 70.6% to LVMWD and 29.4% to Triunfo Sanitation District.

DISCUSSION:

Bioassessment monitoring for sampling sites along Malibu Creek (see attached map) is required by Tapia's NPDES Permit. The monitoring consists of creek site sampling and observations, laboratory analysis and data analysis for each site under protocols established by the Surface Water Ambient Monitoring Program (SWAMP) and the U.S. EPA estuarine sampling guidance documents for RSW-MC011D (Malibu Lagoon).

Site observations include stream flow measurements and a physical habitat assessment, which evaluates stream bank conditions, potential sediment impairment, and canopy cover. It was noted that the stream flows were below average due to persistent drought conditions. Receiving water site RSW-MC009U was not evaluated due to dry conditions. Physical habitat assessments were relatively good for most sites with RSW-007U having the lowest (marginal) score due to sediment deposition and channel alteration.

The laboratory analyses of the site samples identified 3,510 benthic macroinvertebrates from 42 different taxa. The majority of the samples were seed shrimp from the Malibu Lagoon. The upstream sample sites included disturbance tolerant species including midges, amphipods, oligochaetes (segmented worms), a caddisfly, New Zealand mudsnails and seed shrimp.

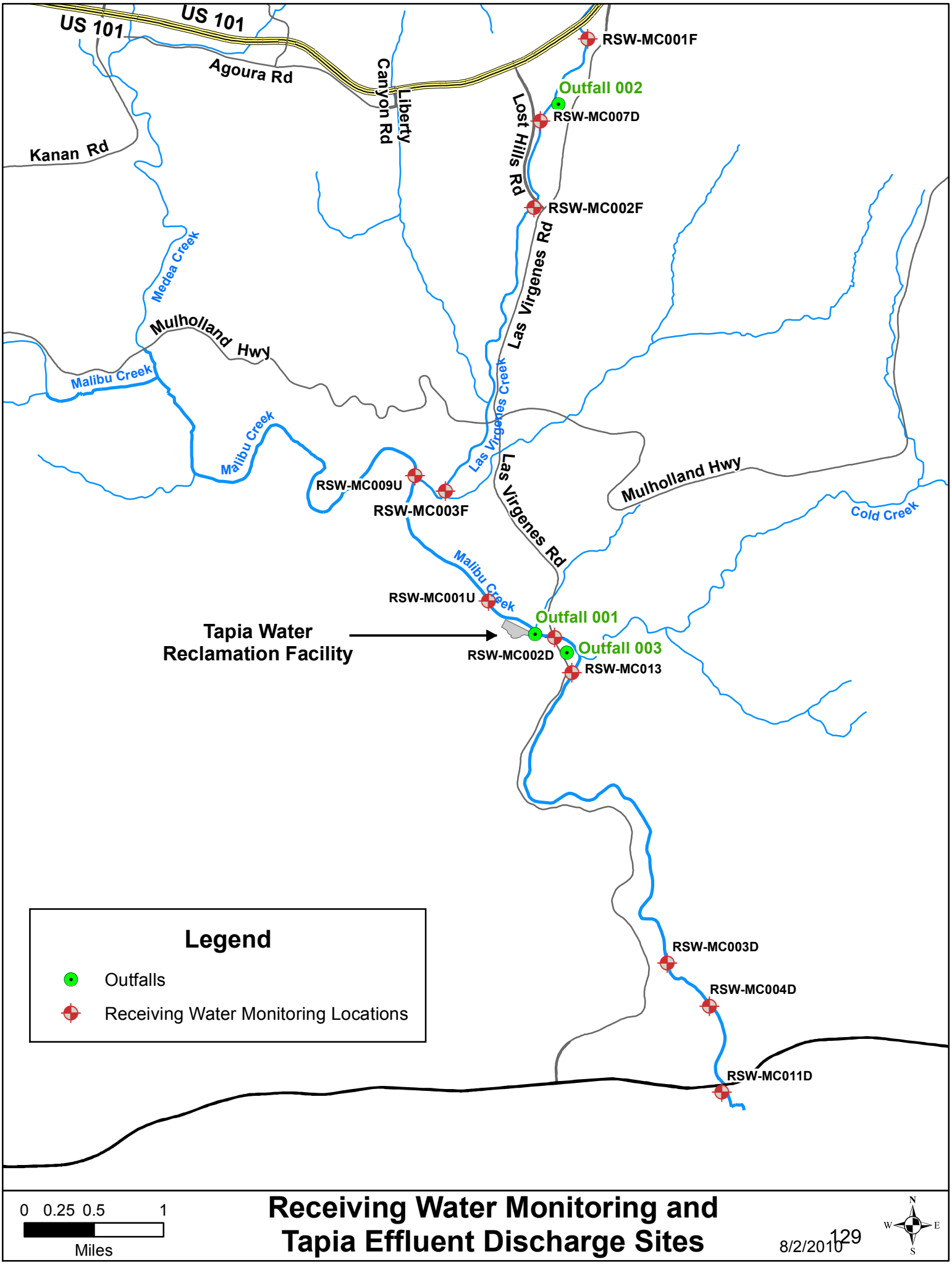
Results from sampling and laboratory analyses were used to determine scores using the Southern California Index of Biological Integrity (SoCA IBI), the California Stream Condition Index (CSCI) and the Southern California Algae Index of Biological Integrity (SoCA Algae IBI). SoCA IBI and CSCI scores were determined by the composition of the benthic macroinvertebrate community, while SoCA Algae IBI scores were determined by the abundances and composition of diatom and soft-bodied algae communities. The SoCA IBI scores for the receiving water stations were all either "poor" or "very poor," CSCI scores were either "likely altered" or "very likely altered," and SoCA Algal IBI scores were classified as "non-reference."

One of the potential reasons given for the low scores in the bioassessment report was the water quality in Malibu Creek. Because of high sulfate and phosphate concentrations in the water, potentially from the Monterey Formation, there was a detrimental effect on benthic macroinvertebrates.

Prepared by: Brett Dingman, Water Reclamartion Manager

ATTACHMENTS:

Map of Receiving Waters



Receiving Water Monitoring and Tapia Effluent Discharge Sites

8/2/2010

ITEM 10C

INFORMATION ONLY

May 1, 2017 JPA Board Meeting

TO: JPA Board of Directors

FROM: General Manager

Subject : Las Virgenes-Triunfo Joint Powers Authority v. United States Environmental Protection Agency: Settlement and Dismissal

---

SUMMARY:

On April 12, 2017, the United States Court of Appeals, Ninth Circuit, approved the settlement in the case of *Las Virgenes-Triunfo Joint Powers Authority v. United States Environmental Protection Agency* and dismissed the action. Attached for reference is a copy of the Court's Order. This action concludes the litigation related to the *2013 Malibu Creek and Lagoon TMDL for Sedimentation and Nutrients to Address Benthic Community Impairments* and enables staff to focus on the Pure Water Project Las Virgenes-Triunfo.

FISCAL IMPACT:

No

ITEM BUDGETED:

No

Prepared by: David W. Pedersen, Administering Agent/General Manager

ATTACHMENTS:

Ninth Circuit Court Order

FILED

APR 12 2017

MOLLY C. DWYER, CLERK
U.S. COURT OF APPEALS

UNITED STATES COURT OF APPEALS

FOR THE NINTH CIRCUIT

LAS VIRGENES MUNICIPAL WATER DISTRICT-TRIUNFO SANITATION DISTRICT, a Joint Powers Authority, Plaintiff - Appellant, v. NATURAL RESOURCES DEFENSE COUNCIL; et al., Intervenors - Appellees, GINA MCCARTHY, Administrator, United States Environmental Protection Agency, Defendant - Appellee.	No. 16-15327 D.C. No. 4:14-cv-01392-SBA Northern District of California, Oakland ORDER

Appellant's motion to dismiss this appeal (Docket Entry No. 22) is granted. Fed. R. App. P. 42(b). The parties shall bear their own costs and attorneys' fees on appeal.

A copy of this order shall serve as and for the mandate of this court.

FOR THE COURT

By: Stephen Liacouras
Circuit Mediator

SL/Mediation