SPECIAL MEETING OF THE SOLVANG CITY COUNCIL

COUNCIL CHAMBERS
1644 OAK STREET, SOLVANG, CA, USA

AGENDA

Monday, April 15, 2019

6:30 P.M.

Please be advised that, pursuant to State Law, any member of the public may address the Council concerning any item on the agenda.

CALL TO ORDER

ROLL CALL

PLEDGE OF ALLEGIANCE

REGULAR AGENDA

WASTEWATER TREATMENT PLANT UPGRADE ALTERNATIVES
Receive presentation on proposed Wastewater Treatment Plant (WWTP) deficiencies, improvement needs and upgrade alternatives, and provide staff with further direction as deemed appropriate.

1. **ADJOURNMENT**

In Compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, you should contact the office of Administrative Services at 688-5575 or the California Relay Service. Notification 48 hours prior to the meeting would enable the City to make reasonable arrangements to ensure accessibility to this meeting.

CITY COUNCIL – SPECIAL MEETING
STAFF REPORT

TO: SOLVANG CITY COUNCIL MEMBERS

FROM: Matt van der Linden, Public Works Director/City Engineer,
Nathan Giacinto, Wastewater Division Supervisor/WWTP Superintendent, and
Paul Matsukas, WWTP Lead Operator

MEETING DATE: April 15, 2019

DATE PREPARED: April 12, 2019

SUBJECT: **WASTEWATER TREATMENT PLANT UPGRADE ALTERNATIVES**

I. RECOMMENDATIONS:

1. Receive presentation on proposed Wastewater Treatment Plant (WWTP) deficiencies, improvement needs and upgrade alternatives.
2. Approve WWTP Project capacity of 1.5 million gallons per day (MGD).
3. Direct staff to proceed with land acquisition of 2.23 acres.

II. BACKGROUND:

At the City Council Meeting of September 10, 2018, staff presented the findings and recommendations of the WWTP Enhanced Treatment Study & Alternative Analysis Final Report. The following staff report and attached PowerPoint presentation were presented. This material is updated and re-presented for the benefit of our three new City Council members, and to further educate the community on the need for major WWTP upgrades and Project alternatives.

Plant History & Permit. The City of Solvang Wastewater Treatment Plant (WWTP) operates under a Waste Discharge Permit from the Regional Water Quality Control Board (RWQCB). Since the 1950's, the City has provided wastewater treatment facilities to protect receiving waters and comply with State waste discharge permit requirements. The City's treatment facilities have been improved and expanded three times to meet the needs of the growing community of Solvang, as well as the contracting community of Santa Ynez. The level of treatment has also been increased from the original screening and settling (primary treatment) to also include aeration and biological treatment (secondary treatment). The existing Plant was designed and permitted for 1.5 million gallons per day (MGD), consists of three sequencing batch reactors (SBRs), and an aerobic digester. The City's current Waste Discharge Permit was issued in 2007 and the City is proceeding through the renewal process at this time. The City's Permit includes effluent discharge limits on the concentrations of Biological Oxygen Demand (BOD), sodium, chloride, and Total Dissolved Solids (TDS).

Permit Renewal. Research by the RWQCB identified nitrogen as a significant contaminant within the Santa Ynez River watershed. The primary sources of excess nitrogen are agricultural operations and wastewater treatment plants. Therefore, in August of 2016, the RWQCB informally notified City staff that as part of our Permit renewal process, discharge limits for nitrogen and ammonia will be added.

The RWQCB requested that the City experiment with adjusting our treatment process to begin to de-nitrify the wastewater, allowing the nitrogen to be released to the atmosphere in gaseous form and not reach the WWTP percolation ponds. In April 2017, Wastewater staff fine-tuned the process sufficiently to achieve de-nitrification of the wastewater. However, the current SBR plant design is not well suited to the process of de-nitrifying the wastewater, creating some instability, additional operational costs, and reducing total treatment capacity.

Current Plant Operation. Wastewater treatment is the process of removing contaminants from municipal sewage through physical, biological and chemical processes to produce effluent (treated waste water) that is safe enough to release into the environment. See Attachment A - Wastewater Treatment Schematic. Common steps in the process include: screening, grit removal, biological treatment with bacteria and micro-organisms, settlement, sludge digestion (and composting), and discharge of treated wastewater.

Different treatment plant designs utilize different variations of these treatment processes. The Solvang WWTP includes the following processes:

1. *Primary* - Screening and grit removal;

2. *Secondary (Part A)* - Aeration, biological treatment and settlement. The Solvang Plant utilizes sequencing batch reactor (SBR) basins to accomplish the aeration and biological treatment process.

3. *Secondary (Part B)* – Sludge digestion (and composting): and

4. *Disposal* – Discharge of treated wastewater to percolation ponds.

Plant Problems. The current SBR plant design is not well suited to the process of de-nitrifying. Prior to de-nitrifying, only two of the three SBR basins were required to handle the total peak wastewater flow. The third unused basin represented available treatment capacity. As a result of the process adjustments required to de-nitrify, all three SBR basins must now be utilized to achieve de-nitrification. Therefore, a significant portion of the City's available treatment capacity has been lost, reducing overall capacity from 1.5 MGD to 0.9 MGD. Also, the safety factor of a spare/redundant basin was lost. This represents the single most pressing need for Plant upgrades.

The existing WWTP also has additional design problems:

1. The existing SBR treatment plant functions poorly with the large flow variation experienced between day and night due to tourist activity. To address this, the system needs an upstream flow equalization basin.

2. The Plant is experiencing major problems with its blowers and inefficient coarse air jet diffusers. The blowers are undersized, the blower motors are oversized, and the coarse air jet diffusers (used for aeration) are undesirable for a de-nitrification process.

3. The outdoor sludge handling system and layout are poorly designed and create problems during wet weather. There are also limitations in the site design related to off-loading of compostable solids (i.e. inefficient for trucking out compost).

4. The existing aerobic digester is less than half the size required.

5. The office/lab and plant electrical equipment are antiquated and have reached the end of their useful life.

Additional Capacity Needs. In November 2015, the Santa Ynez Community Services District (SYCSD), who contracts for wastewater treatment service from the City of Solvang, requested to purchase additional capacity. They have recently withdrawn this request as discussed further below.

In addition to agricultural related nitrate problems in portions of Santa Ynez River Watershed, nitrate contamination from septic systems has been identified as a serious problem in the towns of Los Olivos and Ballard. In October 2018, the Los Olivos Community Services District (LOCSD) requested that the City "keep the door open" for them to possibly send their wastewater to the Solvang WWTP, although they do not anticipate making a final decision on this for a year or more.

Recycled Water Feasibility. In response to the recent severe drought in Santa Barbara County, staff created an annual water supply update. During these water supply updates, the City Council questioned the idea of recycled water to augment water supplies. In summer of 2016, the City Council requested that staff evaluate the feasibility of producing recycled water at the Solvang WWTP. Shortly thereafter, SYCSD embarked on a recycled water facility study of their own. However, their study did not adequately answer some of Solvang's questions related to recycled water, so a recycled water feasibility evaluation for the WWTP was added. The recycled water feasibility evaluation section explores the feasibility of producing and delivering recycled water to augment the City's water supplies.

WWTP Study. In July 2018, the City completed the WWTP Enhanced Treatment Study & Alternative Analysis to look at all issues, evaluate the cost associated with restoring the lost WWTP capacity, expansion for SYCSD, expansion to treat wastewater from Los Olivos and Ballard, and enhanced treatment to produce recycled water for irrigation or other uses. The Study also reviewed reliability concerns and pending and future regulatory requirements. The County of Santa Barbara Public Works Department agreed to partner with the City and contributed $20,000 towards completion of the Study.

III. DISCUSSION:

The Executive Summary and Alternative Site Plans of the WWTP Enhanced Treatment Study & Alternative Analysis are included as Attachment B. Staff recommends Alternative 3, which changes the overall treatment process to membrane bioreactors (MBRs).

A modern MBR produces a variety of advantages over the other options studied. First, without additional upgrades, an MBR system implements recycled water production at the Solvang WWTP within 10 years. The ability to produce recycled water will improve the City's long-term water supply reliability.

Second, Alternative 3 produces the most overall advantage and fewest disadvantages without being the highest cost. Alternative 3 is also the preferred option of SYCSD, who will fund 20% of the system upgrade costs.

Third, MBR plants are currently the state of the art. Over the past couple decades State water discharge regulations have become more restrictive. An MBR plant provides the greatest opportunity for meeting future water discharge quality standards as it produces the cleanest discharge without tertiary (post) treatment.

Phasing. If Alternative 3 is selected, the improvements can be phased as shown in the table below to ease the financial impact on the City.

Years	Description of Improvements
1 - 3	WWTP MBR Upgrades
5 – 6	Fjord Lift Station Expansion (only required if >1.5 MGD)
7 - 9	Recycled Water Storage & Distribution Facilities

If the City chooses to make additional treatment capacity available to SYCSD, LOCSD and Ballard, the Fjord Lift Station will require expansion approximately 5 years after completion of the Plant upgrade. If capacity above 1.5 MDG is not needed then expansion of the Fjord Lift Station is not required.

Capacity. On September 10, 2018 the City Council directed staff to research the following items and return for further direction. Staff has now researched all of these items.

1. Confirm with SYCSD if they still want additional capacity in the Plant;

2. Confirm with LOCSD if they want capacity in the Solvang Plant;

3. Meet with the Alisal Ranch to see if they are agreeable to sell the City additional land required for the proposed upgrades; and

4. Conduct a preliminary analysis of the cost impact to a typical customer's sewer rates.

See Attachment C. On April 2, 2019 SYCSD provided a letter declining interest in additional capacity and will maintain their need of 0.3 MGD capacity. On April 1, 2019 LOCSD reconfirmed they would like Solvang to keep the door open for them but they will not be able to provide the City with a firm decision for a year or more. It should be noted that they appear to be leaning toward a small sewer collection system serving the commercial core of Los Olivos and a small packaged treatment plant located in Los Olivos.

Land Acquisition. Additional land will be required to implement any of the upgrade alternatives. Attachment D provides and overview of two land acquisition options, based on the land needed for the Project Alternatives. Alternatives 1 and 3 will require approximately 0.63 acres of additional land, and Alternative 2 will require approximately 2.23 acres. The additional land is required for the placement of new equipment based on the Project Alternatives, as highlighted in the WWTP Study (Attachment B).

Staff met with representatives from the Alisal Ranch who indicated a willingness to sell the City land needed at the fair market value. An appraisal is currently in process. Staff recommends the City acquire the full 2.23 acres of additional land from the Alisal Ranch for a few reasons:

- Alisal Ranch is currently a willing seller at fair market value.

- If Project Alternatives other than 3 are selected, then additional land may be needed for implementing recycled water distribution facilities (i.e. to put the recycled water into use).

- The area can be used to implement solar electricity generation with the project to further reduce long-term operating costs of the WWTP.

IV. ALTERNATIVES:

If the City does not want to incur the higher cost to pursue recycled water within the next 5 to 10 years, Alternative 2A is the preferred alternative. Alternative 1 is not recommended due to limited future capacity, less redundancy, low process stability, higher level of maintenance required, and less capability of sustaining peaks during wet weather events.

V. FISCAL IMPACT:

Estimated construction (capital) costs for all Alternatives are summarized below.

Alternative	1.5 MGD Cost	2.0 MGD Cost	Cost Increase
1A	$ 7.95 M	$ 9.5 M	$ 1.55 M
1B	$ 13.97 M	$ 15.2 M	$ 1.23 M
2A	$ 10.36 M	$ 11.8 M	$ 1.44 M
2B	$ 15.90 M	$ 17.1 M	$ 1.20 M
3	$ 15.30 M	$ 15.8 M	$ 0.50 M

In addition to the costs above, engineering, environmental, construction management and inspection will total approximately $2 million. Final land acquisition costs must also be added in. As mentioned above, an appraisal is currently in process.

The annual operating cost for the existing WWTP is approximately $1 million. Staff estimates annual operating costs will increase under each Project Alternative, ranging from an estimated $1.3 million to $1.5 million ($300K to $500K additional annual O&M cost).

There are various possible funding sources for the WWTP upgrade project as summarized in the table below. The City’s Agreement with SYCSD requires that they contribute 20% of the cost for improvements restoring the 1.5 MGD original capacity.

Funding Source	Amount or Range
Wastewater Fund Reserves	$2.0 million
General Fund Reserves	$0 to $3.0 million
SYCSD	$1.5 to $3.1 million
Prop 1 IRWM Grant	$0 to $2.0 million
RWQCB Recycled Water Grant (if Alt 3 implemented)	$0 to $5.3 million
Bond Funding	up to $16.5 million
Water Fund Reserves (if Alt 3 implemented)	$0 to $2.0 million

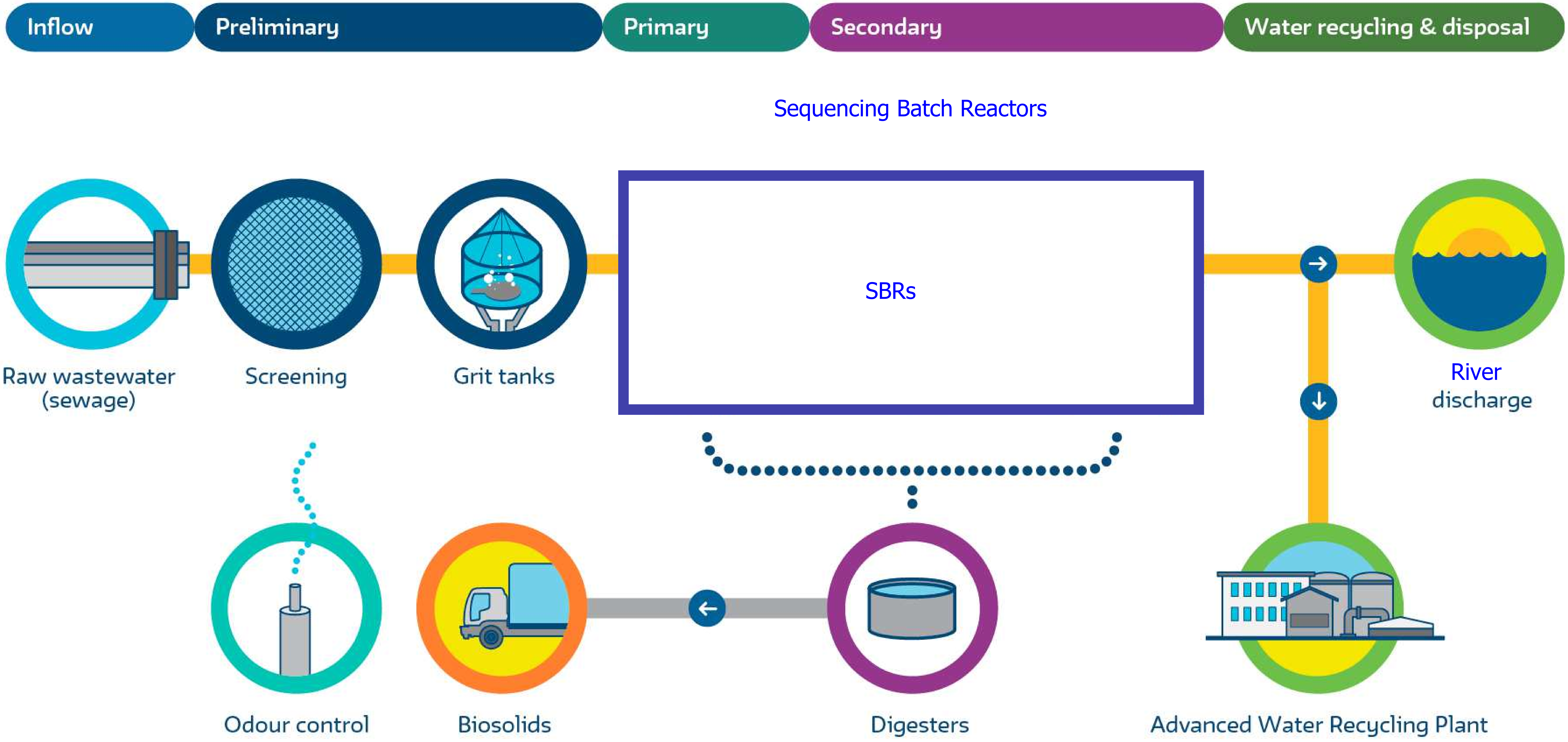
In February 2019, staff submitted a pre-application for $1.0 million in Prop 1 Integrated Regional Water Management (IRWM) – Round 1 Grant funds. There is possibility of an additional $1.0 million in Round 2. Staff anticipates a due date for the grant application around July 2019.

Staff has also retained the services of a financial consultant to evaluate the impact to sewer rates for all alternatives. This rate impact information will be presented at a subsequent City Council meeting.

VI. ATTACHMENTS:

A. Wastewater Treatment Schematic
B. WWTP Enhanced Treatment Study & Alternative Analysis - Executive Summary and Alternative Site Plans
C. SYCSD Capacity Letter
D. Land Acquisition Exhibits

Wastewater treatment process



Executive Summary

Background

The most common form of modern sewage treatment is known as conventional wastewater treatment which is a combination of physical and biological processes designed to remove organic matter from the solution. Conventional wastewater treatment includes primary and secondary treatment. Primary treatment consists of screening, grit removal, and initial settling to remove settleable organic matter. Secondary treatment consists of aeration in open basins with return biological solids (or aeration in trickling filter basins). The by-product of wastewater treatment is a semi-solid waste, called sludge, which typically undergoes aerobic or anaerobic biological digestion, is then dewatered, and composted or disposed of in a landfill.

A more advanced level of treatment is called, tertiary treatment and it involves a series of additional steps after secondary treatment to further reduce organics, turbidity, nitrogen, phosphorus, metals and pathogens. Typically this involves filtration or reverse osmosis, and disinfection. Tertiary treatment is commonly employed to produce recycled water.

Three common types of wastewater treatment plants are: 1) sequencing batch reactor plants, 2) conventional activated sludge plants, and 3) membrane bioreactor plants.

- Sequencing batch reactor (SBR) plants treat the sewage in batches in which aeration, clarification/settling and sludge removal all occur within the same basin. Waste sludge is then sent to a digester, and the remaining treated effluent is discharged to percolation ponds, other receiving waters, or routed for tertiary treatment.

- Conventional plants treat the sewage in separate basins starting with primary treatment, then into aeration basins where bacteria break down the organic material, then into secondary clarifiers where the sludge is separated from the wastewater through a settling process. Waste sludge is then sent to a digester, and the remaining treated effluent is discharged to percolation ponds, other receiving waters, or routed for tertiary treatment.

- Membrane bioreactor (MBR) plants combine a filtration process with a biological process in which aerated activated sludge (wastewater) is drawn through filtering membranes that eliminate the need for a settling process. Waste sludge is then sent to a digester, and the filtered effluent is of recycled water quality.

The City of Solvang Wastewater Treatment Plant (WWTP) treats municipal sewage generated by the City and the community of Santa Ynez. The current Plant capacity is 0.9 million gallons per day (MGD). The Plant was constructed in 1962 and upgraded in 1975 and 1985. The Plant was then improved to sequencing batch reactors (SBRs) in 1993 two of which were required for treatment. The current treatment process provides secondary treatment and consists of three SBRs. The Plant currently discharges its treated effluent into percolation ponds in accordance with State Water Resources Control Board Waste Discharge Permit (WDR) Order No. R3-2007-0069, which is up for renewal. The renewed permit will include a new requirement for nitrogen removal that can't be met by the design of the existing Plant without causing other operational problems. In 2017, the City modified operations to implement the new requirement and improve effluent quality, however this has caused the overall treatment capacity of the Plant to decrease from 1.5 MGD to 0.9 MDG. Previously only two SBRs were required for treatment. Now all three SBRs are currently in service and no redundancy is provided. Therefore, the City is looking to restore the lost capacity by investigating the feasibility of treatment improvements, and expansion of the facility. The primary goal of this study includes: evaluating upgrades and improvements to replace aging facilities and achieve more consistent effluent quality, developing expansion alternatives to restore (or exceed) the original 1.5 MGD capacity, and analyze tertiary treatment opportunities for recycled water.

Existing Performance & Limits of Treatment

The Plant was originally designed with a capacity of 1.5 MGD. The current average day treatment capacity is approximately 0.9 MGD as a result of process modifications to denitrify the wastewater, and due to the increase in wastewater strength over the past several years. The Plant influent is currently around 0.75 MGD, about half of the original design capacity, and receives nearly twice the design concentration of ammonia and total dissolved solids (TDS) then included in the 1993 design. Although all three SBRs are in service, the plant is having difficulties removing nitrogen and clarifying solids to meet expected future permit requirements. This is due to outdated design criteria, and treatment process deficiencies. The WWTP will not be able to meet the new nitrogen removal permit requirement at sustained inflows higher than about 0.9 MGD without implementing facility upgrades and major process improvements.

From the wastewater generation analysis, the near-term and long-term treatment capacity requirements were calculated to be 1.5 MGD and 2.0 MGD respectively. The table below shows the breakdown of the required treatment capacity for each corresponding agency.

Treatment Capacity Requirement Summary

Agency	Near-Term Capacity Goal (MGD)	Long-Term Capacity Goal (MGD)
Solvang	0.9	1.2
SYCSD	0.4	0.6
LOCSD	0.1	0.1
Ballard	0.1	0.1
Total	**1.5**	**2.0**

Necessary Facility Upgrades

In order to effectively implement process improvements, the existing facilities must be upgraded and general site conditions improved. Upgrades and ancillary improvements are required regardless of the process alternative selected. Necessary upgrades include construction of new administration/lab building, sludge processing building and parking lot, installation of new blowers, aerators, mixers, generator and sludge sump pumps, and integration for the new equipment controls and communication system (and renovation of the existing aerobic digester for recycled water storage if desired). Due to space and site layout constraints, additional land is required. The proposed layouts provide better use of available space to accommodate the necessary improvements, and improve access, security and emergency response.

Required Process Improvements

The study examined three alternatives for improving the secondary treatment process including: Alternative 1 – add equalization basin and modify SBRs; Alternative 2 - convert existing facilities and add two clarifiers; and Alternative 3 - convert existing facilities and add MBRs to produce recycled water. Alternative 1 includes a new flow equalization/anoxic basin that would stabilize the problematic fluctuation of inflows and inconsistent loadings to the SBRs. Alternatives 2 and 3 involve converting the existing batch process into a continuous flow process, and converting the SBRs into secondary treatment trains that provide anoxic and aerobic zones in order to improve denitrification. Alternative 2 also includes two new 80' diameter clarifiers for solids separation. Alternative 3 also includes new MBRs and an equipment/chemical building to facilitate the MBR operations. The flow diagrams below indicate process sequence for each alternative, and existing, additional and modified process steps.

Legend: *Italic* indicates existing facility. **Bold** indicates new facility. <u>Underline</u> indicates existing facility converted or modified.

<u>Alternative 1</u>: *Headworks (Screen & Grit Removal)* → **Anoxic/Equalization Basin** → <u>*SBRs*</u> → *Percolation Ponds* (For recycled water: → **Surge Basin** → **Filters** → **Recycled Water Distribution Facilities**)

<u>Alternative 2</u>: *Headworks (Screen & Grit Removal)* → <u>*Anoxic/Aerobic Basins (convert SBR basins)*</u> → **Clarifiers** → *Percolation Ponds* (For recycled water: → **Filters** → **Recycled Water Distribution Facilities**)

<u>Alternative 3</u>: *Headworks (Screen & Grit Removal)* → **Fine Screen** → <u>*Anoxic/Aerobic Basins (convert SBR basins)*</u> → **MBRs** → *Percolation Ponds* (For recycled water: **Recycled Water Distribution Facilities**)

Computer modeling indicates that all alternatives can achieve the near-term treatment capacity of 1.5 MGD, and Alternatives 2 and 3 would have capacities of up to 1.7 MGD and 2.0 MGD respectively (based on reuse of existing basins). Alternatives 1 and 2 would require additional expansion and tanks to achieve a treatment capacity of 2.0 MGD, while Alternative 3 would be able to achieve a treatment capacity of 2.0 MGD without any expansion.

Preliminary Cost Estimates
Alternatives 1A and 2A exclude a tertiary process and maintain the current (lower) effluent quality. Alternatives 1B, 2B and 3 include a tertiary process to produce effluent of recycled water quality. The capital cost associated with upgrades and improvements to restore lost capacity and reach 1.5 MGD capacity, as well as the capital costs to reach long-term 2.0 MGD capacity, are shown in the table below. In addition, the cost difference, and operations & maintenance cost, associated with each alternative are provided. These costs include engineering, construction management, 20% contingency for Capital Expenses, and 10% contingency for Operating Expenses. Note that the capital costs shown for Alternatives 1B, 2B and 3 include recycled water distribution facilities costs.

Cost Estimate Summary (Including Soft Costs and Contingency)

Alternative	1.5 MGD Capital Cost	2.0 MGD Capital Cost	Capital Cost Increase from 1.5 to 2.0 MGD	Annual Operating Cost
1A	$8.0 M	$9.5 M	$1.5M	$1.4M
2A	$10.4M	$11.8M	$1.4M	$1.3M
1B	$13.9M	$15.2M	$1.3M	$1.4M
2B	$15.9M	$17.1M	$1.2M	$1.3M
3	$15.3M	$15.8M	$0.5M	$1.5M

Indicates recycled water option

Evaluation of Alternatives
Alternatives were evaluated with respect to effluent quality: A) WDR effluent discharged into percolation basin (1A and 2A), and B) Title 22 tertiary effluent (1B, 2B and 3). Two sets of multi-objective scoring matrices were used to evaluate the alternatives in a relative scale by applying weighting factors to the project objectives listed below.

- Ability to improve treatment and capacity later
- Difficulty and risk to construct
- Ease of operation
- Footprint
- Later use of new technologies
- Expandability/ability to be phased
- Water quality/Permit compliance

Based on the evaluation Alternative 3 is the superior alternative if the City chooses tertiary treatment (future recycled water). Alternative 2A is favored if the city chooses to proceed without the tertiary process and it would allow for future upgrades to provide recycled water at some future date.

Recycled Water Opportunities
The ability to produce and distribute recycled water to non-potable demands near the City is limited. A preliminary feasibility study was completed to identify potential customers, evaluate necessary infrastructure, and estimate implementation costs. There are only a limited number of potential customers identified along with the application area for recycled water use. Furnishing recycled water to the Alisal Ranch golf courses and fields for irrigation was determined to be feasible; however, there are no distribution lines at the present time and the cost to construct the recycled water infrastructure including connection to the Alisal Ranch golf courses is approximately $1.6M. It should be noted that direct potable reuse could be feasible in the next 8 to 10 years with advances in technology, and once State regulations are finalized.

Summary Recommendations
The current WWTP site has many challenges as it is small, oddly shaped, highly sloped, and has limited available space. However, there are opportunities to reuse existing structures and expand upon existing systems. All Facility Upgrades described above are highly recommended. The key decision factor for the alternatives selection is the level of effluent quality the City desires, and the maximum tolerable Sewer Rate increase. If the City wishes to improve water supply reliability and pursue recycled water for irrigation or direct potable reuse in the future, Alternative 3 is recommended as the most feasible and advantageous since it

provides secondary and tertiary treatment in a single process to produce effluent with recycled water quality. However, it is the most costly and there are no guarantees that there will be customers for the recycled water. If the City does not wish to pursue recycled water in the future, Alternative 2A is recommended as the most suitable option to improve performance, ease of operation, reliability, and permit compliance.

sludge/solids building. An alternative layout for the access road is shown in Figure 6-3 to accommodate the additional tertiary process structure in Alternative 1B. Details on the new surge tank and tertiary process housing structure are included in Appendix B.

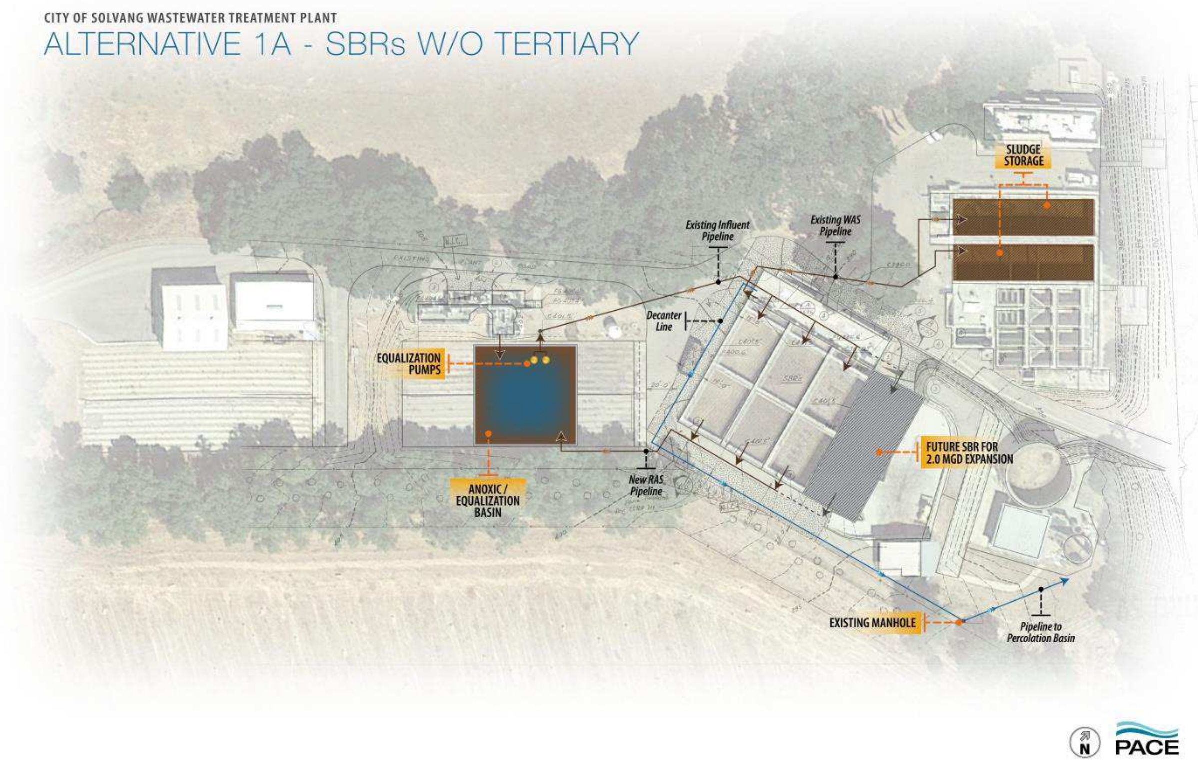


Figure 6-2: Alternative 1A – Without Tertiary Process Improvement Plan

Although Figure 6-2 and Figure 6-3 shows a rectangular shape for the anoxic/EQ basin, a circular basin with equal volumetric size can also be considered. Both basin shapes are similar in cost. A circular basin may provide better structural support compared to a rectangular shape but it will be more difficult to mount pumps on to the curved walls. The shape of the basin will be evaluated in the design phase if Alternative 1 is selected.

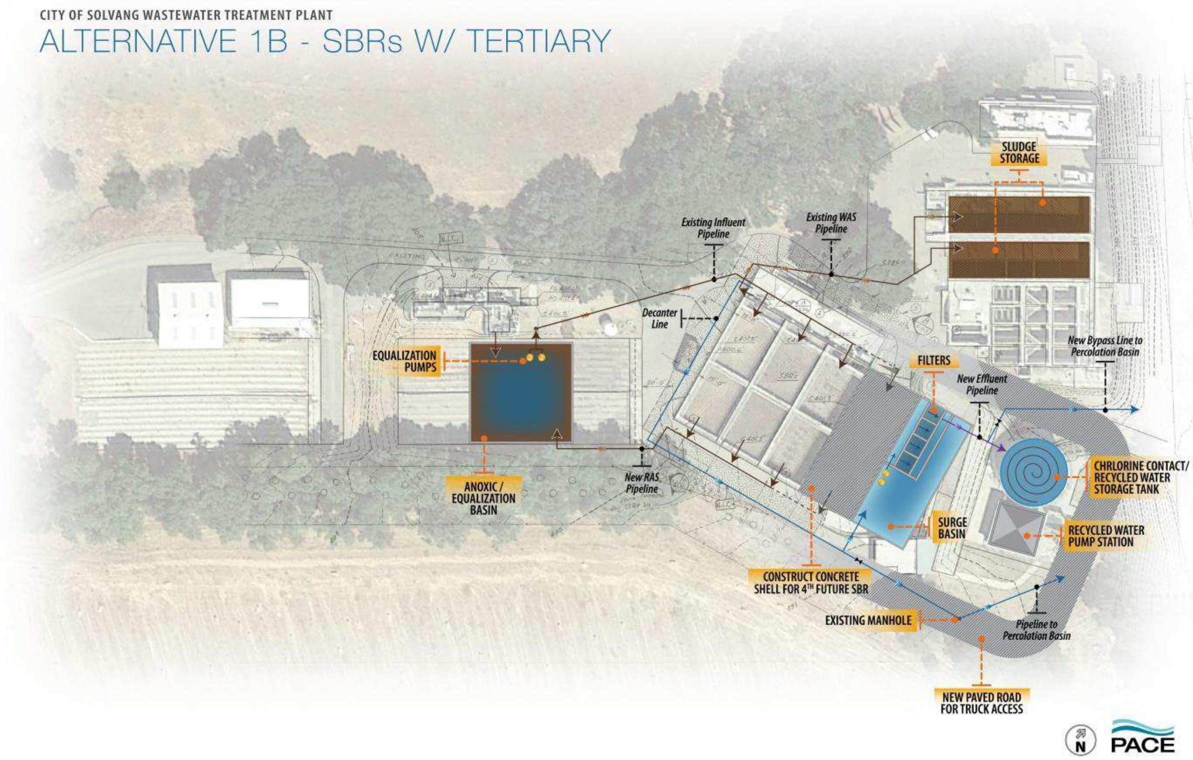


Figure 6-3: Alternative 1B – With Tertiary Process Improvement Plan

6.2 Alternative 2 – New Secondary Clarifiers

Alternative 2 consists of construction of new secondary clarifiers to provide a continuous flow process as shown in Figure 6-4. A total of two new clarifiers with 80' diameter, with 15' side walls and 18' to the bottom of the center, would be constructed to accommodate 3 MGD of peak day flow with one unit out of service. The clarifiers are sized with an overflow flux of 300 gpd/sq ft, and are oversized to handle settleability. Operators will be encouraged to run two of three secondary basins to prevent low F/M with a large anoxic selector zone at the upstream end of the train to control filaments.

A center clarifier feed/RAS pump station can be provided to house feed pumps, RAS/WAS pumps, and automated valves. The pump station would receive secondary MLSS from the aeration tanks and pump MLSS into the clarifiers as well as convey the clarifier underflow back into the anoxic tank for recycling. Clarifier effluent would be conveyed to the filters via gravity flows. Chlorine would be injected to the tertiary effluent to be mixed into the recycled water storage tank before being pumped into the new distribution system. Similar to the Alternative 1 downstream system, filtration would improve the percolation basin operations when flows were not recycled.

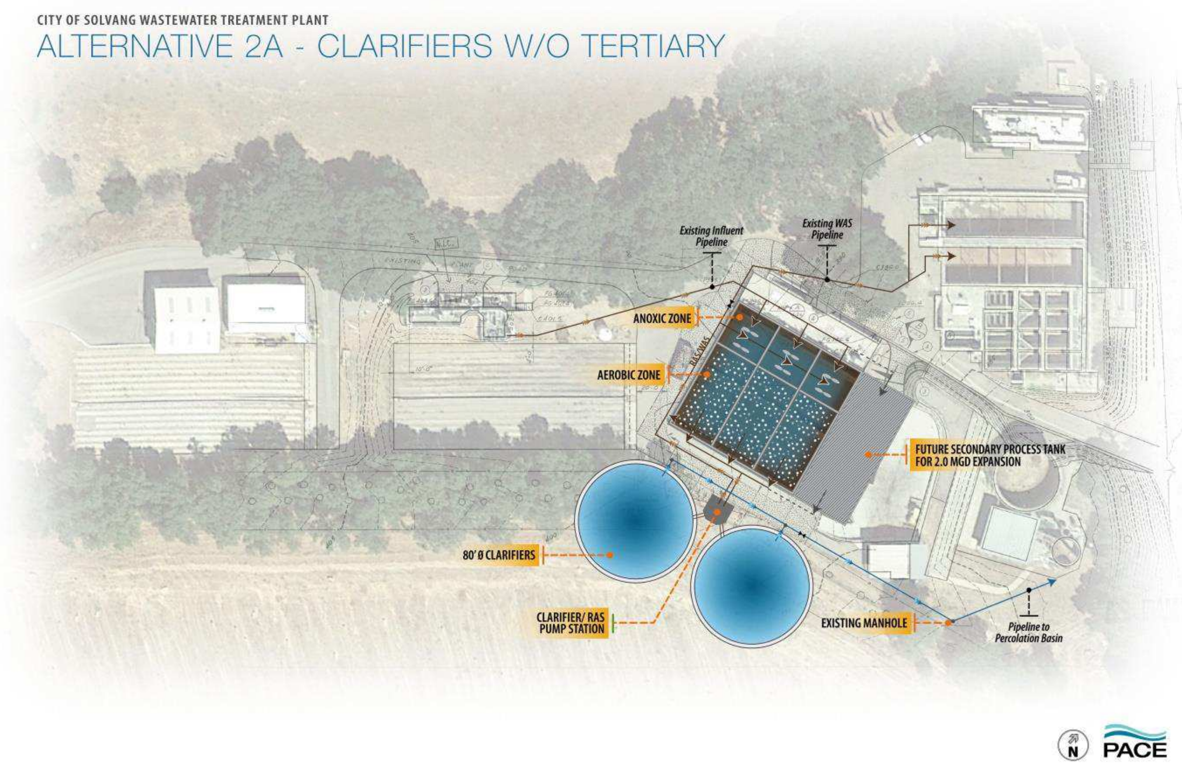


Figure 6-5: Alternative 2A – Without Tertiary Process Improvement Plan

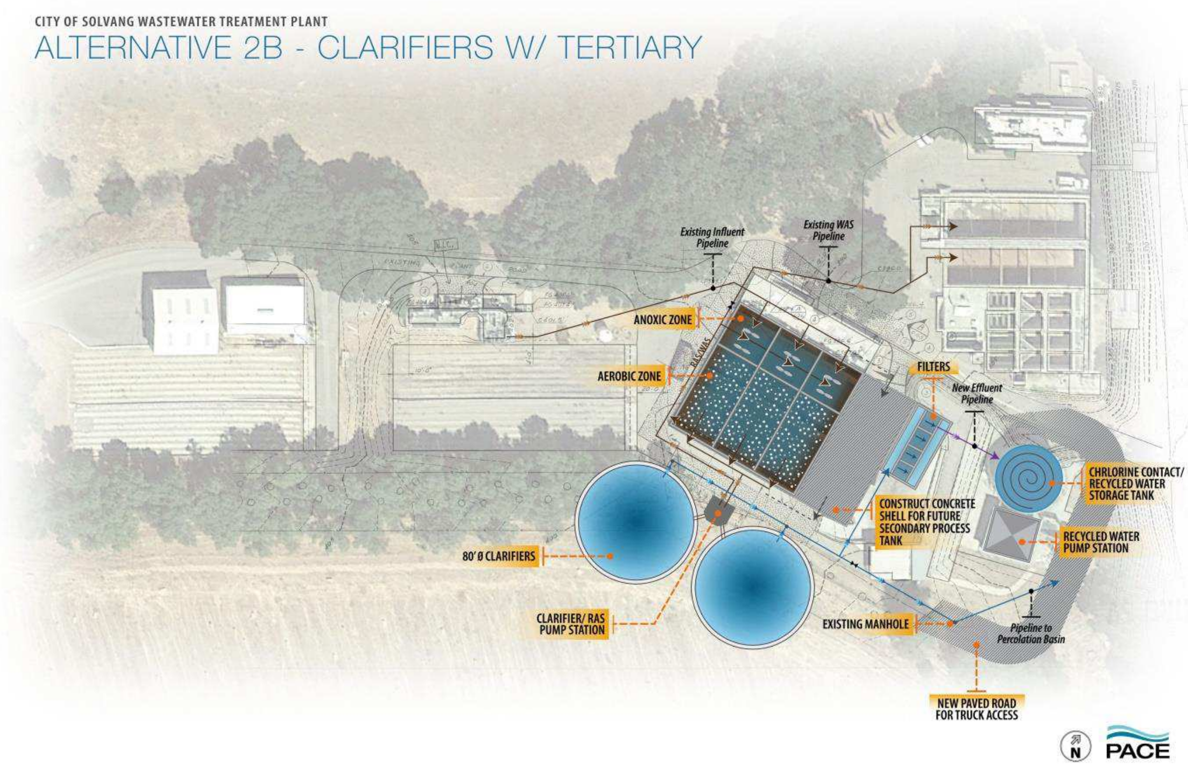
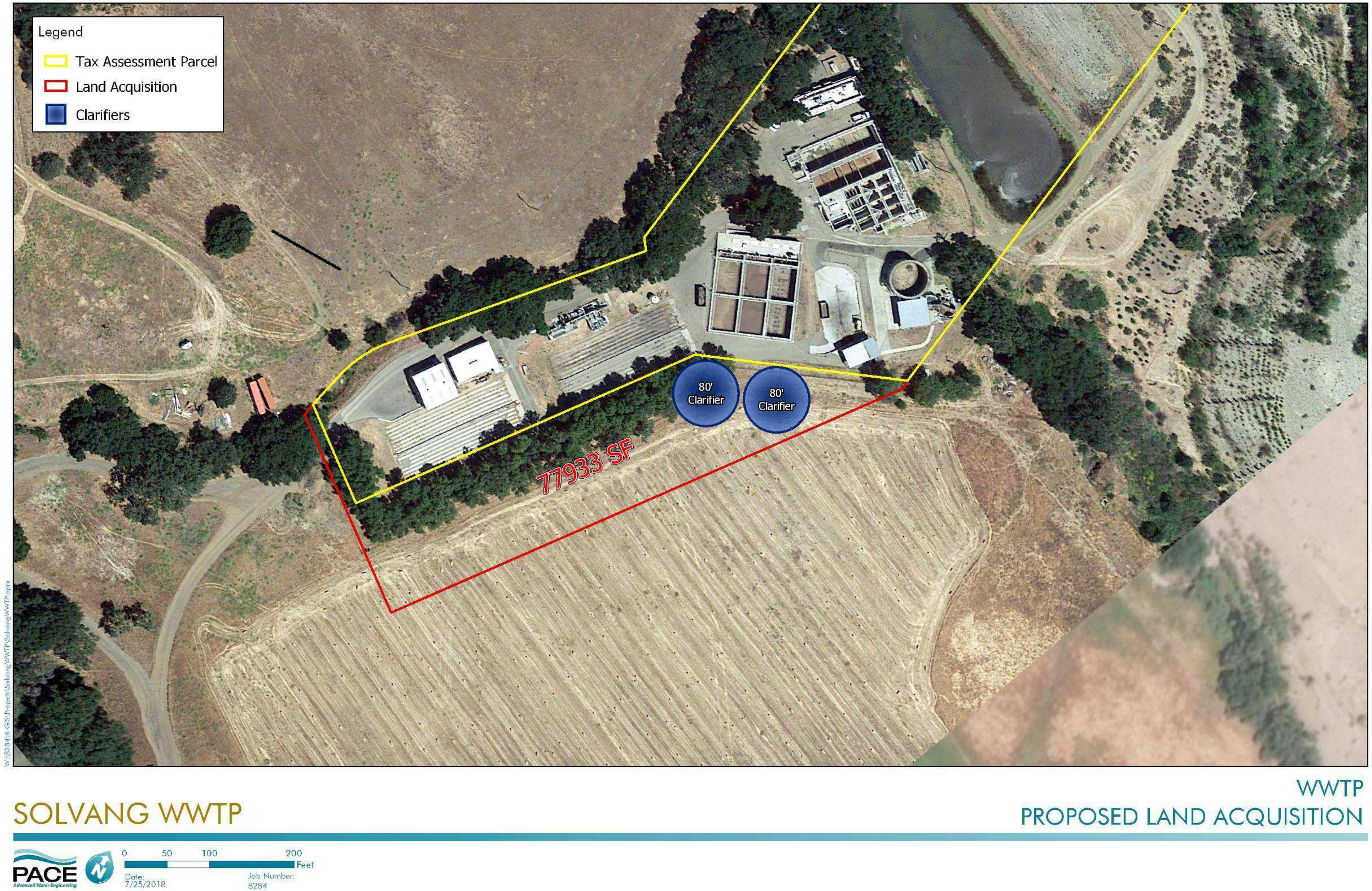


Figure 6-6: Alternative 2B – With Tertiary Process Improvement Plan

Figure 6-7: Land Acquisition Map



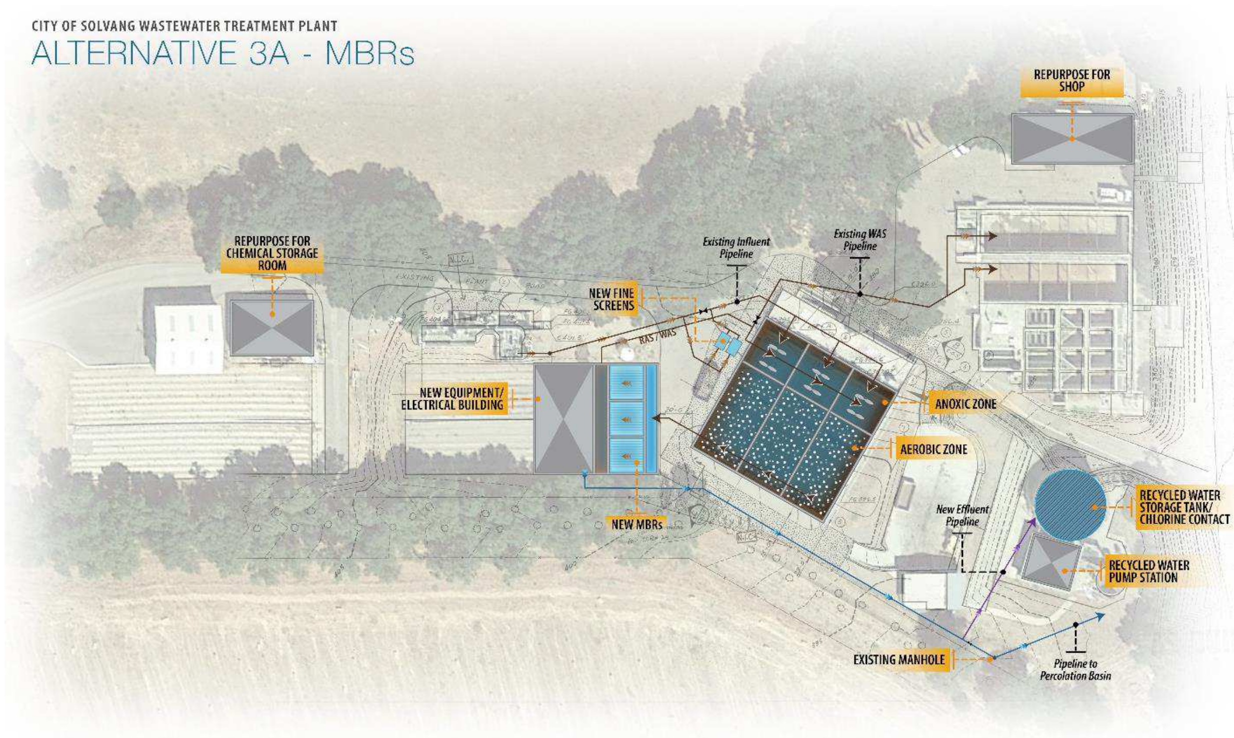


Figure 6-9: Alternative 3A - Improvement Plan

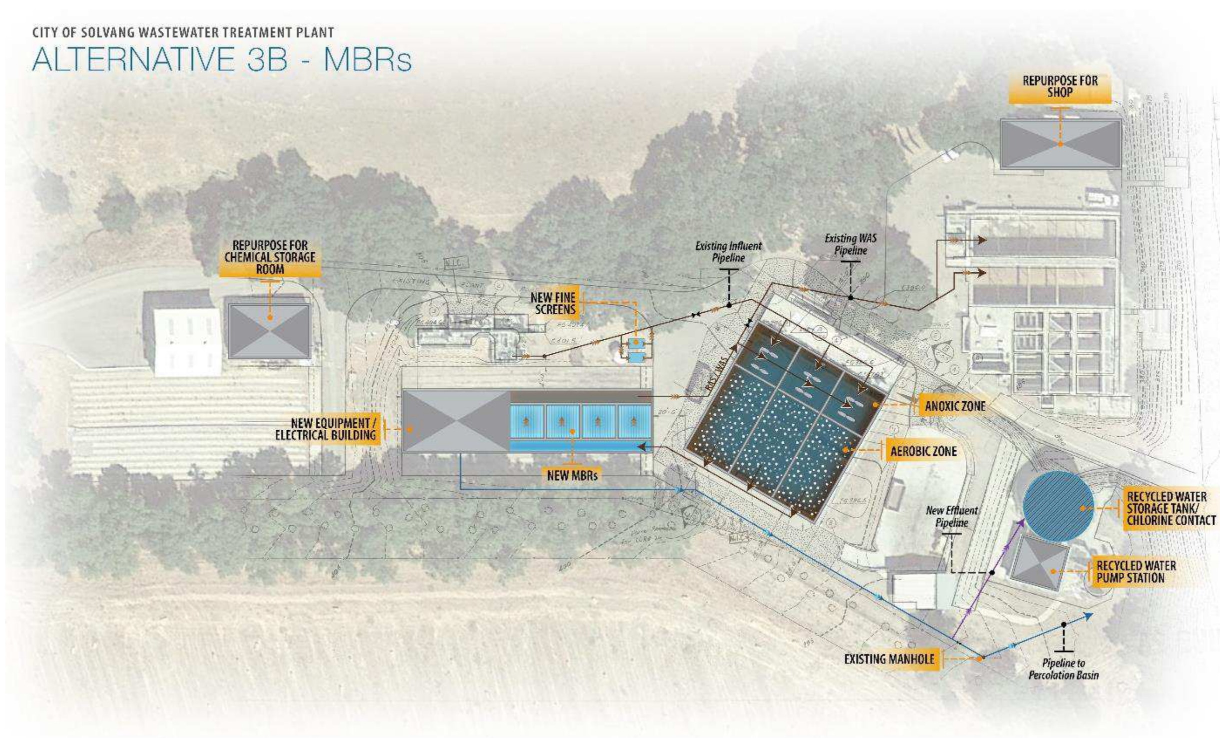


Figure 6-10: Alternative 3B - Improvement Plan

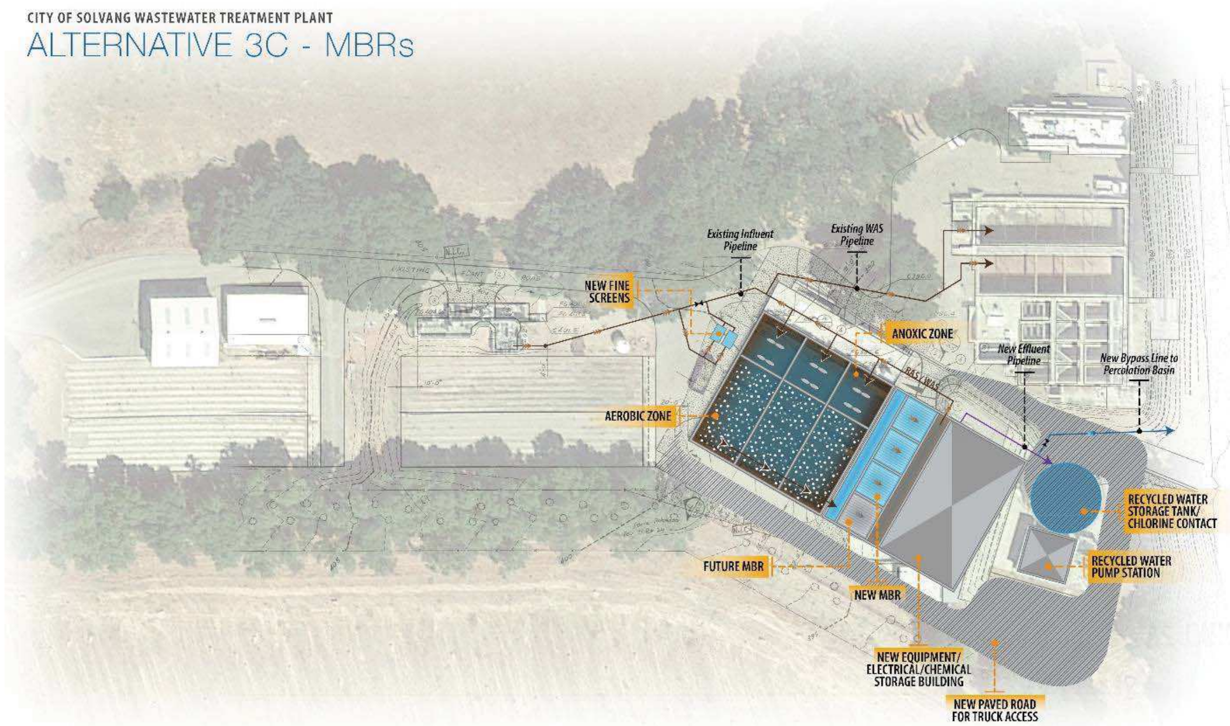


Figure 6-11: Alternative 3C - Improvement Plan

6.4 BioWin Proposed Alternatives Simulation Models

A computer model was developed to simulate each process alternative using existing secondary basins to determine the treatment capacity of the alternative. The input parameters are based on the current influent data with operational assumptions shown in Table 6-5. Each model simulates one out of three treatment trains. Therefore, it can be assumed that the overall capacity of all three treatment trains will be approximately equivalent to three times the capacity resulted from the single train model.

The Biowin simulations indicate that each alternative resulted in different treatment capacities: Alternative 1) 1.5 MGD, Alternative 2) 1.7 MGD and Alternative 3) 2.0 MGD. These capacities are the actual secondary treatment capacity when the current plant is converted using the *existing secondary tanks only*. The simulation results suggest that all three alternatives would meet the near-term treatment capacity goal of 1.5 MGD, however, additional improvements (4^{th} SBR for Alternative 1 and 4^{th} secondary basin for Alternative 2) as proposed in Figure 6-2, Figure 6-4, Figure 6-5 and Figure 6-6 are required to increase capacity to meet long-term treatment capacity goal of 2.0 MGD.

Alternative 1 simulation model is depicted as Figure 6-12. In order to simulate a single train, the EQ/anoxic volume was reduced by half. The duration of each batch cycle is 6 hours with 4 hours for Fill/React and 2 hours for Settle/Decant. This Alternative 1 operation provides a maximum treatment capacity of 1.5 MGD with all trains in service. Implementing the new EQ/anoxic basin in Alternative 1 compared to existing operation will provide the additional treatment capacity to increase available treatment from 0.9 MGD to 1.5 MGD, and will meet the new permit nitrogen limits.

ATTACHMENT C

SANTA YNEZ COMMUNITY SERVICES DISTRICT

Mailing Address: P.O. Box 667, Santa Ynez, CA 93460-0667 • (805) 688-3008

April 2, 2019

Matt van der Linden, PE
411 Second St.
Solvang, CA 93463

Subject: Additional Capacity in the City of Solvang Wastewater Treatment Plant

Dear Matt:

In response to your letter dated September 17, 2018 asking the District for written confirmation of the District's desire to purchase additional capacity, the District has completed an analysis of its existing and future capacity needs and at this time the District believes it current capacity entitlement of 300,000 gallons ADWF gives the District sufficient capacity for its existing and future capacity needs and that it will not need to purchase any additional capacity.

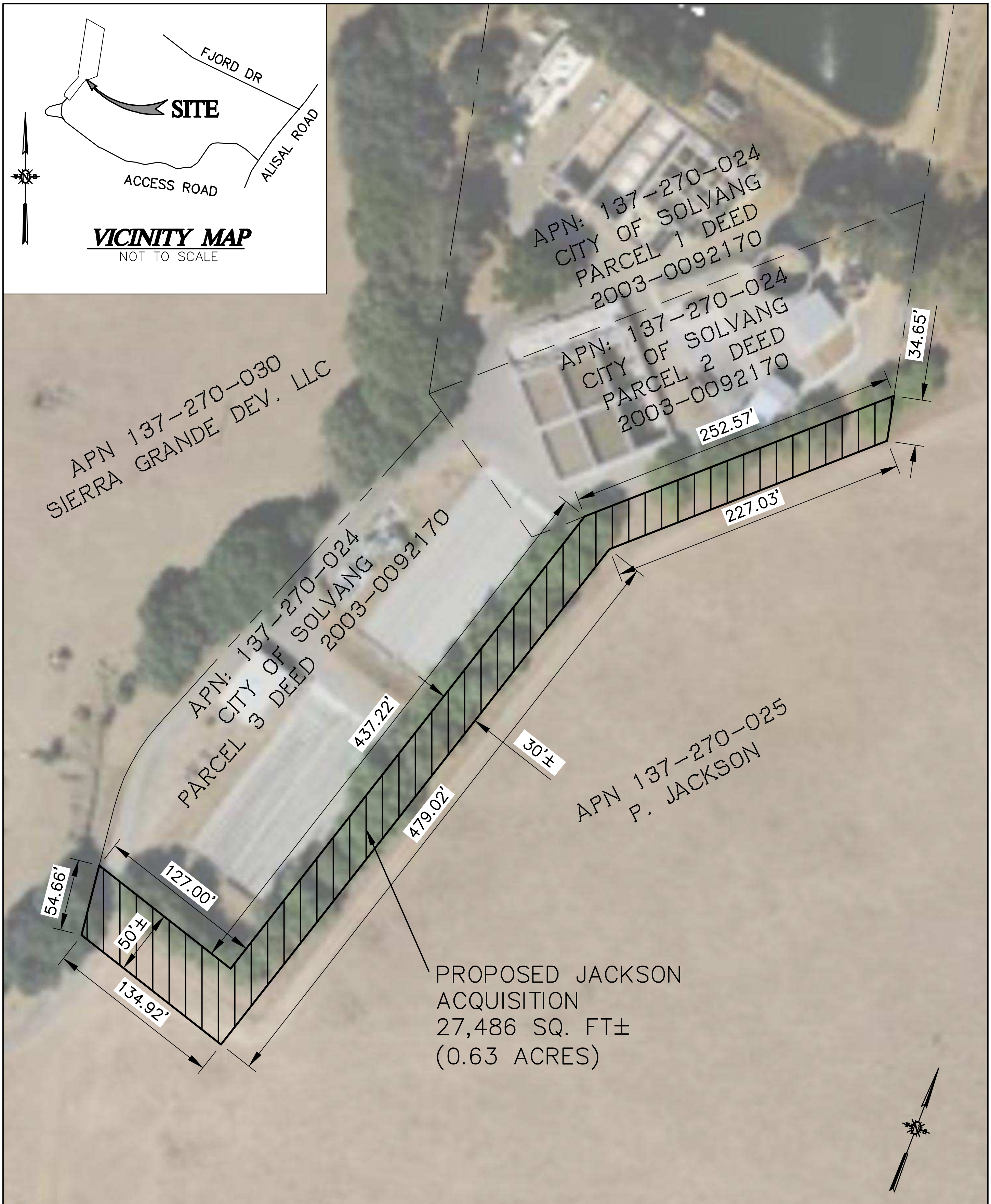
The District looks forward to working with the City in the future funding and upgrade of the Solvang Plant.

Sincerely,

Jeff Hodge
General Manager

Cc: Mayor Ryan Toussaint
Chris Djernes
Rick Hayden – Interim City Manager

ATTACHMENT D



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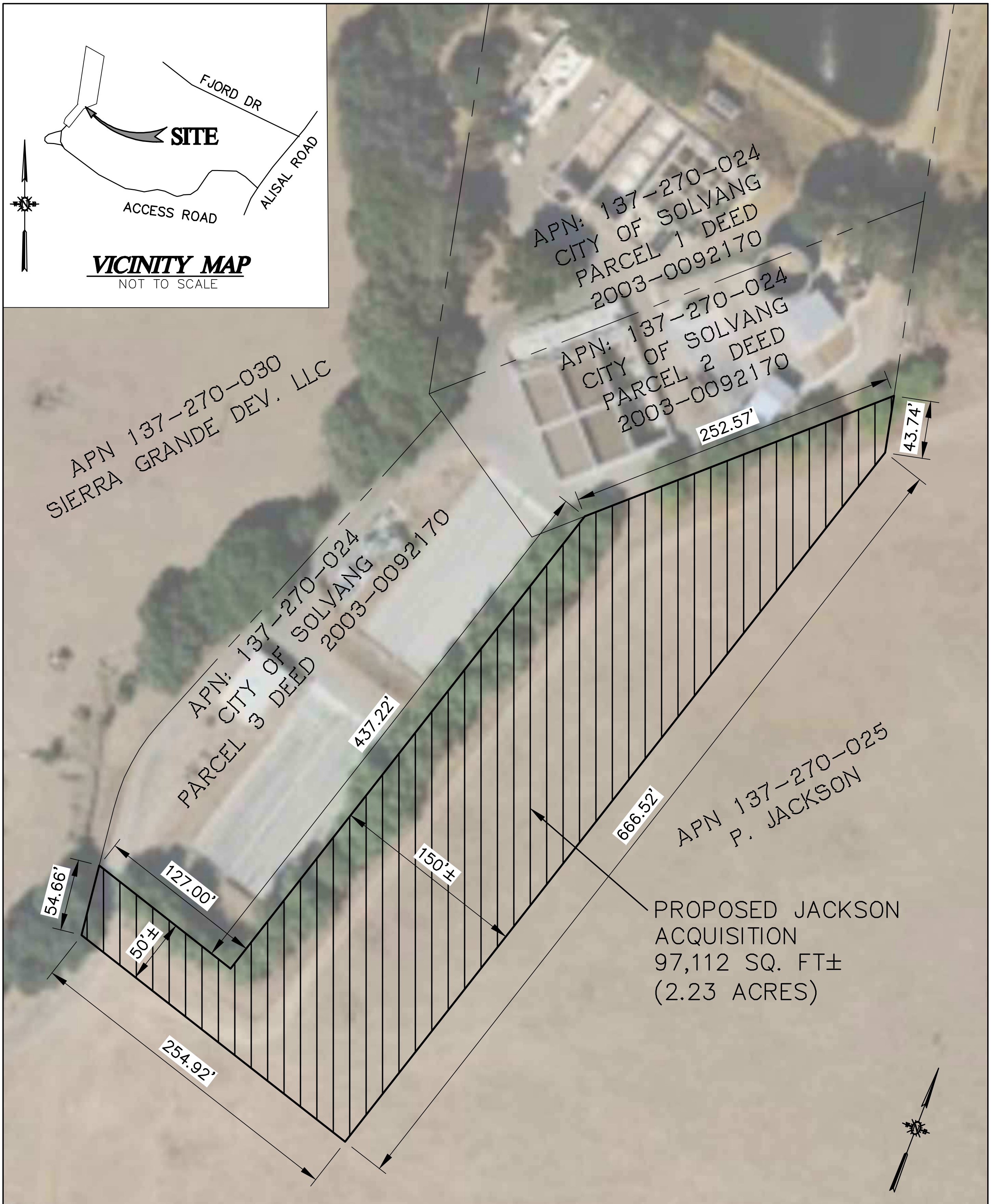
Cannon
1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.7407
F 805.544.3863

APPRAISAL EXHIBIT ALTERNATE 1 & 3
JACKSON ACQUISITION
CITY OF SOLVANG

SHEET 1 OF 1

DRAWN BY	CHECKED BY	SCALE	DATE
JB	BS	1"=100'	12/12/18



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Cannon
1050 Southwood Drive
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APPRAISAL EXHIBIT ALTERNATE 2
JACKSON ACQUISITION
CITY OF SOLVANG

SHEET 1 OF 1

DRAWN BY	CHECKED BY	SCALE	DATE
JB	BS	1"=100'	12/12/18